NO. 21 OF 2013

THE CIVIL AVIATION ACT

SUBSIDIARY LEGISLATION

List of Subsidiary Legislation

Page

CIVIL AVIATION (CHARGES FOR AIR NAVIGATION SERVICES) REGULATIONS, 2014

ARRANGEMENT OF SECTIONS

CIVIL AVIATION (CHARGES FOR AIR NAVIGATION SERVICES) REGULATIONS, 2014

[Legal Notice 46 of 2014]

1. Citation

These Regulations may be cited as the Civil Aviation (Charges for Air Navigation Services) Regulations, 2014.

2. Interpretation

In these Regulations, unless the context otherwise requires-

"Flight Information Region" means the area under the jurisdiction of the Area Control Centre at Nairobi;

"Flight" means-

(a) in the case of an aircraft, from the moment when it first moves for the purposes of taking off until the moment when it comes to rest after landing;

(b) in the case of a free balloon, from the moment when it first becomes detached from the surface until the moment when it next becomes attached thereto or comes to rest thereon.

"maximum takeoff mass", in relation to an aircraft, means the maximum total mass of the aircraft and its contents at which the aircraft may take off in accordance with the certificate of aircraft.

3. Charges

(1) There shall be paid to the Authority by the owner of an aircraft making a flight in the Flight Information Region, and airspace in Kenya outside the Flight Information Region the charges prescribed in respect of air navigation services provided by the Authority.

(2) The charges shall be paid in respect of each flight in the Flight Information Region, and airspace in Kenya outside the Flight Information Region of an aircraft at the rates and in the manner determined and notified by the Cabinet Secretary.

4. Proof of flight and maximum take off mass.

(1) An entry in the aircraft movement log-book at the Air Control Units shall be *prima facie* proof that the particular aircraft was within the airspace over Kenya at the time recorded in the aircraft movement data.

(2) The maximum take off mass as indicated in the certificate of airworthiness shall be *prima facie* proof of the maximum take off mass of the aircraft.

5. Recovery Charges

Any charges to be paid shall constitute a debt to the Authority and if any amount due and demanded for by the Authority remains unpaid beyond the time specified for payment, the Authority may recover the debt using legal means.

6. Detention of aircraft

(1) Notwithstanding that charges may not yet have been sent to the owner under Regulation 3 paragraph (2), the Director-General or any person authorized by him, in writing, in that regard, may detain any aircraft whose owner has refused or neglected to pay the prescribed charges payable.

(2) Any aircraft which has been detained under paragraph (1) of this regulation shall be released upon payment, in full, of the charges owing.

(3) The Director-General and any person authorized by him under paragraph (1) shall not be liable to any suit or other proceedings on account of any act performed by him under paragraph (1).

7. Exemption from payment of charges

The Cabinet secretary may, upon a request made in writing to the Director-General, exempt in writing an owner of an aircraft making flights from the payment of the prescribed charges for any of the following purposes-

(a) testing of aircraft ;

(b) the search for, or relief or rescue of, persons or aircraft in distress ; or

(c) such other purposes as the Cabinet Secretary may approve.

UNTITLED

[Legal Notice 148 of 2015]

[This is a stub. Please see the publication document for the original content.]

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[Legal Notice 190 of 2015]

[This is a stub. Please see the publication document for the original content.]

CIVIL AVIATION (AIRWORTHINESS) REGULATIONS, 2018

ARRANGEMENT OF SECTIONS

CIVIL AVIATION (AIRWORTHINESS) REGULATIONS, 2018

[Legal Notice 90 of 2018]

PART I – PRELIMINARY PROVISIONS

1. Citation

These Regulations may be cited as the Civil Aviation (Airworthiness) Regulations, 2018 and shall come into operation on such date as the Cabinet Secretary may, by notice in the *Gazette*, appoint.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"acceptable" means the Authority has reviewed the method, procedure, or policy and has neither objected to nor approved its proposed use or implementation;

"Act" means the Civil Aviation Act, 2013;

"aeronautical product" means any aircraft, aircraft engine, propeller or subassembly, appliance, material, part or component to be installed thereon;

"aeroplane" means a power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight;

"aerial work" means an aircraft operation in which an aircraft is used for specialized services such as agriculture, construction photography, surveying, observation and patrol, search and rescue, aerial advertisement etc.;

"aircraft" means any machine that derives support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface;

"aircraft component" means any component part of an aircraft up to and including a complete engine or any operational or emergency equipment;

"aircraft type" means all aircraft of the same basic design;

"airframe" means the fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces (including rotors but excluding propellers and rotating airfoils of a engine), and landing gear of an aircraft, accessories and controls;

"airworthy" means the status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation;

"anticipated operating conditions" means those conditions which are known from experience or which can be reasonably envisaged to occur during the operational life of the aircraft, taking into account the operations for which the aircraft is made eligible, the conditions so considered being relative to the meteorological state of the atmosphere, to the configuration of terrain, to the functioning of the aircraft, to the efficiency of personnel and to all the factors affecting safety in flight. Anticipated operating conditions do not include—

Those extremes which can be effectively avoided by means of operating procedures; and those extremes which occur so infrequently that to require the Standards to be met in such extremes would give a higher level of airworthiness than experience has shown to be necessary and practical;

"appliance" means any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, engine or propeller;

"appropriate airworthiness requirements" means the comprehensive and detailed airworthiness codes established, adopted or accepted by a Contracting State for the class of aircraft, engine or propeller under consideration;

"approved" means accepted by the appropriate authority as suitable for a particular purpose;

"approved by the Authority" means approved by the Authority directly or in accordance with a procedure approved by the Authority;

"approved data" means technical information approved by the Authority;

"Approved Maintenance Organisation (AMO)" means an organisation approved to perform specific aircraft maintenance activities by the Authority;

"approved aircraft maintenance programme" means a maintenance programme approved by the Authority;

"associated aircraft systems" means aircraft systems drawing electrical or pneumatic power from an auxiliary power unit during ground operations;

"Authority" means the Kenya Civil Aviation Authority;

"Auxiliary Power-Unit (APU)"means a self-contained power-unit on an aircraft providing electrical or pneumatic power to aircraft systems during ground operations;

"balloon" means a non-power-driven lighter-than-air aircraft;

"bypass ratio" means the ratio of the air mass flow through the bypass ducts of a gas turbine engine to the air mass flow through the combustion chambers calculated at maximum thrust when the engine is stationary in an international standard atmosphere at sea level;

"calendar day" means the period of elapsed time using Coordinated Universal Time or local time that begins at midnight and ends 24 hours later in the next midnight;

"certificate of release to service" means a document containing a certification that inspection and maintenance work has been performed satisfactorily in accordance with the methods prescribed by the Authority;

"continuing airworthiness" means the set of processes by which an aircraft, engine, propeller or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life;

"date of manufacture or construction" means the date of issue of the document attesting that the individual aircraft or engine as appropriate conforms to the requirements of the type or the date of an analogous document;

"design landing mass" means the maximum mass of the aircraft at which, for structural design purposes. it is assumed that it will be planned to land;

"design take-off mass" means the maximum mass at which the aircraft, for structural design purposes, is assumed to be planned to be at the start of the take-off run;

"design taxing mass" means the maximum mass of the aircraft at which structural provision is made for load liable to occur during use of the aircraft on the ground prior to the start of take-off;

"dry lease" means a lease of an aircraft without crew;

"engine" means a unit used or intended to be used for aircraft propulsion, consisting of at least those components and equipment necessary for functioning and control, but excludes the propeller (if applicable);

"facility" means a physical plant, including land, buildings, and equipment, which provide the means for the performance of maintenance, preventive maintenance or modifications of any article;

"factor of safety" means design factor used to provide for the possibility of loads greater than those assumed, and for uncertainties in design and fabrication;

"flight time aeroplane" means the total time from the moment an aeroplane first moves for the purpose of taking off until the moment it comes to rest at the end of the flight;

"flight time helicopters" means the total time from the moment the helicopter blades start turning until the moment the helicopter finally comes to rest at the end of the flight and the rotor blades are stopped;

"glider" means a non-power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces, which remain fixed under given conditions of flight;

"heavier-than-air aircraft" means any aircraft deriving its lift in flight chiefly from aerodynamic forces;

"helicopter" means a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on a substantially vertical axis;

"human performance" means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;

"inspection" means the examination of an aircraft or aircraft component to establish conformity with a standard approved by the Authority;

"landing surface" means that part of the surface of an aerodrome which the aerodrome authority has declared available for the normal ground or water run of aircraft landing in a particular direction;

"limit loads" means the maximum loads assumed to occur in the anticipated operating conditions;

"load factor" means the ratio of a specified load to the weight of the aircraft, the former being expressed in terms of aerodynamic forces, inertia forces, or ground reactions;

"maintenance" means that the performance of tasks required to ensure the continuing airworthiness of an aircraft, including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair;

"Maintenance Control Manual" means a manual containing procedures, instructions and guidance for use by maintenance and concerned operational personnel in the execution of their duties;

"maintenance programme" means a document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies;

"major modification" means a type design change not listed in the aircraft, aircraft engine, or propeller specifications that might appreciably affect the mass and balance limits, structural strength, performance, power plant operation, flight characteristics, or other qualities affecting airworthiness or environmental characteristics or that will be embodied in the product according to non-standard practices;

"major repair" means a repair of an aeronautical product that might appreciably affect the structural strength, performance, power plant, operation flight characteristics or other qualities affecting airworthiness or environmental characteristics or that will be embodied in the product using non-standard practices;

"modification" means a change to the type design of an aircraft or aeronautical product which is not a repair;

"operator" means a person, organization or enterprise, engaged in or offering to engage in an aircraft organization;

"overhaul" means the restoration of an aircraft or aircraft component using methods, techniques and practices acceptable to the Authority, including disassembly, cleaning and inspection as permitted, repair as necessary, and reassembly; and testing in accordance with approved standards and technical data, or in accordance with current standards and technical data acceptable to the Authority, which have been developed and documented by the State of Design, holder of the type certificate, supplemental type certificate, or a material, part, process, or appliance approval under Parts Manufacturing Authorisation (PMA) or Technical Standard Order (TSO);

"performance Class 1 helicopter" means a helicopter with performance such that, in case of engine failure, it is able to land on the rejected take-off area or safely continue the flight to an appropriate landing area;

"performance Class 2 helicopter" means helicopter with performance such that, in case of engine failure, it is able to safely continue the flight, except when the failure occurs prior to a defined point after take-off or after a defined point before landing, in which cases a forced landing may be required;

"performance Class 3 helicopter" means that a helicopter with performance such that, in case of engine failure at any point in the flight profile, a forced landing must be performed;

"power plant" means the system consisting of all the engines, drive system components (if applicable), propellers (if installed), their accessories, ancillary parts, fuel and oil systems installed on an aircraft but excluding the rotors of a helicopter;

"prescribed" means the Authority has issued written policy or methodology which imposes either a mandatory requirement, if the written policy or methodology states "shall," or a discretionary requirement if the written policy or methodology states "may";

"preventive maintenance" means simple or minor preservation operations and the replacement of small standard parts not involving complex assembly operations;

"propeller" means a device for propelling an aircraft that has blades on an engine driven shaft and that when rotated, produces by its action on the air, a thrust approximately perpendicular to its plane of rotation; it includes control components normally supplied by its manufacturer, but does not include main and auxiliary rotors or rotating airfoils of engine;

"rating" means an authorizations entered into or associated with a license or certificate and forming part thereof, stating special conditions, privileges or limitations pertaining to such license or certificate;

"rebuild" means the restoration of an aircraft or aircraft component by using methods, techniques, and practices acceptable to the Authority, when it has been disassembled, cleaned, inspected as permitted, repaired as necessary, reassembled, and tested to the same tolerances and limits as a new item, using either new parts or used parts that conform to new part tolerances and limits;

"rendering (a Certificate of Airworthiness) valid" means that the action taken by a Contracting State, as an alternative to issuing its own Certificate of Airworthiness, in accepting a Certificate of Airworthiness issued by any other Contracting State as the equivalent of its own Certificate of Airworthiness;

"repair" means restoration of an aeronautical product to an airworthy condition and to ensure that the aircraft continues to comply with the design aspects of the airworthiness requirements used for the issue of a type certificate, for that aircraft type, after the aircraft has been damaged or subjected to wear;

"satisfactory evidence" means a set of documents or activities that a Contracting State accepts as sufficient to show compliance with an airworthiness requirement;

"signature" means an individual's unique identification used as a means of authenticating any record entry or a maintenance record; a signature may be hand-written, electronic or any other form acceptable to the Authority;

"smoke" means—

(a) hot vapor or cloud like gases or visible gaseous or soot containing fine particles of carbon being produced by combustion; or

(b) the carbonaceous materials in exhaust emissions which obscure the transmission of light;

"specific operating provisions" means a document describing the ratings, Class and or Limited, in detail and containing or referencing material and process specifications used in performing repair work, along with any limitations applied to the approved maintenance organisation;

"standard" means an object, artefact, tool, test equipment, system or experiment that stores, embodies, or otherwise provides a physical quantity which serves as the basis for measurement of the quantity; it also includes a document describing the operations and processes that must be performed in order for a particular end to be achieved;

"State of Design" means the State having jurisdiction over the organization responsible for the type design;

"State of Manufacture" means a Contracting State under whose authority an aircraft was assembled, approved for compliance with the type certificate and all extant supplemental type certificates, test flown and approved for operation; the state of manufacture may or may not also be the state of design;

"State of Registry" means a Contracting State on whose register an aircraft is entered;

"tribunal" means the National Civil Aviation Administrative Review Tribunal established under section 66 of the Act;

"Type Certificate" means a document issued by a Contracting State to define the design of an aircraft type and to certify that this design meets the appropriate airworthiness requirements of that State; and

"validation" means confirmation by a contracting state on the basis of satisfactory evidence that the specific intended use or application complies with the requirements or standards of the state.

3. Application

These Regulations shall apply to all persons operating or maintaining the following—

(a) Kenyan registered aircraft, wherever operated;

(b) Aircraft registered in another Contracting State that are operated by a person licensed in Kenya, and must be maintained in accordance with the standards of the aircraft State of Registry, wherever that maintenance is performed; and

(c) Aircraft of other Contracting States operating in Kenya.

PART II – AIRCRAFT AND COMPONENT ORIGINAL CERTIFICATION AND SUPPLEMENTAL TYPE CERTIFICATES

4. Acceptance of type of certificate

(1) The Authority may accept a type certificate or Equivalent of type document issued by a state of design in respect of an aircraft or certificate aircraft component if—

(a) the type certificate or equivalent document was issued based on an airworthiness code recognized by the Authority; or

(b) the design, materials, construction equipment, performance and maintenance of aircraft or aircraft component technical evaluation against a recognized airworthiness code has been carried out by the Authority and has been found to—

(i) meet the required standards of the recognized airworthiness code; or

(ii) has complied with any recommendations required by the Authority.

(2) Upon acceptance of the type certificate by the Authority, the Authority may, prior to issue of certificate of airworthiness or restricted certificate of airworthiness, require the applicant to comply with any additional requirements as prescribed by the Authority.

(3) In this regulation, recognized airworthiness code means standards relating to the design, materials, construction equipment, performance and maintenance of aircraft or aircraft component issued by the State of Design and accepted and prescribed by the Authority.

5. Acceptance of production

Authority shall only accept application for production of aircraft or aircraft component if the Authority is satisfied that—

(a) the work to be undertaken conforms to the specified design as approved by the State of Design;

(b) there is in place a suitable arrangement with the holder of a type certificate which ensures satisfactory co-ordination between production and design; and

(c) there is acceptable arrangement for oversight by the State of Design.

6. Issue of supplemental type certificate

(1) A person who alters a product by introducing a major modification in type design, not great enough to require a new application for a type certificate, shall apply for a supplemental type certificate to the regulatory agency of the State of Design that approved the type certificate for that product, or to the State of Registry of the aircraft.

PART III – CERTIFICATES OF AIRWORTHINESS

7. Application for certificate of airworthiness

(1) An owner of an aircraft registered in Kenya or an agent of the owner may apply to the Authority for issue of a certificate of airworthiness for that aircraft.

(2) An applicant for a certificate of airworthiness shall apply on a form prescribed by the Authority.

8. Certificate of airworthiness to be in force

(1) A person shall not fly an aircraft unless there is in force in respect of that aircraft, a certificate of airworthiness or restricted certificate of airworthiness or a special flight permit duly issued or rendered valid under the law of the State of Registry and any conditions subject to which the certificate was issued or rendered valid are complied with.

(2) The Certificate of Airworthiness shall contain Information in the First Schedule to these Regulations.

9. Classifications of certificates of airworthiness

The certificates of airworthiness shall be classified as follows—

(a) a certificate of airworthiness;

(b) a restricted certificate of airworthiness in the form of a restricted certificate;

(c) a special flight permit; and

(d) export certificate of airworthiness

10. Amendment of Certificates of airworthiness

The Authority may amend or modify any type of certificate of airworthiness issued under these Regulations upon application by the owner, operator or on the Authority's own initiative.

11. Surrender of certificate of airworthiness

An owner of an aircraft who sells the aircraft shall surrender the certificate of airworthiness or restricted certificate of airworthiness or special flight permit as applicable—

(a) to the buyer upon sale of the aircraft within Kenya; or

(b) to the Authority in the case of aircraft sold outside Kenya.

12. Validity and renewal of a Certificate of airworthiness

(1) A certificate of airworthiness or restricted certificate of airworthiness issued under these Regulations shall be valid for 12 months from the date of issue.

(2) The certificates referred to in sub-regulation (1) above shall be valid from the dates of issue for the periods specified unless—

(a) a shorter period is specified by the Authority;

(b) the Authority amends, extends, suspends, revokes or otherwise terminates the certificate; and

(c) the aircraft owner or operator surrenders the certificate to the Authority.

(3) A special flight permit shall be valid for a period of time specified in the permit.

(4) A certificate of airworthiness or restricted certificate of airworthiness issued in respect of an aircraft shall cease to be in force if—

(a) the aircraft or such of its equipment as is necessary for the airworthiness of the aircraft is maintained or if any part of the aircraft or such equipment is removed or is replaced, otherwise than in a manner and with material of a type approved by the Authority either generally or in relation to a class of aircraft or to the particular aircraft.

(b) the aircraft or any of its equipment is not maintained as required by the maintenance programme or schedule approved by the Authority in relation to that aircraft;

(c) an inspection or modification classified as mandatory by the Authority applicable to the aircraft or of any such equipment as aforesaid, has not, been completed to the satisfaction of the Authority; or

(d) the aircraft or any such equipment as aforementioned sustains damage and the damage is ascertained during inspection which affects the airworthiness of the aircraft.

(5) An application for renewal of a certificate of airworthiness shall be made in a form and manner prescribed by the Authority at least sixty days before the expiry of the certificate.

13. Aircraft identification

An applicant for a certificate of airworthiness or a restricted certificate of airworthiness or special flight permit shall show that the aircraft is properly registered and marked and has identification plates affixed to the aircraft.

14. Issue of certificates of airworthiness

(1) A certificate of airworthiness shall be issued for certificates of aircraft in the specific category and model designated by the state of design in the type certificate.

(2) The Authority shall issue a certificate of airworthiness if—

(a) the applicant presents evidence to the Authority that the aircraft conforms to a type design approved under a type certificate or a supplemental type

certificate and to the applicable airworthiness directives of the state of manufacture or design;

(b) the aircraft has been inspected in accordance with the performance rules of these Regulations for inspections and found airworthy by persons authorised by the Authority to make such determinations within the last thirty days;

(c) the Authority finds, after an inspection, that the aircraft conforms to type design and is in condition for safe operation;

(d) the aircraft when operated in accordance with the requirements specified in the flight manual or equivalent document for the aircraft conforms to the approved type specifications specified in the approved type certificate or equivalent document;

(e) the maintenance determined by the Authority as a prerequisite for issue of a certificate of airworthiness has been carried out and certified by a person acceptable to the Authority in accordance with these Regulations;

(f) the results of flying trials, and such other tests of the aircraft as the authority may require are complied with the aircraft as the Authority may require, are complied with; and

(g) the applicant submits an Export Certificate of Airworthiness that shall be valid for 45 days from the date of issue or satisfactory evidence of airworthiness status of the aircraft as applicable issued by the state of manufacture or previous state of registry or satisfactory evidence, in whole or in part, that the aircraft complies with the applicable Standards of the regulation and compliance with the appropriate airworthiness requirements.

(3) The Authority may issue a certificate of airworthiness subject to such other conditions relating to the airworthiness of the aircraft as the Authority thinks fit.

(4) A certificate of airworthiness shall specify one of the following categories as are, in the opinion of the Authority, appropriate to the aircraft operation—

(a) commercial air transport (passenger);

(b) commercial air transport (cargo);

(c) general aviation; or

(d) aerial work.

(5) A certificate of airworthiness shall be issued subject to the condition that the aircraft shall be flown only for the following purposes—

(a) commercial air transport (passenger): any purpose;

(b) commercial air transport (cargo): any purpose other than commercial air transport of passengers;

(c) aerial work: purpose includes' such tasks as aerial photography, aerial survey (geological and ordinance survey), electrical power line and gas pipeline inspections, carriage of external loads and flight training. Aerial Work does not include the carriage of passengers for hire or reward. Aerial Work Permissions are specific to an operator and a nominated aircraft;

(d) general aviation: any purpose other than commercial air transport or aerial work.

(6) The Authority may in the process of issuing a certificate of airworthiness demand that reports be furnished by a person qualified to furnish such reports.

(7) The aircraft shall be subjected to such inspections and ground and flight tests as are deemed necessary by the State to show compliance with the design aspects of the appropriate airworthiness requirements.

15. Airworthiness directives and service bulletins

(1) A person shall not operate an aircraft or aircraft components to which an airworthiness directive applies except in accordance with the requirements of airworthiness directive.

(2) Upon registration of an aircraft in Kenya, the Authority shall notify the State of Design of the registration of the aircraft in Kenya, and request that the Authority receive all airworthiness directives addressing that aircraft, airframe, aircraft engine, propeller, appliance or component.

(3) Where the State of Design considers that a condition in an aircraft, airframe, engine, propeller, appliance or component is unsafe as shown by the issue of an airworthiness directive by that State, such directives shall apply to Kenyan registered aircraft of the type identified in that airworthiness directive.

(4) Where a manufacturer identifies a service bulletin as mandatory, such bulletin shall apply to a Kenyan registered aircraft of the type identified in that bulletin.

(5) The Authority may identify manufacturer's service bulletins and other sources of data or develop and prescribe inspections, procedures and limitations for mandatory compliance pertaining to affected aircraft in Kenya.

(6) A person shall not operate any Kenyan registered aircraft to which the measures of this regulation apply, except in accordance with the applicable directives and bulletins.

16. Issue of restricted certificates of airworthiness

(1) The Authority may issue a restricted certificate of airworthiness to the aircraft that does not qualify for a certificate of airworthiness including micro light, experimental amateur and kit built aircraft, an aircraft used for air races, aircraft flying for exhibition purpose, a kite and any non-type certificated aircraft.

(2) An aircraft holding a restricted certificate of airworthiness shall be subject to operating limitations within Kenya and shall not make international flights.

(3) The Authority shall issue specific operating limitations for each restricted certificate of airworthiness.

17. Issue of special flight permits

(1) The Authority may issue a special flight permit for an aircraft that is capable of safe flight but unable to meet applicable airworthiness requirements for the purpose of—

(a) flying to a base where weighing, painting, repairs, modifications, maintenance, or inspections are to be performed or to a point of storage;

(b) flying for the purpose of experimenting with or testing the aircraft including its engines and equipment;

(c) flying for the purpose of qualifying for the issue, renewal or validation of certificate of airworthiness or restricted certificate of airworthiness and the approval of a modification of the aircraft;

(d) delivering or exporting the aircraft;

(e) evacuating aircraft from areas of impending danger; and

(f) operating at mass in excess of the aircraft's maximum certified takeoff mass for flight beyond normal range over water or land areas where adequate landing facilities or appropriate fuel are unavailable with the excess mass limited to additional fuel, fuel-carrying facilities, and navigation equipment necessary for the flight.

(2) The Authority shall issue a special flight permit if the applicant submits—

(a) an application made in a form and manner prescribed by the Authority;

(b) a certificate of registration;

(c) a valid certificate of insurance,

a certificate of fitness for flight signed by an authorised person any other requirement requested by the authority.

18. Export Certificate of Airworthiness

(1) An owner of an aircraft registered in Kenya or an agent of the owner may apply to the Authority for issue of an export certificate of airworthiness for aeronautical products or article.

(2) The certificates of airworthiness shall be classified as follows—

(a) Class I product-complete aircraft engine or propeller which has been certificated;

(b) Class II product — a major component of Class I product such as a wing, fuselage and empennage service, the failure of which would jeopardize the safety of a class I product or any part, material or system thereof;

(c) Class III product-any product or component which is not a Class I or Class II product or standard part.

(3) An application for an export certificate of airworthiness shall be made on a form prescribed by the Authority at least 14 days before the intended date of export of the aircraft out of Kenya.

(4) The Authority shall issue an export certificate of airworthiness if—

(a) the applicant submits a statement of compliance with the full intents of the approved maintenance programme or schedule;

(b) the applicant submits a statement of compliance with the mandatory airworthiness directives and service bulletins applicable to the aircraft and its equipment;

(c) the aircraft has been inspected in accordance with the performance rules of these regulations and found airworthy by persons authorised by the Authority to make such determination within the last 14 days;

(d) the maintenance determined by the Authority as a prerequisite for issue of the export certificate of airworthiness has been carried out and certified by a person acceptable to the Authority in accordance with these regulations; the result of test flight, and such other tests as the Authority may determine are complied with;

(e) historical records establish the production, modification and maintenance standard of the aircraft; or

(f) a weight and balance report with a loading schedule, where applicable, for each aircraft in accordance with the applicable regulations is furnished to the Authority.

(5) Export certificate of airworthiness shall not be used for the purpose of flight but for confirmation of recent satisfactory review of the airworthiness status of the aircraft.

(6) Any extension or variations granted to an aircraft in accordance with an approved maintenance programme or schedule shall be automatically revoked before issue of the export certificate of airworthiness.

19. Conditions on the special flight permit

(1) A person shall not fly an aircraft on a special flight permit unless that person has complied with conditions of this Regulation.

(2) A person who flies an aircraft on a special flight permit referred to under regulation 17 shall ensure that—

(a) the flight is made under the supervision of a person approved by the Authority for such flight, subject to any additional conditions which may be specified in the permit;

(b) a copy of the permit is carried on board the aircraft at all times when the aircraft is operating under the conditions of the permit;

(c) operating under the conditions of the permit;

(d) the aircraft registration markings assigned to the aircraft are displayed;

(e) no persons or property are carried on board for hire or reward;

(f) only persons essential for the safe operation of the aircraft are carried on the aircraft and the person must be advised of the contents of the permit;

(g) the aircraft is operated only by flight crew holding appropriate license with sufficient experience to appreciate the reasons for the aircraft non-compliance to the prescribed airworthiness standards;

(h) the flight is conducted in accordance with applicable flight operating rules and procedures of the states of the intended routing;

(i) the routing is such that areas of heavy air traffic, areas of heavy human concentration of a city, town settlement or any other areas where the flight might create hazardous exposure to persons or property are avoided;

(j) the flight is performed in accordance to the performance limitations prescribed in the aircraft flight manual and any other limitation that the Authority may impose on such flight;

(k) all flights are conducted prior to the expiry date of the special flight permit or at any other time the Authority declares so in writing; and

(l) the aircraft shall not depart for the flight on a special flight permit unless the aircraft has on board authorizations from the State of intended routing.

(3) The operator shall inform the State on the conditions of the aircraft and intended flight and the operator must obtain their consent.

(4) The Authority shall require a properly executed

maintenance endorsement statement in the aircraft permanent record by an authorised person stating that the subject aircraft has been inspected and found to be safe for the intended flight.

(5) The special flight issued under these regulations shall be valid for a single flight as prescribed in the routing.

20. Certificate of fitness for flight

(1) A person shall not fly an aircraft for the purpose of flight testing after repair, modification or maintenance unless that aircraft has been issued with a Certificate of Fitness for Flight containing a maintenance endorsement statement.

(2) A certificate of fitness for flight shall be issued by an appropriate qualified person in accordance with these Regulations and the Civil Aviation (Personnel Licensing) Regulations.

(3) A certificate of fitness for flight is the basis under which the Authority may issue a special flight permit under regulation 17 for the purpose of allowing the aircraft to be ferried.

(4) A certificate of fitness for flight may be used as a basis for ferry or to flight test an aircraft after repair, modifications or maintenance as long as the aircraft does not make an international flight; and is not, for purposes of these Regulations, a certificate of airworthiness.

PART IV – CONTINUED AIRWORTHINESS OF AIRCRAFT AND AIRCRAFT COMPONENTS

21. Responsibility for maintenance

(1) An owner or operator of an aircraft shall be for responsible for maintaining the aircraft in an airworthy condition by ensuring that

(a) all maintenance which affect airworthiness are performed as prescribed by the State of Registry;

(b) maintenance personnel make appropriate entries in the aircraft maintenance records certifying that the aircraft is airworthy;

(c) the certificate of release to service is completed to the effect that the maintenance work performed has been completed satisfactorily and in accordance with the prescribed methods including an approved maintenance program as approved by the Authority; and

(d) in the event there are open discrepancies, the certificate of release to service includes a list of the uncorrected maintenance items which are made part of the aircraft permanent records.

(2) In the event that an aircraft registered in Kenya is continuously operated outside Kenya for a period exceeding thirty days, the owner or operator of the aircraft shall be responsible for maintaining the aircraft in an airworthy condition and ensuring that—

(a) notice in a form prescribed by the Authority, is given to the Authority prior to the aircraft undertaking such operations; and

(b) arrangements acceptable to the Authority for ongoing Inspection and oversight of the airworthiness of that aircraft are made.

(3) The operator of a helicopter of over 3,175 kg maximum mass shall monitor and assess maintenance and operational experience with respect to continuing airworthiness and provide the information as prescribed by the State of Registry and report through the system prescribed by the Authority.

22. Continuing airworthiness information

(1) An operator of an aircraft shall—

(a) monitor and assess maintenance and operational experience with respect to continuing airworthiness and provide the information as prescribed by the Authority;

(b) obtain and assess continuing airworthiness information and recommendations available from the organisation responsible for the type design and implement resulting actions considered necessary in accordance with a procedure acceptable to the Authority.

(2) Any failure to maintain an aircraft in an airworthy condition as defined by the appropriate airworthiness requirements shall render the aircraft ineligible for operation until the aircraft is restored to an airworthy condition.

(3) Information for use in developing procedures for maintaining the aeroplane in an airworthy condition shall be made available.

(4) Maintenance information shall include a description of the aeroplane and recommended methods for the accomplishment of maintenance tasks. Such information shall include guidance on defect diagnosis and ageing aircraft maintenance requirements.

(5) Maintenance programme information shall include the maintenance tasks and the recommended intervals at which these tasks are to be performed

23. Responsibilities of the Authority on continuing airworthiness

(1) The Authority shall—

(a) ensure that, when it first enters on its register an aircraft of a particular type for which it is not the State of Design and issues or validates a Certificate of Airworthiness in regulation 14, and it shall notify the State of Design that it has entered such an aircraft on its register;

(b) determine the continuing airworthiness of an aircraft in relation to the appropriate airworthiness requirements in force for that aircraft;

(c) develop or adopt requirements to ensure the continuing airworthiness of the aircraft during its service life, including requirements to ensure that the aircraft

(i) continues to comply with the appropriate airworthiness requirements after a modification, a repair or the installation of a replacement part; and

(ii) is maintained in an airworthy condition and in compliance with the maintenance requirements of Civil Aviation (Air Operator Certificate And Administration) Regulations, and theses, this Regulations;

(d) ensure that the operator continues to comply with the appropriate airworthiness requirements after a modification, a repair or the installation of a replacement part; and

(e) ensure that the aircraft is maintained in an airworthy condition and in compliance with the maintenance requirements of Part V of the Civil Aviation (Air Operator Certification and Administration) Regulations and these Regulations;

(f) upon receipt of mandatory continuing airworthiness information from the State of Design, adopt the mandatory information directly or assess the information received and take appropriate action;

(g) ensure that all mandatory continuing airworthiness information which it, as the Authority, originated in respect of that aircraft, is transmitted to the appropriate State of Design; and

(h) ensure that, in respect of aeroplane over 5 700 kg and helicopters over 3 175 kg maximum certificated take-off mass, there exists a system whereby information on faults, malfunctions, defects and other occurrences that cause or might cause adverse effects on the continuing airworthiness of the aircraft is transmitted to the organization responsible for the type design of that aircraft.

(2) Whenever this information relates to an engine or propeller, such information shall be transmitted to both the organization responsible for engine or propeller type design and the organization responsible for aircraft type design. Where a continuing airworthiness safety issue is associated with a modification, the Authority shall ensure that there exists a system whereby the above information is transmitted to the organization responsible for the design of the modification.

(3) When an aircraft has sustained damage, the Authority shall judge whether the damage is of a nature such that the aircraft is no longer airworthy as defined by the appropriate airworthiness requirements.

(4) If the damage is sustained or ascertained when the aircraft is in the territory of another Contracting State, the authorities of the other Contracting State shall be entitled to prevent the aircraft from resuming its flight on the condition that they shall advise the State of Registry immediately, communicating to it all details necessary to formulate the judgment referred to in (2).

(5) When the Authority considers that the damage sustained is of a nature such that the aircraft is no longer airworthy, it shall prohibit the aircraft from resuming flight until it is restored to an airworthy condition and the Authority may, in exceptional circumstances, prescribe particular limiting conditions to permit the aircraft to fly a non-commercial air transport operation to an aerodrome at which it will be restored to an airworthy condition.

(6) In prescribing particular limiting conditions the Authority shall consider all limitations proposed by the Contracting State that had originally, in accordance with this regulation, prevented the aircraft from resuming its flight and the Contracting State shall permit such flight or flights within the prescribed limitations.

(7) When the Authority considers that the damage sustained is of a nature such that the aircraft is still airworthy, the aircraft shall be allowed to resume its flight.

24. Compliance with the manufacturer's instructions

An aircraft registered in Kenya shall not engage in any operations, unless—

(a) the aircraft, including its engines, equipment and radios has been maintained in accordance with the approved maintenance programme and maintenance procedures recommended by the aircraft manufacturer;

(b) a certificate of release to service has been completed and signed by a licensed aircraft maintenance engineer to certify that all maintenance work has been completed satisfactorily and in accordance with the approved maintenance programme and procedures; and

(c) there is an accepted aircraft flight manual, pilot operating handbook or owner's manual available in the aircraft for the use of the flight crew, containing the limitations within which the aircraft is considered airworthy, together with such additional instructions and information as may be necessary to show compliance with the specified regulations relating to performance and for the safe operation of the aircraft, except that if the aircraft has a maximum take - off certificated mass of 5,700 kg or less, the limitations may be made available by means of placards or other documents accepted by the Authority.

25. Safety and survival equipment

An operator shall ensure that—

(a) prescribed safety and survival equipment that the crew or passengers are expected to use are accessible and easily identified, and its method of operation are clearly marked;

(b) the aircraft shall be equipped to provide the crew and occupants with the maximum opportunity to survive in the expected external environment for a reasonable time-span and items to be considered shall include—

(i) number of life rafts and life jackets;

(ii) survival equipment suited to the likely environment;

(iii) emergency radios and pyrotechnical distress signaling equipment; and

(iv) automatic emergency radio beacons.

26. Reporting of failures, malfunctions, and defects

(1) An owner or operator of an aircraft registered in Kenya shall report to the Authority any failures, malfunctions, or defects that may result in at least one of the following—

(a) fires during flight and whether the related fire-warning system properly operated;

(b) fires during flight not protected by a related fire-warning system;

(c) false fire warning during flight;

(d) an engine exhaust system that causes damage during flight to the engine, adjacent structure, equipment, or components;

(e) an aircraft component that causes accumulation or circulation of smoke, vapor, or toxic or noxious fumes in the crew compartment or passenger cabin during flight;

(f) engine shutdown during flight because of flameout;

(g) engine shutdown during flight when external damage to the engine or aircraft structure occurs;

(h) engine shutdown during flight due to foreign object ingestion or icing;

(i) shutdown during flight of more than one engine on a multi-engine aircraft;

(j) a propeller feathering malfunction or inability of the system to control over-speed during flight;

(k) a fuel or fuel-dumping system malfunction that affects fuel flow or causes hazardous leakage during flight;

(l) an uncommanded landing gear extension or retraction, or opening or closing of landing gear doors during flight;

(m) brake system components malfunction that result in loss of brake actuating force when the aircraft is in motion on the ground;

(n) aircraft structure damage that requires major repair;

(o) failure or malfunction of any flight control system, flap, Slat or spoiler;

(p) any excessive unscheduled removals of essential equipment on account of defects;

(q) cracks, permanent deformation, or corrosion of aircraft structure, if more than the maximum acceptable to the manufacturer or the Authority;

(r) aircraft components or systems malfunctions that result intaking emergency actions during flight except action to shut down an engine;

(s) emergency evacuation systems or components including all exit doors, passenger emergency evacuating lighting systems, or evacuation equipment that are found defective, or that fail to perform the intended functions during an actual emergency or during training, testing, maintenance, demonstration, or inadvertent deployments;

(t) each interruption to a flight, unscheduled change of aircraft en route, or unscheduled stop or diversion from a route, caused by known or suspected technical difficulties or malfunctions;

(u) any abnormal vibration or buffeting caused by a structural or system malfunction, defect, or failure;

(v) failure or malfunction of more than one attitude, airspeed, or altitude instrument during a given operation of the aircraft;

(w) the number of engines removed prematurely because of malfunction, failure or defect, listed by make and model and the aircraft type in which it was installed; or

(x) the number of propeller featherings in flight, listed by type of propeller and engine and aircraft on which it was installed.

(2) A report required under this regulation shall—

(a) be made within three days after determining that the failure, malfunction, or defect required to be reported has occurred; and

(b) include as much of the following information as is available and applicable —

(i) type and registration mark of the aircraft;

(ii) name of the operator;

(iii) aircraft serial number;

(iv) where the failure, malfunction, or defect is associated with an article approved under a Technical Standard Order (TSO) authorisation, the article serial number and model designation, as appropriate;

(v) where the failure, malfunction or defect is associated with an engine or propeller, the engine or propeller serial number, as appropriate;

(vi) product model;

(vii) identification of the part, component, or system involved, including the part number; and

(viii) the nature of the failure, malfunction, or defect.

(3) The Authority, upon receipt of the report specified in sub-regulation (2) for aircraft registered in Kenya, shall submit the reports to the State of Design.

(4) The Authority, upon receipt of the report specified in sub-regulation (2) for foreign registered aircraft operating in Kenya, shall submit all such reports to the State of Registry and the State of Design.

PART V – AIRCRAFT MAINTENANCE AND INSPECTION

27. Persons authorised to perform maintenance, preventive maintenance and modification

(1) A person shall not perform any task defined as maintenance on an aircraft or aircraft components, except as provided in this regulation.

(2) The following are the persons authorised to perform maintenance, preventive maintenance and modification—

(a) a pilot licensed by the Authority;

(b) a person performing maintenance under the supervision of a licensed aircraft maintenance engineer(LAME);

(c) a LAME; and

(d) an AMO.

(3) A pilot licensed by the Authority may perform preventive maintenance on an aircraft of maximum certificated take-off mass of 5,700 kg or less owned or operated by that pilot so long as the aircraft is not listed for use by an AOC holder and the pilot has attended maintenance course on the type of aircraft.

(4) A pilot licenced by the Authority operating a balloon listed for use by an AOC holder may perform maintenance, preventive maintenance and modification on balloons, provided that pilot has been trained on the appropriate balloon maintenance.

(5) A person working under the supervision of a LAME may perform the maintenance, preventive maintenance, or modifications that the LAME is authorised to perform if the supervising LAME—

(a) personally observes the work being done to the extent necessary to ensure that it is being done properly; and

(b) is readily available, in person, for consultation.

(6) A LAME may perform or supervise the maintenance or modification of an aircraft or aircraft component for which he or she is rated in accordance with the Civil Aviation (Personnel Licensing) Regulation.

(7) An AMO may perform aircraft maintenance within the limits specified by the Authority.

(8) A manufacturer holding an AMO certificate may—

(a) rebuild or alter any aircraft component manufactured by that manufacturer under a type or production certificate;

(b) rebuild or alter any aircraft component manufactured by that manufacturer under a Technical Standard Order (TSO) Authorisation, a Parts Manufacturer Approval (PMA) by the State of Design, or product and process specification issued by the State of Design; and

(c) perform any inspection required by the Civil Aviation (Operation of Aircraft) Regulations, on aircraft that the manufacturer manufactures, while currently operating under a production certificate or under a currently approved production inspection system for such aircraft.

28. Personnel authorised to approve for return to service

(1) Except as authorized by the Authority, a person shall not approve an aircraft, airframe, engine, propeller, appliance, or component for return to service after it has undergone maintenance, preventive maintenance, rebuilding, or modification.

(2) The following persons are authorised to approve for return to service—

(a) a pilot licensed by the Authority who may return his or her aircraft to service after performing authorised preventive maintenance provided he has successfully completed an approved maintenance course on the type of aircraft;

(b) a pilot licensed by the Authority who may return his or her aircraft to service after performing authorised preventive maintenance provided he has successfully completed an approved maintenance course on the type of aircraft;

(c) a LAME who may approve aircraft and aircraft components for return to service after the LAME has performed, supervised, or inspected its maintenance subject to the limitations specified in the Civil Aviation (Personnel Licensing) Regulations and Civil Aviation (Air Operator Certification and Administration) Regulations;

(d) an AMO that may approve aircraft and aircraft components for return to service as provided in the operations specific operating provisions approved by the Authority.

(3) The persons authorized to approve modifications under Sub-Regulation 1 must have sound knowledge of the design principles embodied in the Aircraft type being modified or repaired.

29. Persons authorised to perform inspections

(1) Except as authorized by the Authority, a person shall not perform the inspections required by these Regulations, for aircraft and aircraft components prior to or after the aircraft has undergone maintenance, preventive maintenance, rebuilding, or modification.

(2) The following persons are authorised to carry out inspections—

(a) a LAME who may conduct the required inspections of aircraft and aircraft components for which the LAME is rated and current; or

(b) an AMO that may perform the required inspections of aircraft and aircraft components as provided in the specific operating provisions approved by the Authority.

30. Preventive Maintenance: Limitations

Preventive maintenance is limited to the following work—

(a) removal, installation and repair of landing gear tires;

(b) replacing elastic shock absorber cords on landing gear;

(c) servicing landing gear shock struts by adding oil, air, or both;

(d) servicing landing gear wheel bearings, such as cleaning and greasing;

(e) replacing defective safety wiring or cotter keys;

(f) lubrication not requiring disassembly other than removal of non-structural items such as cover plates, cowlings, and fairings;

(g) making simple fabric patches not requiring rib stitching or the removal of structural parts or control surfaces;

(h) replenishing hydraulic fluid in the hydraulic reservoir;

(i) refinishing decorative coating of fuselage, wings, tail group surfaces excluding balanced control surfaces, fairings, cowling, landing gear, cabin, or cockpit interior when removal or disassembly of any primary structure or operating system is not required;

(j) applying preservative or protective material to components where no disassembly of any primary structure or operating system is involved and where such coating is not prohibited or is not contrary to good practices;

(k) repairing upholstery and decorative furnishings of the cabin or cockpit when the repairing does not require disassembly of any primary structure or operating system or interfere with an operating system or affect primary structure of the aircraft;

(l) making small simple repairs to fairings, non-structural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper airflow;

(m) replacing side windows where that work does not interfere with the structure of any operating system such as controls and electrical equipment;

(n) replacing safety belts;

(o) replacing seats or seat parts with replacement parts approved for the aircraft, not involving disassembly of any primary structure or operating system;

(p) troubleshooting and repairing broken circuits in landing light wiring circuits;

(q) replacing bulbs, reflectors, and lenses of position and landing lights;

(r) replacing wheels and skis where no mass and balance computation is involved;

(s) replacing any cowling not requiring removal of the propeller or disconnection of flight controls;

(t) replacing or cleaning spark plugs and setting of spark plug gap clearance;

(u) replacing any hose connection except hydraulic connections;

(v) replacing prefabricated fuel lines;

(w) cleaning fuel and oil strainers;

(x) replacing and servicing batteries;

(y) replacement or adjustment of non-structural fasteners incidental to operations; and

(z) the installation of anti-misfueling devices to reduce the diameter of fuel tank filler openings provided the specific device has been made a part of the aircraft type certificate data by the aircraft manufacturer, the manufacturer has provided appropriately approved instructions acceptable to the Authority for the installation of the specific device, and installation does not involve the disassembly of the existing filler opening.

31. Performance rules: maintenance

(1) A person performing maintenance, preventive maintenance, or modification on an aircraft or aircraft component shall use the methods, techniques, and practices prescribed in—

(a) the current manufacturer's maintenance manual or instructions for continued airworthiness issued by its manufacturer; and

(b) additional methods, techniques and practices required by the Authority; or methods, techniques and practices approved by the Authority where the manufacturer's documents were not available.

(2) A person shall use the tools, equipment, and test apparatus necessary to assure completion of the work in accordance with accepted industry practices.

(3) If the involved manufacturer recommends special equipment or test apparatus, the person performing maintenance shall use that equipment or apparatus, or its equivalent acceptable to the Authority.

(4) A person performing maintenance, preventive maintenance, or modification on an aircraft or aircraft component shall do that work in such a manner, and use materials of such a quality, that the condition of the aircraft or aircraft component worked on will be at least equal to its original or properly altered condition with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness.

(5) The methods, techniques, and practices contained in an AOC holder's maintenance control manual and, maintenance programme, as approved by the Authority, will constitute an acceptable means of compliance with the requirements of this regulation.

(6) The methods, techniques, and practices contained in an AMO Maintenance Procedures Manual as approved by the Authority, will constitute an acceptable means of compliance with the requirements of these Regulations.

32. Performance rules: inspection

(1) A person performing an inspection required by the Authority shall—

(a) perform the inspection so as to determine whether the aircraft or portion of the aircraft under inspection meets all applicable airworthiness requirements; and

(b) if there is an inspection programme required or accepted for the specific aircraft being inspected, perform the inspection in accordance with the instructions and procedures specified in the inspection programme.

(2) A person performing an inspection required on a rotorcraft shall inspect, in accordance with the maintenance manual or instructions for continued airworthiness, the systems which shall include, but not limited to—

(a) the drive shafts or similar systems;

(b) the main rotor transmission gear box for obvious defects;

(c) the main rotor and center section or the equivalent area; and

(d) the auxiliary rotor on helicopters.

(3) A person performing an inspection shall use a checklist while performing the inspection, which—

(a) may be of the person's own design, one provided by the manufacturer of the equipment being inspected, or one obtained from another source; and

(b) shall include the scope and detail of the items prescribed or approved by the Authority.

(4) A person approving a reciprocating-engine-powered aircraft for return to service after an inspection shall, before that approval, run the aircraft engine or engines to determine satisfactory performance in accordance with the current manufacturer's recommendations of—

(a) power output (static and idle revolutions per minute);

(b) magnetos;

(c) fuel and oil pressure; and

(d) cylinder and oil temperature.

(5) A person approving a turbine-engine-powered aircraft for return to service shall, before that approval, run the aircraft engine or engines to determine satisfactory performance in accordance with the current manufacturer's recommendations.

(6) A person performing an inspection shall, before that inspection, thoroughly clean the aircraft and aircraft engine and remove or open all necessary inspection plates, access doors, fairings, and cowlings.

(7) A person performing an inspection shall inspect, where applicable, the following components—

(a) fuselage and hull group—

(i) fabric and skin for deterioration, distortion, other evidence of failure, and defective or insecure attachment of fittings; and

(ii) systems and components for improper installation, apparent defects, and unsatisfactory operation;

(b) cabin and cockpit group—

(i) generally for uncleanliness and loose equipment that foul the controls;

(ii) seats and safety belts for poor condition and apparent defects;

(iii) leakage;

(iv) instruments for poor condition, mounting, marking, and where practicable for improper operation;

(v) flight and engine controls for improper installation and improper operation;

(vi) batteries for improper installation and improper charge;

(vii) all systems for improper installation, poor general condition, apparent and obvious defects, and insecurity of attachment.

(c) engine and nacelle group—

(i) engine section for visual evidence of excessive oil, fuel, or hydraulic leaks, and sources of such leaks;

(ii) studs and nuts for improper torquing and obvious defects;

(iii) internal engine for cylinder compression and for metal particles or foreign matter on screens and sump drain plugs, if there is weak cylinder compression, for improper internal condition and improper internal tolerances;

(iv) engine mount - for cracks, looseness of mounting, and looseness of engine to mount;

(v) flexible vibration dampeners - for poor condition and deterioration;

(vi) engine controls for defects, improper travel, and improper safe tying;

(vii) lines, hoses, and clamps for leaks, improper condition, and looseness;

(viii) exhaust stacks for cracks, defects, and improper attachment;

(ix) accessories for apparent defects in security of mounting;

(x) all systems for improper installation, poor general condition, defects, and insecure attachment;

(xi) cowling for cracks and defects;

(d) landing gear group—

(i) all units for poor condition and insecurity of attachment;

(ii) shock absorbing devices for improper oleo fluid level;

(iii) linkages, trusses, and members for undue or excessive wear, fatigue, and distortion;

(iv) retracting and locking mechanism for improper operation;

(v) hydraulic lines for leakage;

(vi) electrical system for chafing and improper operation of switches;

(vii) wheels for cracks, defects, and condition of bearings;

(viii) tires for wear and cuts;

(ix) brakes for improper adjustment;

(x) floats and skis for insecure attachment and obvious or apparent defects;

(e) wing and centre section assembly for—

(i) poor general condition;

(ii) fabric or skin deterioration;

(iii) distortion;

(iv) evidence of failure;

(v) insecurity of attachment;

(f) complete empennage assembly for—

(i) poor general condition;

(ii) fabric or skin deterioration;

(iii) distortion;

(iv) evidence of failure;

(v) insecure attachment;

(vi) improper component installation;

(vii) improper component operation;

(g) propeller group—

(i) propeller assembly - for cracks, nicks, binds, and oil leakage;

(ii) bolts - for improper torquing and lack of safety;

(iii) anti-icing devices - for improper operations and obvious defects;

(iv) control mechanisms - for improper operation, insecure mounting, and restricted travel;

(h) avionics and instrument equipment—

(i) for improper installation and insecure mounting;

(ii) wiring and conduits - for improper routing, insecure mounting, and obvious defects;

(iii) bonding and shielding for improper installation and poor condition;

(iv) antenna including trailing antenna - for poor condition, insecure mounting, and improper operation;

(i) electronic/electrical group—

(i) wiring and conduits for improper routing,

(ii) insecure mounting, and obvious defects;

(iii) bonding and shielding for improper installation and poor condition; and

(v) each installed miscellaneous item that is not otherwise covered by this listing or has instructions for continued airworthiness for improper installation and improper operation.

33. Airworthiness limitation performance rules

A person performing an inspection or other maintenance specified in an airworthiness limitations section of a current manufacturer's maintenance manual, or instructions for continued airworthiness, shall perform the inspection or other maintenance in accordance with that section, or in accordance with specific operating provisions approved by the Authority.

34. Aircraft mass schedule

(1) An aircraft in respect of which a certificate of airworthiness is issued under these Regulations shall be weighed and the position of the aircraft's centre of gravity determined, at such times and in such manner as the Authority may require or approve in the case of that aircraft.

(2) Upon the aircraft being weighed, the owner or operator of the aircraft shall prepare a mass schedule showing—

(a) the basic mass of the aircraft, namely the mass of the empty aircraft together with the mass of unusable fuel and unusable oil in the aircraft and of such items of equipment as are indicated in the mass schedule, or such other mass as may be approved by the Authority in the case of that aircraft; or

(b) the position of the centre of gravity of the aircraft when the aircraft contains only the items included in the basic mass or such other position of the centre of gravity as may be approved by the Authority in the case of that aircraft;

(c) the loading information shall include the empty mass of the aircraft, together with a definition of the condition of the aircraft at the time of weighing, the corresponding centre of gravity position, and the reference points and datum lines to which the centre of gravity limits are related;

(d) the loading information shall include the empty mass of the aircraft, together with a definition of the condition of the aircraft at the time of weighing, the corresponding centre of gravity position, and the reference points and datum lines to which the centre of gravity limits are related;

(e) the loading limitations shall include all limiting masses, centers of gravity positions, mass distributions, and floor loadings.

(3) The mass schedule shall be preserved by the operator of the aircraft until the expiration of a period of six months following the next occasion on which the aircraft is weighed for the purpose of this Regulation.

35. Markings and Placards

An operator shall ensure that markings and placards—

(a) on instruments, equipment, controls, etc., shall include such limitations or information as necessary for the direct attention of the flight crew during flight; or

(b) instructions shall be provided to give any information that is essential to the ground crew in order to preclude the possibility of mistakes in ground servicing (e.g. towing, refueling) that could pass unnoticed and that could jeopardize the safety of the aircraft in subsequent flights.

PART VI – AIRCRAFT NOISE CERTIFICATION

36. Requirement of noise certification.

(1) An aircraft to which this regulation applies shall not land or take off in Kenya unless there is in force a noise certificate issued or rendered valid by the competent Authority in which the aircraft is registered.

(2) Each application shall include—

(a) with regard to a new aircraft—

(i) a statement of conformity issued by State of Manufacture or exporting Authority;

(ii) the noise information determined in accordance with the applicable noise requirements.

(b) with regard to a used aircraft—

(i) the noise information determined in accordance with applicable noise requirements, and

(ii) historical records to establish the production, modification and maintenance standard of the aircraft.

37. Engine Emission certifications

(1) The provisions of sub-regulations (2) and (3) shall apply to all turbojet and turbofan engines intended for propulsion.

(2) Emissions certification shall be granted by the Authority on the basis of satisfactory evidence that the engine complies with requirements which are at least equal to the stringency of the provisions of these Regulation.

(3) The document attesting emissions certification for each individual engine shall include at least the following information which is applicable to the engine type—

(a) name of certificating authority;

(b) manufacturers type and model designation;

(c) statement of any additional modifications incorporated for the purpose of compliance with the applicable emissions certification requirements;

(d) rated thrust;

(e) reference pressure ratio;

(f) a statement indicating compliance with Smoke Number requirements;

(g) a statement indicating compliance with gaseous pollutant requirements.

(4) The Authority shall recognize as valid emissions certification granted by the certificating authority of another State provided that the requirements under which such certification was granted are not less stringent than the provisions of these Regulations.

38. Issue, suspension, revocation of aircraft noise certificate

(1) An aircraft included in the classification defined for noise certification purpose in Part A of the Second Schedule to these Regulations shall be issued with a noise certificate or a suitable statement attesting noise certification contained in another document approved by the State of Registry and required by that State to be carried in the aircraft.

(2) The noise certificate referred to in sub-regulation (1) shall be issued or validated by the Authority on the basis of satisfactory evidence that the aircraft complies with the requirements which are at least equal to the applicable standards specified in the Second Schedule to these Regulations.

(3) The document attesting noise certification of an aircraft shall provide information in accordance with Part B of the Second Schedule to these Regulations.

(4) The Authority shall—

(a) suspend or revoke the noise certificate of aircraft on the civil aircraft register if the aircraft ceases to comply with the applicable noise standards; and

(b) not re-instate or grant a new noise certificate unless the aircraft is found on reassessment to comply with the applicable noise standards.

(5) The provisions of sub regulation (2) to (4) shall apply to all engines included in the classifications defined for emission certification purposes where such engines are fitted to aircraft engaged in international air navigation.

(6) Where ownership of an aircraft has changed the noise certificate shall be transferred together with the aircraft.

(7) A noise certificate shall be issued for an unlimited duration. It shall remain valid subject to—

(a) compliance with the applicable type design, environmental protection and continuing airworthiness requirements;

(b) the aircraft for which the certificate is issued retains the same registration marks; and

(c) the certificate has not been suspended, surrendered or revoked.

PART VII – MAINTENANCE RECORDS AND ENTRIES

39. Keeping certificate of release to service records

(1) All operators shall maintain a certificate of release to service in duplicate.

(2) A certificate of release to service issued shall—

(a) be effective from the date of issue;

(b) cease to be effective upon expiration of the period in calendar days or flight time, whichever is earlier as specified in the maintenance schedule; and

(c) be kept on board the aircraft and the original kept by the operator.

40. Technical Logbook

(1) A technical logbook shall be kept in respect of every aircraft registered in Kenya in respect of which a certificate in either commercial air transport or aerial work category is in force.

(2) Technical logbook entries on defects which affect the airworthiness and safe operation of the aircraft shall be made as specified in the Civil Aviation (Air Operator Certification and Administration) Regulations 2018.

(3) Upon rectification of any defect which has been entered in the technical logbook in accordance with sub-regulation (2) of this regulation, a person issuing a certificate of release to service under Civil Aviation (Approved Maintenance Organisation) Regulations 2018, in respect of that defect shall enter that certificate in the technical logbook.

41. Aircraft, engine and propeller logbooks.

(1) In addition to any other log books required by or under these Regulations, the following log books shall be kept in respect of aircraft registered in Kenya—

(a) an aircraft log book;

(b) a separate log book in respect of each engine fitted in the aircraft; and

(c) a separate log book in respect of each variable pitch propeller fitted to the aircraft;

(2) The log books shall include the particulars respectively specified in the Third Schedule to these Regulations and in the case of an aircraft having a maximum certificated take-off mass of 2730 kg or less, shall be of a type approved by the Authority.

(3) An entry in a log book other than such an entry as is referred to in sub-paragraphs 2(d) (ii) or 3 (d)(ii) of the Third Schedule to these Regulations shall be made as soon as practicable after the occurrence to which it relates, but not more than 7 days after the expiration of the Certificate of Release to Service, in force in respect of the aircraft at the time of the occurrence.

(4) An entry in a log book, being such an entry as is referred to in sub-paragraphs 2(d) (ii) or 3(d)(ii) of the Third Schedule to these Regulations shall be made upon each occasion that any maintenance, overhaul, repair, replacement, modification or inspection is undertaken on the engine or propeller as the case may be.

(5) Entries in the log book may refer to other documents which shall be clearly identified, and any other documents so referred to shall be deemed, for the purposes of these regulations to be part of the log book.

(6) It shall be the duty of the operator of every

Aircraft in respect of which log books are required to be kept to keep the log books or cause them to be kept in accordance with these regulations.

(7) Subject to this regulation, every log book shall be preserved by the operator of the aircraft until a date 2 years after the aircraft, the engine or the variable pitch propeller as the case may be, has been destroyed or has been permanently withdrawn form use.

42. Maintenance Records

(1) A person who performs maintenance on an aircraft or aircraft component shall, when the work is performed satisfactorily, make an entry in the maintenance record of that equipment as follows—

(a) a description or reference to data acceptable to the Authority of work performed;

(b) completion date of the work performed; and

(c) name, signature and licence number of the person approving the work.

(2) The signature required by sub-regulation (1) (c) shall constitute the approval for return to service only for the work performed.

(3) A person working under the supervision of a LAME shall not perform any inspection required in these Regulations, or any inspection performed after a major repair or modification.

(4) A person performing the work referred to in sub regulation (1) shall enter records of major repairs and major modifications, on a prescribed form set out in the Fourth Schedule.

(5) A person performing a major repair or major modification shall—

(a) execute the appropriate form prescribed by the Authority at least in duplicate;

(b) give a signed copy of that form to the aircraft owner or operator; and

(c) forward a copy of that form to the Authority, in accordance with Authority instructions, within forty eight hours after the aircraft or aircraft component is approved for return to service.

(6) AMO which performs a major repair or modification shall—

(a) use the aircraft owner or operator 's work order upon which the repair is recorded;

(b) give the aircraft owner or operator's a signed copy of the work order and retain a duplicate copy for at least one year from the date of approval for return to service of the aircraft or aircraft component;

(c) give the aircraft owner or operator a certificate of release to service signed by an authorised representative of the AMO and incorporating the following information—

(i) identity of the aircraft or aircraft component;

(ii) the make, model, serial number, nationality and registration marks, and location of the repaired area of an aircraft;

(iii) the manufacturer's name, name of the part, model, and serial numbers if any of an aircraft component; and

(iv) signature of the authorised representative, the name and address of the AMO and AMO certificate number.

43. Records of overhaul and rebuilding

(1) A person shall not record in any required maintenance entry or form, an aircraft or aircraft component as being overhauled unless the aircraft or aircraft component has been—

(a) disassembled, cleaned, inspected as permitted, repaired as necessary, and reassembled using methods, techniques, and practices acceptable to the Authority; and

(b) tested in accordance with approved standards and technical data, or in accordance with current standards and technical data acceptable to the Authority, which have been developed and documented by the holder of the type certificate, supplemental type certificate, or a material, part, process, or appliance manufacturing approval.

(2) A person shall not record in any required maintenance entry or form an aircraft or aircraft component as being rebuilt unless the aircraft or aircraft component has been disassembled, cleaned, inspected as permitted, repaired as necessary, reassembled and tested to the same tolerances and limits as a new item, using either new parts or used parts that conform to new part tolerances and limits.

44. Approval for return to service

A person shall not approve for return to service any aircraft or aircraft component that has undergone maintenance, preventive maintenance, rebuilding, or modification unless—

(a) the appropriate maintenance record entry has been made in accordance with these Regulations;

(b) the major repair or major modification form specified in the Third Schedule of these Regulations has been executed in the manner prescribed by the Authority;

(c) if a major repair or major modification results in any change in the aircraft operating limitations or flight data contained in the approved aircraft flight manual, those operating limitations or flight data are appropriately revised and set out as prescribed.

45. Content, form, and disposition of records for inspections

(1) A person approving the return to service of an aircraft or aircraft component after any inspection performed in accordance with the Civil Aviation (Operation of Aircraft)

Regulations, 2018, shall make an entry in the maintenance record of that equipment containing the following information—

(a) type of inspection and a brief description of the extent of the inspection;

(b) date of inspection;

(c) aircraft total time and cycles in service;

(d) signature, the license number held by the person approving return to service the aircraft or aircraft component;

(e) if the aircraft is found to be airworthy and approved for return to service, the person shall include a statement certifying that the aircraft has been inspected in accordance with the type of work and was determined to be in an airworthy condition;

(f) if the aircraft is not approved for return to service because the aircraft needs maintenance, non-compliance with the applicable specifications, airworthiness directives, or other approved data, a statement that the aircraft has been inspected in accordance with inspection and a dated list of discrepancies and unairworthy items have been provided to the aircraft owner or operator; and

(g) if an inspection is conducted under an inspection programme provided for in the Civil Aviation (Operation of Aircraft) Regulations, 2018, the person performing the inspection shall make an entry identifying the inspection program accomplished, and containing a statement that the inspection was performed in accordance with the type of inspections and procedures for that particular programme.

(2) A person performing any inspection required in the Civil Aviation (Operation of Aircraft) Regulations, 2018, who finds that the aircraft is not airworthy or does not meet the applicable type certificate data sheet, airworthiness directives or other approved data upon which the aircraft's airworthiness depends, shall give the owner or operator a signed and dated list of those discrepancies.

46. Damage to aircraft

(1) Where an aircraft registered in Kenya or in another Contracting State has sustained damage, the Authority shall judge whether the damage is of a nature that affects the airworthiness of the aircraft and prohibit the aircraft from resuming flight, until it is restored to an airworthy condition.

(2) Where the aircraft is from another Contracting State, the Authority shall notify the State of Registry of that aircraft immediately.

(3) Notwithstanding sub-regulation (1), the Authority may, in exceptional circumstances, prescribe particular limiting conditions to permit the aircraft to fly a non-commercial air transport operation to an aerodrome at which it will be restored to an airworthy condition.

PART VIII – GENERAL PROVISIONS

47. Possession of the license, certificate or authorisation

(1) A holder of a licence, certificate or authorisation issued by the Authority shall have in his or her physical possession or at the work site when exercising the privileges of that license, certificate or authorisation.

(2) A crew member of a foreign registered aircraft shall hold a valid license, certificate or authorisation and have in his or her physical possession or at the work site when exercising the privileges of that license, certificate or authorisation.

48. Inspection of licenses, certificates and authorisation

A person who holds a license, certificate, or authorisation required by these Regulations shall present it for inspection upon a request from the Authority or any other person authorised by the Authority.

49. Change of Address

(1) A holder of a certificate, or any other such document issued under these Regulations shall notify the Authority of the change in the physical and mailing address and shall do so in the case of—

(a) physical address, at least fourteen days before the change; and

(b) mailing address, upon the change.

(2) A person who does not notify the Authority of the change in the physical address within the time frame specified in sub-regulation (1) shall not exercise the privileges of the certificate or authorisation.

50. Replacement of documents

A person may apply to the Authority for replacement of documents issued under these Regulations if such documents are lost or destroyed.

51. Suspension and revocations of certificates

(1) The Authority may, where it considers it to be in the public interest, suspend provisionally, pending further investigation, any certificate or any such other document issued under these Regulations.

(2) The Authority may, upon the completion of an investigation which has shown sufficient ground to the Authority's satisfaction and where it considers it to be in the public interest, revoke, suspend, or vary any certificate or any other document issued or granted under these Regulations.

(3) The Authority may, where it considers it to be in the public interest, prevent any person or aircraft from flying.

(4) A holder or any person having the possession or custody of any certificate or any such other documents which have been revoked, suspended or varied under these Regulations shall surrender the certificate, licence or such other documents to the Authority within 14 days from the date of revocation, suspension or variation.

(5) The breach of any condition subject to which any certificate or any such other document has been granted or issued under these Regulations shall render the document invalid during the continuance of the breach.

52. Use and retention of certificates and records

(1) A person shall not—

(a) use any certificate, or such other document issued or required under these Regulations which has been forged, altered, revoked, or suspended, or to which that person is not entitled;

(b) forge or alter any certificate or any such other document issued or required by or under these Regulations;

(c) lend any certificate or any such other document issued or required under these Regulations to any other person; or

(d) make any false representation for the purpose of procuring for himself or herself or any other person the issue, renewal or variation of the certificate or any such other document.

(2) During the period for which it is required under these Regulations to be preserved, a person shall not mutilate, alter, render illegible or destroy any records, or any entry made therein, required by or under these Regulations to be maintained, or knowingly make, or procure or assist in the making of, any false entry in any such record, or willfully omit to make a material entry in such record.

(3) All records required to be maintained by or under these Regulations shall be recorded in a permanent and indelible material.

(4) A person shall not purport to issue any certificate or any such other document for the purpose of these Regulations unless he is authorised to do so under these Regulations.

(5) A person shall not issue any certificate of the kind referred to in sub-regulation unless he has satisfied himself that all statements in the certificate are correct, and that the applicant is qualified to hold that certificate.

53. Reports of violation

(1) A person who knows of a violation of the Civil Aviation Act, 2013 or any rule, regulation or order made there-under, shall report it to the Authority.

(2) The Authority will determine the nature and type of any additional investigation or enforcement action that need be taken.

54. Enforcement of directions

A person who fails to comply with any direction given to him or her by the Authority or by any authorised person under any provision of these Regulations shall be deemed for the purposes of these Regulations to have contravened that provision.

55. Aeronautical user fees

(1) The Authority shall notify the fees to be charged in connection with the issue, validation, renewal, extension or variation of any certificate, licence or such other document, including the issue of a copy thereof, or the undergoing of any examination, test, inspection or investigation or the grant of any permission or approval, required by, or for the purpose of these Regulations any orders, notices or proclamations made thereunder.

(2) Upon an application being made in connection with which any fee is chargeable in accordance with the sub-regulation (1), the applicant shall be required, before the application is entertained, to pay the fee so chargeable.

(3) If payment of a fee has been made, the application is withdrawn by the applicant or otherwise ceases to have effect or is refused, the Authority, shall not refund the payment made.

56. Application of Regulations to Government and visiting forces, etc.

(1) These Regulations shall apply to aircraft, not being military aircraft, belonging to or exclusively employed in the service of the Government, and for the purposes of such application, the Department or other authority for the time being responsible for management of the aircraft shall be deemed to be the operator of the aircraft, and in the case of an aircraft belonging to the Government, to be the owner of the interest of the Government in the aircraft.

(2) Except as otherwise expressly provided, the naval, military and air force authorities and member of any visiting force and property held or used for the purpose of such a force shall be exempt from the provision of these regulations to the same extent as if the visiting force formed part of the military force of Kenya.

57. Extra-territorial application of the regulations

Except where the context otherwise requires, the provisions of these Regulations shall—

(a) in so far as they apply, whether by express reference or otherwise, to aircraft registered in Kenya, apply to such aircraft wherever they may be;

(b) in so far as they apply, whether by express reference or otherwise, to other aircraft, apply to such aircraft when they are within Kenya; and

(c) in so far as they prohibit, require or regulate (whether by express reference or otherwise) the doing of anything by any person in, or by any of the crew of, any aircraft registered in Kenya, shall apply to such persons and crew, wherever they may be.

PART IX – MISCELLANEOUS PROVISIONS

58. Contravention of Regulations

A person who contravenes any provision of these Regulations may have his license, certificate, approval, authorisation, exemption or such other document revoked or suspended.

59. Appeals to the Tribunal

A person aggrieved with a decision of the Authority under these regulations may within twenty-one days appeal to the Tribunal.

60. Offences and penalties

(1) If any provision of these Regulations is contravened in relation to an aircraft, the operator of that aircraft and the pilot-in-command, if the operator or, the pilot in command is not the person who contravened that provision he shall, without prejudice to the liability of any other person under these Regulations for that contravention, be deemed for the purposes of the following provisions of this Regulation to have contravened that provision unless he proves that the contravention occurred without his consent or connivance and that he exercised all due diligence to prevent the contravention.

(2) If it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these Regulations was due to any cause not avoidable by the exercise of reasonable care by that person, the act or omission shall be deemed not to be a contravention by that person of that provision.

(3) Where a person is charged with contravening a provision of these Regulations orders, notices or proclamations made there under by reason of his having been a member of the flight crew of an aircraft on a flight for the purpose of commercial air transport operations, the flight shall be treated, without prejudice to the liability of any other person under these Regulations, as not having been for that purpose if he proves that he neither knew nor had reason to know that the flight was for that purpose.

(4) A person who contravenes any provision of these Regulations, orders, notices or proclamations made thereunder not being a provision referred to in sub-regulation (9) shall, upon conviction, be liable to or a fine, and in the case of a continuing contravention, each day of the contravention shall constitute a separate offence.

(5) In case an aircraft is involved in a contravention and the contravention is by the owner or operator of the aircraft, the aircraft shall be subject to a lien for the penalty.

(6) Any aircraft subject to alien for the purpose of Sub-regulation (5) may be seized by and placed in the custody of the Authority;

(7) The aircraft shall be released from custody of the Authority upon—

(a) payment of the penalty or the amount agreed upon in compromise;

(b) deposit of a bond in such amount as the Authority may prescribe, conditioned upon payment of the penalty or the amount agreed upon in compromise;

(c) receiving an order of the court to that effect.

(8) The Authority and any person specifically authorised by name by him or any police officer not below the rank of inspector specifically authorised by name by the Minister, may compound offences under Part A of the Fifth Schedule to these Regulations by assessing the contravention and requiring the person reasonably suspected of having committed the offence to pay to the Authority a sum equivalent in Kenya shillings one (1) million for provisions referred to in sub-part (i) and sub-part (ii) respectively in Part A of the Fifth Schedule to these Regulations.

(9) If any person contravenes any provision specified In Part B of the Fifth Schedule to these Regulations, upon conviction is liable to a fine not less than the equivalent in Kenya Shillings one (1) million or to imprisonment for a term of twelve months or to both.

(10) A person who contravenes any provision specified as an "A" provision in the Fifth Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding one million shillings for each offence and or to imprisonment for a term not exceeding one year or to both.

(11) A person who contravenes any provision specified as a "B" provision in the Fifth Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding two million shillings for each offence and or to imprisonment for a term not exceeding three years or to both.

(12) A person who contravenes any provision of these Regulations not being a provision referred to in the Fifth Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding two million shillings, and in the case of a second or subsequent conviction for the like offence to a fine not exceeding four million shillings.

61. Transition

(1) A license, certificate, approval or any other document issued to an operator prior to the commencement of these Regulations shall continue in force as if it was issued under these Regulations until it expires or is cancelled by the Authority.

(2) Notwithstanding any other provision of these Regulations, a person who at the commencement of these Regulations, is carrying out any acts, duties or operations affected by these Regulations shall, within one (1) year from the date of commencement, or within such longer time that the Cabinet Secretary may, by notice in the *Gazette* prescribe, comply with the requirements of these Regulations or cease to carry out such acts, duties or operations.

62. Revocation of L.N. 83/2013

The Civil Aviation (Airworthiness) Regulations, 2013 are revoked.

FIRST SCHEDULE (Regulation 8(2))

*	*State of Registry Issuing Authority*	*
	CERTIFICATE OF AIRWORTHINESS	
1. Nationality and registration 2. Manufacturer and 3. Aircraft serial number marks manufacturer's designation of aircraft**		
4. Categories and/or operation***		
5. This Certificate of Airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 December 1944 and †..... in respect of the above-mentioned aircraft which is considered to be airworthy when maintained and operated in accordance with the foregoing and the pertinent operating limitations. Date of issue..... Signature ..... † Insert reference to appropriate Airworthiness Code.		
6. ****		

* For use of the State of Registry.

** Manufacturer's designation of aircraft should contain the aircraft type and model.

*** This space is normally used to indicate the certification basis, i.e. certification code, with which the particular aircraft complies and/or its permitted operational category, e.g. commercial air transportation, aerial work or private.

**** This space shall be used either for periodic endorsement (giving date of expiry) or for a statement that the aircraft is being maintained under a system of continuous inspection.

SECOND SCHEDULE (Regulation 38(1), (2) and (3))

AIRCRAFT NOISE CERTIFICATION CLASSIFICATIONS

PART

A

1. Subsonic jet aeroplanes

(a) Subsonic jet aeroplanes — Application for Type Certificate submitted before 6 October 1977.

(b) Subsonic jet aeroplanes — Application for Type Certificate submitted on or after 6 October 1977 and before 1 January 2006.

(c) Subsonic jet aeroplanes and propeller-driven aeroplanes with maximum certificated take-off mass 55 000 kg and over — Application for Type Certificate submitted on or after 1 January 2006 and before 31 December 2017.

(d) Subsonic jet aeroplanes with maximum certificated take-off mass less than 55 000 kg — Application for Type Certificate submitted on or after 1 January 2006 and before 31 December 2020.

(e) Subsonic jet aeroplanes with maximum certificated take-off mass 55 000 kg and over — Application for Type Certificate submitted on or after 31 December 2017.

(f) Subsonic jet aeroplanes with maximum certificated take-off mass less than 55 000 kg ft Application for Type Certificate submitted on or after 31 December 2020.

2. Propeller-driven STOL aeroplanes

3. Helicopters

(a) Helicopters- Application for the Type Certificate was submitted on or after 1 January 1985

(b) Helicopters- Application for the Type Certificate submitted on or after 17 November 1988,

(c) Helicopters- Application for the Type Certificate submitted on or after 21 March 2002

4. Installed auxiliary power units (APU) and associated aircraft systems during ground operations

(a) Application for a Type Certificate was submitted on or after 6 October 1977.

5. Propeller-driven aeroplanes

(a) Propeller-driven aeroplanes over 8 618 kg — Application for Type Certificate submitted before 1 January 1985;

(b) Propeller-driven aeroplanes not exceeding 8 618 kg — Application for Type Certificate submitted before 17 November 1988;

(c) Propeller-driven aeroplanes not exceeding 8 618 kg — Application for Type Certificate or certification of Derived Version submitted on or after 17 November 1988;

(d) Propeller-driven aeroplanes over 8 618 kg — Application for Type Certificate submitted on or after 1 January 1985 and before 1 January 2006;

(e) Propeller-driven aeroplanes with maximum certificated take-off mass over 8 618 kg and less than 55 000 kg — Application for Type Certificate submitted on or after 1 January 2006 and before 31 December 2020;

(f) Propeller-driven aeroplanes with maximum certificated take-off mass 55 000 kg and over — Application for Type Certificate submitted on or after 31 December 2017;

(g) Propeller-driven aeroplanes with maximum certificated take-off mass over 8 618 kg and less than 55 000 kg — Application for Type Certificate submitted on or after 31 December 2020.

6. Helicopters not exceeding 3 175 kg maximum certificated take-off mass

(a) Helicopters -Type Certificate was submitted on or after 11 November 1993;

(b) Helicopters -Type Certificate submitted on or after 21 March 2002.

7. Supersonic aeroplanes

(a) Supersonic aeroplanes — Application for Type Certificate submitted before 1 January 1975;

(b) Supersonic aeroplanes — application for Type Certificate submitted on or after 1 January 1975.

8. Tilt-rotors.-Application for a Type Certificate submitted on or after 1 January 2018.

PART B

Information to be included in the document attesting noise certification

(1) The following information shall be included on the document attesting noise certification of an aircraftft—

1. Name of State

2. Title of the noise document

3. Number of the document

4. Nationality or common mark and registration marks

5. Manufacturer and manufacturer's designation of aircraft

6. Aircraft serial number

7. Engine manufacturer, type and model

8. Propeller type and model for propeller-driven aeroplanes

9. Maximum take-off mass and unit

10. Maximum landing mass and unit for certificates issued

11. The chapter and section of the Regulations according to which the aircraft is certificated

12. Additional modifications incorporated for the purpose of compliance with the applicable noise certification Standards

13. The lateral/full-power noise level in the corresponding unit for documents issued

14. The approach noise level in the corresponding unit for documents issued

15. The flyover noise level in the corresponding unit for documents issued

16. The overflight noise level in the corresponding unit for documents

17. The take-off noise level in the corresponding unit for documents issued

18. Statement of compliance

19. Date of issuance of the noise certification document

20. Signature of the officer issuing it.

The information stated under subparagraphs (a) — (h) shall also be included in the aircraft flight manual. Concerning 1(h) a note shall be added stating the thrust/power cut back height relates to the noise certification demonstration procedure and is not intended for use in normal operations.

Noise certificate

For use by State of Registry	1. <State of Registry>		Document number: 3.	
2. NOISE CERTIFICATE				
4. Nationality and registration marks:	5. Manufacturer and manufacturer's designation of aircraft:		6. Aircraft serial number:	
7. Engine:		8. Propeller:*		
9. Maximum take-off mass: kg	10. Maximum landing mass:* kg		11. Noise certification Standard:	
12. Additional modifications incorporated for the purpose of compliance with the applicable noise certification Standards:				
13. Lateral/full-power noise level:*	14. Approach noise level:*	15. Flyover noise level:*	16. Overflight noise level:*	17. Take-off noise level:*
Remarks:				
18. This noise certificate is issued pursuant to Volume I of Annex 16 to the Convention on International Civil Aviation, in respect of the above-mentioned aircraft, which is considered to comply with the indicated noise Standard when maintained and operated in accordance with the relevant requirements and operating limitations. 19. Date of issue				
20. Signature				

* These boxes may be omitted depending on the noise certification Standard.

THIRD SCHEDULE (Regulation 41(1), (2), (3) and (4))

AIRCRAFT, ENGINE AND PROPELLER LOG BOOKS

Aircraft log book—

(1) The following entries shall be included in the aircraft log book—

(a) the name of the constructor, the type of the aircraft, the number assigned to it by the constructor and the date of construction of the aircraft;

(b) the nationality and registration marks of the aircraft;

(c) the name and address of the operator of the aircraft;

(d) the date of each flight and the duration of the period between take-off and landing, or, if more than one flight was made on that day, the number of flights and the total duration of the periods between take-off and landings on that day;

(e) particulars of all maintenance work carried out on the aircraft or its equipment;

(f) particulars of any defects occurring in the aircraft or in any equipment required to be carried in it by or under these Regulations, and of the action taken to rectify such defects including a reference to the relevant entries in the technical log required by Regulations 10(2) and (3) of these Regulations.

(g) particulars of any overhauls, repairs, replacements and modifications relating to the aircraft or any such equipment as aforesaid.

Provided that entries shall not be required to be made under subparagraphs (e), (f) and (g) in respect of any engine or variable pitch propeller.

(2) The following entries shall be included in the engine log book—

(a) the name of the constructor, type of engine, the number assigned to it by the constructor and the date of the construction of the engine;

(b) the nationality and registration marks of each aircraft in which the engine is fitted;

(c) the name and address of the operator of each such aircraft—

(d) either—

(i) the date of each flight and the duration of the period between take off and landing or, if more than one flight was made on that day, the number of flights and the total duration of the periods between take-off and landings on that day; or

(ii) the aggregate duration of periods between take-off and landing for all flights made by that aircraft since, the immediately preceding occasion that any maintenance, overhaul, repair, replacement, modification or inspection was undertaken on the engine.

(e) Particulars of all maintenance work done on the engine;

(f) Particulars of any defects occurring in the engine, and of the rectification of such defects, including reference to the relevant entries in the technical log required by regulation 10(2) and (3) of these Regulations;

(g) Particulars of all overhauls, repairs, replacement and modifications relating to the engine or any of its accessories.

(3) The following entries shall be included in the variable pitch propeller log book—

(a) the name of the constructor, the type of the propeller, the number assigned to it by the constructor and the date of the construction of the propeller;

(b) the nationality and registration marks of each aircraft, and the type and number of each engine, to which the propeller is fitted;

(c) the name and address of the operator of each such aircraft;

(d) either—

(i) the date of each flight and the duration of the period between take-off and landing or, if more than one flight was made on that day, the number of flights and the total duration of the periods between take-off and landings on that day; or

(ii) the aggregated duration of periods between take-off and landing for all flights made by that aircraft since the immediately preceding occasion that any maintenance, overhaul, repair, replacement, modification or inspection was undertaken on the propeller;

(e) particulars of all maintenance work done on the propeller;

(f) particulars of any defects occurring in the propeller, and of the rectification of such defects, including a reference to the relevant entries in the technical log required by regulation 10(2) and (3) of these Regulations;

(g) particulars of any overhauls, repairs, replacements and modifications relating to the propeller.

FOURTH SCHEDULE (Regulation 42(4))

MAJOR REPAIRS AND MODIFICATION FORM

7. Approval for Return to Service				
Pursuant to the authority given persons specified below, the unit(s) identified in item 4 was inspected in the manner prescribed by the Kenya Civil Aviation Authority and is APPROVED ☐ REJECTED				
B Y	KCAA Inspector	Inspection Authorisation		Other (Specify)
	Maintenance Organisation	Other		
Date of Approval or Rejection		Certificate or Designation Number		Signature of Authorised Individual

MAJOR REPAIR AND MODIFICATION (Airframe, Engine, Propeller or Appliance)					[State] For KCAA Use Only Office Identification
INSTRUCTIONS: Print or type all entries. See the Civil Aviation (Airworthiness) Regulation 42 for instructions and disposition of this form.					
1. Aircraft	Make		Model		
	Serial Number		Nationality and Registration Mark		
2. Owner	Name (As shown on registration certificate)		Address (As shown on registration certificate)		
3. For Authority Use Only					
4. Unit Identification				5. Type	
Unit	Make	Model	Serial Number	Repair	Modification
Airframe					
Engine					
Propeller					
Appliance	Type Manufacture				
6. Conformity Statement					
A. Organisation Name and Address	B. Kind of License Organisation ☐ Licensed (LAME) ☐A ☐C or ☐A C ☐ Approved Maintenance Organisation ☐ Manufacturer			C. Certificate License Number (For an AMO include the appropriate ratings issued for the major repair or modification)	
D. I certify that the repair and or modification made to the units) identified in item 4 above and described on the reverse or attachments hereto have been made in accordance with the requirements of the Civil Aviation (Airworthiness) Regulations and that the information furnished herein is true and correct to the best of my knowledge.					

FIFTH SCHEDULE (Regulation 60(8), (9), (10) and (11))

PENALTIES

REG. NO.	TITLE	PART
6	Issue of supplemental type certificate	A
8	Certificate of airworthiness to be in force.	A
15	Airworthiness directives and service bulletins.	A
19	Conditions on the special flight permit.	B
20(1)	Certificate of fitness for flight.	A
21	Responsibility for maintenance.	B
22	Continued airworthiness information	A
24	Compliance with the manufacturer's instructions and airworthiness directives.	A
25	Reporting of failures, malfunctions, and defects.	A
26	Persons authorised to perform maintenance, preventive maintenance and modification.	B
27	Personnel authorised to approve for return to service.	B
28	Persons authorised to perform inspections.	B
30	Performance rules: maintenance.	A
31	Performance rules: inspection.	A
32	Airworthiness limitation performance rules.	A
33	Aircraft mass schedule	B
34	Requirements of noise certification	A
36	Keeping of maintenance release records.	A
37	Technical Log entries.	A
38	Aircraft ,engine and propeller log books	A
39	Maintenance, rebuilding, and modification records.	A
40	Description of overhaul and rebuilding records.	A
41	Approval for return to service.	A
48	Use and retention of certificates and records.	B
50	Enforcement of directions	A

THE CIVIL AVIATION (AERONAUTICAL SEARCH AND RESCUE) REGULATIONS, 2018

ARRANGEMENT OF REGULATIONS

THE CIVIL AVIATION (AERONAUTICAL SEARCH AND RESCUE) REGULATIONS, 2018

[Legal Notice 119 of 2018]

PART I – PRELIMINARY

1. Citation

These Regulations may be cited as the Civil Aviation (Aeronautical Search and Rescue) Regulations.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"accident" means an occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked or in the case of unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which—

(a) a person is fatally or seriously injured as a result of—

(i) being in the aircraft; or

(ii) direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or

(iii) direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

(b) the aircraft sustains damage or structural failure which—

(i) adversely affects the structural strength, performance or flight characteristics of the aircraft; and

(ii) would normally require major repair or replacement of the affected component;

except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or

(c) the aircraft is missing or is completely inaccessible;

"Aeronautical Information Publication, (AIP)" means a publication issued by or with the Kenya Civil Aviation Authority and containing aeronautical information of a lasting character essential to air navigation;

"Aeronautical Rescue Coordination Centre, (RCC)" means a unit responsible for promoting efficient organization of Aeronautical Search and Rescue services and for coordinating the conduct of Aeronautical Search and Rescue operations within a Aeronautical Search and Rescue region;

"Aeronautical Rescue Sub-Centre, (RSC)" means a unit subordinate to a rescue coordination centre, established to complement the latter according to particular provisions of the responsible authorities;

"Aeronautical Search" means an operation normally coordinated by a rescue coordination centre or rescue sub-centre using available personnel and facilities to locate persons in distress;

"Aeronautical Search and Rescue aircraft" means an aircraft provided with specialized equipment suitable for the efficient conduct of Aeronautical Search and Rescue missions;

"Aeronautical Search and Rescue facility" means any mobile resource, including designated Aeronautical Search and Rescue units, used to conduct Aeronautical Search and Rescue operations;

"Aeronautical Search and Rescue service" means the performance of distress monitoring, communication, coordination and Aeronautical Search and Rescue functions, initial medical assistance or medical evacuation, through the use of public and private resources, including cooperating aircraft, vessels and other craft and installations;

"Aeronautical Search and Rescue region (SRR)" means an area of defined dimensions, associated with a rescue coordination centre, within which Aeronautical Search and Rescue services are provided;

"Aeronautical Search and Rescue unit" means a mobile resource composed of trained personnel and provided with equipment suitable for the expeditious conduct of Aeronautical Search and Rescue operations;

"aircraft" means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface;

"alerting post" means any facility intended to serve as an intermediary between a person reporting an emergency and a rescue coordination centre or rescue sub-centre;

"alert phase" means a situation wherein apprehension exists as to the safety of an aircraft and its occupants;

"Authority" means the Kenya Civil Aviation Authority established under section 4 of the Act;

"Cabinet Secretary" means the Cabinet Secretary responsible for matters relating to Civil Aviation;

"Convention" means the Convention on International Civil Aviation adopted at Chicago on the 7th December, 1944;

"COSPAS-SARSAT" means the Space System for the Search of Vessels in Distress-Aeronautical Search and Rescue Satellite Aided Tracking;

"Director Air Navigation Services" means the Director for the time being responsible for air navigations services provided by the Authority;

"Director-General" means the Director-General of Kenya Civil Aviation Authority;

"distress phase" means a situation wherein there is a reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger and require immediate assistance;

"ditching" means the forced landing of an aircraft on water;

"emergency phase" is a generic term meaning, as the case may be, uncertainty phase, alert phase or distress phase;

"EPIRB" means Emergency Position Indicating Radio Beacon;

"flight information region" means an airspace of defined dimensions within which flight information service and alerting service are provided;

"IBRD" means International Beacon Registration Database;

"incident" means an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation;

"International Civil Aviation Organization" means the specialized agency of the United Nations responsible for formulating standards and recommended practices for the purposes of civilian international air transport, established in Chicago on 7th December 1944;

"Joint Rescue Coordination Centre (JRCC)" means a rescue coordination centre responsible for both aeronautical and maritime Aeronautical Search and Rescue operations;

"operator" means a person, organization or enterprise engaged in or offering to engage in an aircraft operation;

"person" means any institution or organization equipped to assist in a Aeronautical Search and Rescue operation, an organ of state, a government and an agency of the government of a foreign country;

"pilot-in-command" means the pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight;

"PLB" means Personnel Locator Beacon;

"rescue" means an operation to retrieve persons in distress, provide for their initial medical or other needs, and deliver them to a place of safety;

"State of Registry" means the State on whose register the aircraft is entered;

"uncertainty phase" means a situation wherein uncertainty exists as to the safety of an aircraft and its occupants; and

"vessel" means any water-navigable craft of any type, whether self-propelled or not.

3. Application

These Regulations shall apply to all aircraft requiring Aeronautical Search and Rescue services and to persons or organizations responsible for the maintenance and operation of Aeronautical Search and Rescue services in Kenya and in areas over the high seas to which Kenya has been given responsibility under the regional air navigation plan.

PART II – AERONAUTICAL SEARCH AND RESCUE ORGANIZATION

4. Provision of Aeronautical Search and Rescue services

(1) The Director of Air Navigation Services is the designated Aeronautical Search and Rescue agency for Aeronautical Search and Rescue operations in Kenya.

(2) The designated Aeronautical Search and Rescue agency shall be responsible to the Director-General for coordinating and directing the prompt provision of Aeronautical Search and Rescue services within Kenya, including portions of the high seas as determined on the basis of regional air navigation agreements, to ensure that assistance is rendered to persons in distress.

(3) The designated Aeronautical Search and Rescue agency shall in coordination with the Authority—

(a) determine the type and degree of Aeronautical Search and Rescue services to be provided within the Aeronautical Search and Rescue region, and shall coordinate such services in accordance with these Regulations;

(b) establish a system for reporting occurrences and the conduct of Aeronautical Search and Rescue operations to the Authority; and

(c) ensure the availability of sufficient resources and facilities to coordinate the Aeronautical Search and Rescue operations at any one time.

(4) The Authority in coordination with the designated Aeronautical Search and Rescue agency shall ensure availability of resources, communication facilities and a skilled manpower to coordinate and provide the Aeronautical Search and Rescue functions.

(5) The designated Aeronautical Search and Rescue agency shall establish processes to improve service provision, including the aspects of planning domestic and international cooperative arrangements and training.

(6) In providing assistance to aircraft in distress and to survivors of aircraft accidents, the designated Aeronautical Search and Rescue agency shall do so regardless of the nationality or status of such persons or the circumstances in which such persons are found.

(7) Aeronautical Search and Rescue units and other available facilities shall be used to assist any aircraft or its occupants that are or appear to be in a state of emergency.

(8) Where separate aeronautical and maritime rescue coordination centres serve the same area, the designated Aeronautical Search and Rescue agency shall ensure the closest possible cooperation and coordination between the relevant aeronautical, maritime and military emergency response services.

(9) The designated Aeronautical Search and Rescue agency shall facilitate consistent and cooperative engagement between aeronautical and maritime Aeronautical Search and Rescue services.

(10) The designated Aeronautical Search and Rescue agency may cooperate in establishment of joint rescue coordination centres to coordinate aeronautical and maritime Aeronautical Search and Rescue operations where practical.

5. Aeronautical Search and Rescue region

The Aeronautical Search and Rescue region within which Aeronautical Search and Rescue services shall be provided, will be coincident to the national boundary of Kenya including portions of the high seas as determined on the basis of regional air navigation agreements.

6. Establishment of Aeronautical Rescue coordination centre and rescue sub centres

(1) The designated Aeronautical Search and Rescue agency shall establish and publish in the AIP, a rescue coordination centre, equipped with appropriate facilities and personnel to—

(a) facilitate efficient organization of Aeronautical Search and Rescue services; and

(b) coordinate the conduct of Aeronautical Search and Rescue operations within the Aeronautical Search and Rescue region.

(2) The designated Aeronautical Search and Rescue agency may establish and publish in the AIP search and rescue sub centres, subordinate to the rescue coordination centre, where this is considered to improve the efficiency of Aeronautical Search and Rescue services within Kenya.

(3) The rescue coordination centre, and as appropriate, rescue sub centre, shall be staffed 24 hours a day by trained personnel proficient in the use of English language used for radiotelephony communications.

(4) The rescue coordination centre personnel involved in the conduct of radiotelephony communications shall be proficient in the use of the English language.

(5) The designated Aeronautical Search and Rescue agency shall make formal arrangements for cooperative and appropriate use of public and private Aeronautical Search and Rescue units that are suitably located, equipped and crewed for Aeronautical Search and Rescue operations throughout the Aeronautical Search and Rescue region.

(6) The designated Aeronautical Search and Rescue agency shall maintain an accurate and complete database of Aeronautical Search and Rescue Units and other Aeronautical Search and Rescue facilities and resources within the Aeronautical Search and Rescue region and make arrangements for the timely advice to the Rescue Coordination Centre of any change in their readiness or capability.

(7) In areas where telecommunications facilities would not permit persons observing an aircraft in emergency to notify the rescue coordination centre concerned directly and promptly, suitable units of public or private services shall be designated and such units shall be published in the AIP as alerting posts.

7. Aeronautical Search and Rescue communications

(1) The designated Aeronautical Search and Rescue agency shall ensure that the rescue coordination centre shall have means of rapid and reliable two way communication with—

(a) associated air traffic services units;

(b) associated rescue sub-centres;

(c) appropriate direction-finding and position-fixing stations;

(d) where appropriate, coastal radio stations capable of alerting and communicating in the region;

(e) the headquarters of Aeronautical Search and Rescue units in the region;

(f) all maritime rescue coordination centres in the region and aeronautical, maritime or joint rescue coordination centres in adjacent regions;

(g) a designated meteorological office or meteorological watch office;

(h) Aeronautical Search and Rescue units;

(i) alerting posts; and

(j) the COSPAS-SARSAT Mission Control Centre servicing the Aeronautical Search and Rescue region.

(2) The designated Aeronautical Search and Rescue agency shall ensure that each rescue sub centre have means of rapid and reliable two-way communication with—

(a) adjacent rescue sub centres;

(b) a meteorological office or meteorological watch office;

(c) Aeronautical Search and Rescue units; and

(d) alerting posts.

8. Aeronautical Search and Rescue operations

The designated Aeronautical Search and Rescue agency shall—

(a) publish in the AIP, as Aeronautical Search and Rescue units, elements of public or private services suitably located and equipped for Aeronautical Search and Rescue operations;

(b) publish in the AIP, as parts of the Aeronautical Search and Rescue plan of operation, elements of public or private services that do not qualify as Aeronautical Search and Rescue units but are able to participate in Aeronautical Search and Rescue operations; and

(c) have equipment capable of communicating any distress information with the designated Mission Control Centre (MCC).

9. Registration of ELTs & PLBs

(1) All ELTs on board aircraft and all PLBs used during aviation sports activities shall be registered in the National IBRD.

(2) The Director-General of the Authority shall maintain the National IBRD.

10. Aeronautical Search and Rescue equipment

(1) The designated Aeronautical Search and Rescue agency shall ensure that—

(a) Aeronautical Search and Rescue units are provided with equipment for locating promptly, and for providing adequate assistance at the scene of an accident;

(b) Aeronautical Search and Rescue units have means of rapid and reliable two-way communication with other Aeronautical Search and Rescue facilities engaged in the same operation;

(c) Aeronautical Search and Rescue aircraft are equipped to be able to communicate on the aeronautical distress and on- scene frequencies and on such other frequencies as may be determined by the Authority;

(d) Aeronautical Search and Rescue aircraft are equipped with a device for homing on distress frequencies;

(e) Aeronautical Search and Rescue aircraft, when used for Aeronautical Search and Rescue over maritime areas, are equipped to be able to communicate with vessels;

(f) each Aeronautical Search and Rescue aircraft, when used for Aeronautical Search and Rescue over maritime areas, carry a copy of the International Code of Signals to enable it to overcome language difficulties that may be experienced in communicating with ships;

(g) at least one of the aircraft participating in an Aeronautical Search and Rescue operation, carries droppable survival equipment, unless it is known that there is no need to provide supplies to survivors by air.

(2) The designated Aeronautical Search and Rescue agency shall ensure that appropriate survival equipment, suitably packed for dropping by aircraft are located at aerodromes.

PART III – COOPERATION AND CO-ORDINATION OF AERONAUTICAL SEARCH AND RESCUE SERVICES

11. Cooperation and coordination with other States and agencies

(1) The designated Aeronautical Search and Rescue agency shall in its operations—

(a) ensure that the Aeronautical Search and Rescue organization is coordinated with those of neighbouring States where these operations are proximate to adjacent Aeronautical Search and Rescue regions; and

(b) develop common search and rescue plans and procedures to facilitate coordination of search and rescue operations with those of neighboring States.

(2) The Authority, through the rescue coordination centre shall—

(a) request from other rescue coordination centres such assistance, including aircraft, vessels, persons or equipment, as may be needed;

(b) grant any necessary permission for the entry of such aircraft, vessels, persons or equipment into its territory; and

(c) make the necessary arrangements with the appropriate customs, immigration or other authorities with a view to expediting such entry.

(3) The rescue coordination centre shall when requested, provide assistance to other rescue coordination centres and coordinate any assistance required by those centres in the form of aircraft, vessels, persons or equipment.

(4) The designated Aeronautical Search and Rescue agency shall make arrangements for—

(a) joint training exercises involving its Aeronautical Search and Rescue units, those of other States and operators, in order to promote Aeronautical Search and Rescue efficiency; and

(b) periodic liaison visits by personnel of its rescue coordination centres and sub-centre to the centres of neighboring States.

12. Aeronautical Search and Rescue letters of agreement

(1) The designated Aeronautical Search and Rescue agency in coordination with the Authority and relevant government authorities shall establish letters of agreement with Aeronautical Search and Rescue service providers within the State and with all Aeronautical Search and Rescue agencies of contiguous States, to strengthen Aeronautical Search and Rescue cooperation and coordination.

(2) Subject to subregulation (1), the designated Aeronautical Search and Rescue agency shall set forth in the agreements, the conditions for entry of each other's Aeronautical Search and Rescue units into respective territories and ensure that these agreements also provide for expediting entry of such units with the least possible formalities.

13. Entry into the territory of Kenya by other States' parties

(1) The Director-General shall in coordination with relevant government authorities and subject to such conditions as may be prescribed by such authorities, permit immediate entry into the Kenyan territory, Aeronautical Search and Rescue units of other States for the purpose of searching for the site of aircraft accidents and rescuing survivors of such accidents.

(2) Other States parties, who wish their Aeronautical Search and Rescue units to enter the territory of Kenya for Aeronautical Search and Rescue purposes shall transmit a request, giving full details of the projected mission and the need for it, to the Director-General.

(3) Subject to subregulation (2), the Director General shall—

(a) acknowledge the receipt of such a request; and

(b) in coordination with relevant State agencies, as soon as possible, indicate the conditions, if any, under which the projected mission may be undertaken.

14. Cooperation with other services not forming part of the Aeronautical Search and Rescue organization

(1) All aircraft, vessels and local services and facilities, which do not form part of the Aeronautical Search and Rescue organization shall cooperate fully with the latter in Aeronautical Search and Rescue and extend any possible assistance to the survivors of aircraft accidents.

(2) Close coordination between relevant aeronautical and maritime authorities shall be maintained to provide for the most effective and efficient Aeronautical Search and Rescue services.

(3) The designated Aeronautical Search and Rescue agency shall ensure that its Search and Rescue services cooperate with those agencies responsible for investigating accidents and with those responsible for the care of those who suffer from the accidents.

(4) To facilitate accident investigation, rescue units shall, when practicable, be accompanied by persons qualified in the conduct of aircraft accident and incident investigations.

(5) The Authority shall designate a search and rescue point of contact for the receipt of COSPAS-SARSAT distress data.

15. Establishment of Aeronautical Search and Rescue Committee

(1) The Cabinet Secretary shall in coordination with the relevant government departments, establish an Aeronautical Search and Rescue Committee to ensure a coordinated and effective Aeronautical Search and Rescue service within Kenya.

(2) The Aeronautical Search and Rescue Committee shall comprise representatives from—

(a) the Ministry responsible for civil aviation;

(b) the Authority;

(c) air traffic services;

(d) aircraft operators;

(e) Kenya Defence Forces;

(f) the Kenya Maritime Authority;

(g) National Police Service;

(h) the Meteorological Services;

(i) Kenya Airports Authority;

(j) Airline Pilots Association;

(k) Accident Investigation Bureau;

(l) the Disaster Management Unit; and

(m) such other persons as may be determined by the Cabinet Secretary.

(3) The Cabinet Secretary shall appoint the chairperson of the committee from among the members, whose role shall be to coordinate the functions of the committee with the assistance of a secretary appointed by the committee from among its members.

(4) The committee shall in coordination with the designated Aeronautical Search and Rescue agency ensure the effective delivery of Aeronautical Search and Rescue services within the Aeronautical Search and Rescue region in accordance with these Regulations.

(5) Notwithstanding subregulation (4), the committee shall in coordination with the designated Aeronautical Search and Rescue agency, be responsible for—

(a) developing and recommending the national strategic Aeronautical Search and Rescue policy;

(b) coordination of administrative and operational matters regarding Aeronautical Search and Rescue of aircraft;

(c) providing an interface between the national and other regional and international organizations involved in Aeronautical Search and Rescue operations;

(d) overseeing the implementation of the Aeronautical Search and Rescue plan for Kenya and of procedures contained in the Aeronautical Search and Rescue Manual;

(e) coordinating arrangements for Aeronautical Search and Rescue training and exercises required by the Aeronautical Search and Rescue plan including follow-up of actions recommended following the conduct of Aeronautical Search and Rescue exercises;

(f) promoting effective use of all available facilities for Aeronautical Search and Rescue;

(g) serving as a co-operative forum to exchange information and develop positions and policies of interest to Parties involved in the Plan;

(h) promoting close co-operation and co-ordination between civilian and military authorities and organizations for the provision of effective Aeronautical Search and Rescue services;

(i) improving co-operation among aeronautical, maritime and land Aeronautical Search and Rescue communities for the provision of effective Aeronautical Search and Rescue services;

(j) coordinating Aeronautical Search and Rescue exercises as necessary;

(k) ensuring the availability of appropriately packed, droppable life support equipment that is securely positioned and maintained at strategic locations throughout the Aeronautical Search and Rescue region and readily available for rapid loading onto Aeronautical Search and Rescue Units;

(l) determining other ways to enhance the overall effectiveness and efficiency of Aeronautical Search and Rescue services within Kenya and to standardize Aeronautical Search and Rescue procedures and equipment where practicable; and

(m) conduct a post mortem following an Aeronautical Search and Rescue exercise or activity and advise the Director- General of its findings and recommendations.

(6) The Committee shall meet at least twice a year to discuss matters related to its functions pursuant to subregulation (5) and to make any necessary recommendations to the Director-General on matters affecting aeronautical Search and Rescue services in Kenya.

(7) The chairperson of the committee may at any time and in coordination with the designated Aeronautical Search and Rescue agency, call a special meeting of the committee when circumstances so require at a time and place to be determined and shall notify the members of the committee in writing.

16. Dissemination of information

(1) The designated Aeronautical Search and Rescue agency shall—

(a) publish in the Kenya AIP the Aeronautical Search and Rescue point of contact for the receipt of COSPAS-SARSAT distress data;

(b) publish in the AIP the arrangements and information necessary for the entry into Kenya of Aeronautical Search and Rescue units of other States for the purpose of Aeronautical Search and Rescue of aircraft;

(c) make available, through the rescue coordination centres or other agencies, information regarding Aeronautical Search and Rescue plans of operation.

(2) The Authority shall, to the extent desirable and practicable, disseminate information to the general public and emergency response authorities regarding actions to be taken when there is reason to believe that an aircraft's emergency situation may become cause for public concern or require a general emergency response.

PART IV – PREPARATORY MEASURES

17. Preparatory information

(1) The designated Aeronautical Search and Rescue agency shall make readily available, at all times, up to-date information concerning the following in respect of its Aeronautical Search and Rescue region, Aeronautical Search and Rescue units, rescue sub-centres and alerting posts, and air traffic services units—

(a) means of communication that may be used in Aeronautical Search and Rescue operations;

(b) addresses and telephone numbers of all operators, or their designated representatives, engaged in operations in the region; and

(c) any other public and private resources including medical and transportation facilities that are likely to be useful in Aeronautical Search and Rescue.

(2) The designated Aeronautical Search and Rescue agency shall ensure that the rescue coordination centre has readily available all other information of interest to Aeronautical Search and Rescue, including information regarding—

(a) the locations, call signs, hours of watch, and frequencies of all radio stations likely to be employed in support of Aeronautical Search and Rescue operations;

(b) the locations and hours of watch of services keeping radio watch, and the frequencies guarded;

(c) locations where supplies of droppable emergency and survival equipment are stored; and

(d) objects which it is known might be mistaken for unallocated or unreported wreckage, particularly if viewed from the air.

(3) The rescue coordination centre shall coordinate with the marine Aeronautical Search and Rescue units to have ready access to information regarding the positions, course and speed of ships within areas that may be able to provide assistance to aircraft in distress and information on how to contact such ships.

(4) The designated Aeronautical Search and Rescue agency shall in cooperation with other States and the maritime authority arrange communication links with Anvers or regional ship reporting systems to facilitate Aeronautical Search and Rescue operations at sea.

(5) The designated Aeronautical Search and Rescue agency shall provide relevant information on the availability of Aeronautical Search and Rescue Units within the Aeronautical Search and Rescue region for publication in the AIP.

18. Aeronautical Search and Rescue plan of operation

(1) The designated Aeronautical Search and Rescue agency shall prepare detailed plans of operation for the conduct of Aeronautical Search and Rescue operations within the Aeronautical Search and Rescue region.

(2) Aeronautical Search and Rescue plan of operations shall be developed jointly with representatives of the operators and other public or private services that may assist in providing Aeronautical Search and Rescue services or benefit from them, taking into account that the number of survivors could be large.

(3) The plans of operation shall specify arrangements for the servicing and refueling, to the extent possible, of aircraft, vessels and vehicles employed in Aeronautical Search and Rescue operations, including those made available by other States.

(4) The Aeronautical Search and Rescue plans of operation shall contain details regarding actions to be taken by those persons engaged in Aeronautical Search and Rescue, including—

(a) the manner in which Aeronautical Search and Rescue operations are to be conducted in the Aeronautical Search and Rescue region;

(b) the use of available communication systems and facilities;

(c) the actions to be taken jointly with other rescue coordination centres;

(d) the methods of alerting en-route aircraft and ships at sea;

(e) the duties and prerogatives of persons assigned to Aeronautical Search and Rescue;

(f) the possible redeployment of equipment that may be necessitated by meteorological or other conditions;

(g) the methods for obtaining essential information relevant to Aeronautical Search and Rescue operations, such as weather reports, forecasts and appropriate NOTAM;

(h) the methods for obtaining, from other rescue coordination centres, such assistance, including aircraft, vessels, persons or equipment, as may be needed;

(i) the methods for assisting distressed aircraft being compelled to ditch to rendezvous with surface craft;

(j) the methods for assisting Aeronautical Search and Rescue operation or other aircraft to proceed to aircraft in distress; and

(k) cooperative actions to be taken in conjunction with air traffic services units and other authorities concerned to assist aircraft known or believed to be subject to unlawful interference.

(5) Aeronautical Search and Rescue plans of operation shall be integrated with airport emergency plans to provide for rescue services in the vicinity of aerodromes including, for coastal aerodromes and areas of water.

(6) Aeronautical Search and Rescue plans for operation shall be integrated with emergency response plans developed by the air operators in accordance with the provisions of the Civil Aviation (Operation of Aircraft) Regulations.

(7) To facilitate the implementation of the Aeronautical Search and Rescue plan, the designated Aeronautical Search and Rescue agency shall prepare and keep updated an Aeronautical Search and Rescue manual containing the necessary procedures for Aeronautical Search and Rescue operations and matters connected therewith.

19. Aeronautical Search and Rescue units

The designated Aeronautical Search and Rescue agency shall ensure that each Aeronautical Search and Rescue unit—

(a) is cognizant of all parts of the plans of operation described in regulation 14 that are necessary for the effective conduct of its duties;

(b) keeps the rescue coordination centre informed of its preparedness;

(c) maintains readiness and the required number of Aeronautical Search and Rescue facilities; and

(d) maintains adequate supplies of rations, medical stores, signaling devices and other survival and rescue equipment.

20. Training and exercises

The designated Aeronautical Search and Rescue agency shall provide for regular training of its Aeronautical Search and Rescue personnel and arrange appropriate Aeronautical Search and Rescue exercises to achieve and maintain maximum efficiency in Aeronautical Search and Rescue operations.

21. Procedure at the scene of accidents

The Cabinet Secretary shall ensure that wreckage resulting from aircraft accidents within Kenya or, in the case of accidents on the high seas, within the Aeronautical Search and Rescue regions, is removed, obliterated or charted following completion of the accident investigation, if its presence might constitute a hazard or confuse subsequent Aeronautical Search and Rescue operations.

PART V – OPERATING PROCEDURES

22. Information concerning emergencies

(1) The rescue coordination centre shall immediately be given all available information concerning an aircraft believed to be in an emergency by the authority or any element of the search and rescue organization.

(2) The rescue coordination centre shall, immediately upon receipt of information concerning aircraft in emergency, evaluate such information and assess the extent of the operation required.

(3) When information concerning aircraft in emergency is received from other sources than air traffic services units, the rescue coordination centre shall determine to which emergency phase the situation corresponds and apply the procedures applicable to that phase.

23. Procedures for rescue coordination centre during emergency phases

(1) The rescue coordination centre shall upon the occurrence of an uncertainty phase, cooperate to the utmost with air traffic services units and other appropriate agencies and services in order that incoming reports may be speedily evaluated.

(2) The rescue coordination centre shall upon the occurrence of an alert phase, immediately alert Aeronautical Search and Rescue units and initiate any necessary action.

(3) The rescue coordination centre shall upon the occurrence of a distress phase—

(a) immediately initiate action by Aeronautical Search and Rescue units in accordance with the appropriate plan of operation;

(b) ascertain the position of the aircraft, estimate the degree of uncertainty of this position, and, on the basis of this information and the circumstances, determine the extent of the area to be searched;

(c) notify the operator, where possible, and keep the operator informed of developments;

(d) notify other rescue coordination centres, the help of which seems likely to be required, or which may be concerned in the operation;

(e) notify the associated air traffic services unit, when the information on the emergency has been received from another source;

(f) request at an early stage such aircraft, vessels, coastal stations and other services not specifically included in the appropriate plan of operation and able to assist to—

(i) maintain a listening watch for transmissions from the aircraft in distress, survival radio equipment or ELT 406Mhz;

(ii) assist the aircraft in distress as far as practicable; and

(iii) inform the rescue coordination centre of any developments;

(g) from the information available, draw up a detailed plan of action for the conduct of the search or rescue operation required and communicate such plan for the guidance of the authorities immediately directing the conduct of such an operation;

(h) amend as necessary, in the light of evolving circumstances, the detailed plan of action;

(i) notify the appropriate accident investigation authorities; and

(j) notify the State of Registry of the aircraft.

(4) Subject to subregulations (1), (2), and (3), the order in which the actions are described shall be followed unless circumstances dictate otherwise.

(5) In the event that an emergency phase is declared in respect of an aircraft whose position is unknown and may be in one of two or more Aeronautical Search and Rescue regions, the following shall apply—

(a) when a rescue coordination centre is notified of the existence of an emergency phase and is unaware of other centres taking appropriate action, it shall assume responsibility for initiating suitable action in accordance with these regulations and confer with neighboring rescue coordination centres with the objective of designating one rescue coordination centre to assume responsibility forthwith;

(b) unless otherwise decided by common agreement of the rescue coordination centres concerned, the rescue coordination centre to coordinate Aeronautical Search and Rescue action shall be the centre responsible for—

(i) the region in which the aircraft last reported its position;

(ii) the region to which the aircraft was proceeding when its last reported position was on the line separating two Aeronautical Search and Rescue regions;

(iii) the region to which the aircraft was destined when it was not equipped with suitable two-way radio communication or not under obligation to maintain radio communication; or

(iv) the region in which the distress site is located as identified by the COSPAS-SARSAT system;

(c) after declaration of the distress phase, the rescue coordination centre with overall coordination responsibility shall inform all rescue coordination centres that may become involved in the operation of all the circumstances of the emergency and subsequent developments;

(d) all rescue coordination centres becoming aware of any information pertaining to the emergency shall inform the rescue coordination centre that has overall responsibility.

(6) The rescue coordination centre responsible for Aeronautical Search and Rescue action shall forward to the air traffic services unit serving the flight information region in which the aircraft is operating, information of the Aeronautical Search and Rescue action initiated when passing information to aircraft in respect of which an emergency phase has been declared.

24. Procedures where responsibility for operations extends to two or more Rescue Coordination Centres (RCCs)

Where the conduct of operations over the entire Aeronautical Search and Rescue region is the responsibility of more than one rescue coordination centre, each involved rescue

coordination centre shall take action in accordance with the relevant plan of operations when so requested by the rescue coordination centre of the region.

25. Procedures for authorities in the field

The authorities immediately directing the conduct of Aeronautical Search and Rescue operations in the field or any part thereof shall—

(a) give instructions to the units under their direction and inform the rescue coordination centre of such instructions; and

(b) keep the rescue coordination centre informed of any developments.

26. Procedures for rescue coordination centretermination and suspension of operations

(1) Aeronautical Search and Rescue operations shall continue, when practicable, until all survivors are delivered to a place of safety or until all reasonable hope of rescuing survivors has passed.

(2) The rescue coordination centre shall be responsible for determining when to discontinue Aeronautical Search and Rescue operations.

(3) When an Aeronautical Search and Rescue operation has been successful or when a rescue coordination centre considers, or is informed, that an emergency no longer exists, the emergency phase shall be cancelled and the Aeronautical Search and Rescue operation terminated and any authorities, facilities or services that had been activated or notified, be promptly informed.

(4) If an Aeronautical Search and Rescue operation becomes impracticable and the rescue coordination centre concludes that there might still be survivors, the centre shall suspend on-scene activities pending further developments and promptly inform any agency, facility or service which has been activated or notified.

(5) Relevant information subsequently received shall be evaluated and Aeronautical Search and Rescue operations resumed when justified and practicable.

27. Procedures at the scene of an accident

(1) The rescue coordination centre or rescue sub-centre shall designate one or more units on scene to coordinate all actions to help ensure the safety and effectiveness of air and surface operations, taking into account facility capabilities and operational requirements when multiple facilities are engaged in Aeronautical Search and Rescue operations on scene.

(2) A pilot-in-command who observes that either another aircraft or a surface craft is in distress, shall, if possible and unless considered unreasonable or unnecessary—

(a) keep the craft in distress in sight until compelled to leave the scene or advised by the rescue coordination centre that it is no longer necessary;

(b) determine the position of the craft in distress;

(c) as appropriate, report to the rescue coordination centre or air traffic services unit as much of the following information as possible—

(i) type of craft in distress, its identification and condition;

(ii) its position, expressed in geographical or grid coordinates or in distance and true bearing from a distinctive landmark or from a radio navigation aid;

(iii) time of observation expressed in hours and minutes Coordinated Universal Time (UTC);

(iv) number of persons observed;

(v) whether persons have been seen to abandon the craft in distress;

(vi) on-scene weather conditions;

(vii) apparent physical condition of survivors;

(viii) apparent best ground access route to the distress site; and

(ix) act as instructed by the rescue coordination centre or the air traffic services unit.

(3) If the first aircraft to reach the scene of an accident is not an Aeronautical Search and Rescue aircraft, it shall take charge of on- scene activities of all other aircraft subsequently arriving until the first Aeronautical Search and Rescue aircraft reaches the scene of the accident.

(4) Subject to subregulation (3), if such aircraft is unable to establish communication with the appropriate rescue coordination centre or air traffic services unit, it shall, by mutual agreement hand over to an aircraft capable of establishing and maintaining such communications until the arrival of the first Aeronautical Search and Rescue aircraft.

(5) When it is necessary for an aircraft to convey information to survivors or surface rescue units, and two-way communication is not available, it shall, if practicable, drop communication equipment that would enable direct contact to be established, or convey the information by dropping a hard copy message.

(6) When a ground signal has been displayed, the aircraft shall indicate whether the signal has been understood or not by the means described in subregulation (5) or, if this is not practicable, by making the appropriate visual signal.

(7) When it is necessary for an aircraft to direct a surface craft to the place where an aircraft or surface craft is in distress, the aircraft shall do so by transmitting precise instructions by any means at its disposal and if no radio communication can be established, the aircraft shall make the appropriate visual signal.

28. Procedures for a pilot-in-command intercepting a distress transmission

Whenever a distress transmission is intercepted by a pilot-in-command of an aircraft, the pilot shall, if feasible—

(a) acknowledge the distress transmission;

(b) record the position of the craft in distress if given;

(c) take a bearing on the transmission;

(d) inform the appropriate rescue coordination centre or air traffic services unit of the distress transmission, giving all available information; and

(e) at the pilot's discretion, while awaiting instructions, proceed to the position given in the transmission.

29. Aeronautical Search and Rescue signals

(1) The air-to-surface and surface-to-air visual signals described in the Schedule shall, when used, have the meaning indicated therein and shall be used only for the purpose indicated and no other signals likely to be confused with them shall be used.

(2) Upon observing any of the signals, aircraft shall take such action as may be required by the interpretation of the signal given in the Schedule.

30. Maintenance of records, appraisals and information sharing

(1) The rescue coordination centre shall keep a record of the operational efficiency of the Aeronautical Search and Rescue organization in the region.

(2) The rescue coordination centre shall prepare appraisals of actual Aeronautical Search and Rescue operations in the region and the reports shall include any pertinent remarks on the procedures used and on the emergency and survival equipment, and any suggestions for improvement of those procedures and equipment.

(3) The appraisals which are likely to be of interest to other States shall be submitted to ICAO for information and dissemination as appropriate.

PART VI – GENERAL PROVISIONS

31. Requisition of aircraft or vessel

(1) The Cabinet Secretary may for purposes of any aeronautical Search and Rescue operation—

(a) make requisition for any civil aircraft or vessel;

(b) request the assistance of any military aircraft or vessel; or

(c) request any holder of a Kenya aircraft flight crew license or the master of a vessel to assist in the operation.

(2) Where the Cabinet Secretary contemplates requisitioning a civilian aircraft or vessel or requesting a civilian holder of a Kenyan aircraft flight crew license or the master of a vessel, the Cabinet Secretary may do so only if—

(a) human life is in immediate and grave danger; and

(b) there are no other means available to conduct the operation.

32. Recovery of certain expenses

(1) If any Aeronautical Search and Rescue operation is undertaken in connection with any occurrence caused by the unlawful act or omission of any person, the Cabinet Secretary may recover from that person the whole or any portion of the expenses incurred in connection with that operation.

(2) The Cabinet Secretary may, after having recovered the expenses contemplated in subregulation (1), compensate any person who has incurred any loss or damage as a result of the operation.

(3) Subject to subregulations (1) and (2), the Cabinet secretary shall determine and notify in writing the expenses to be recovered depending on the nature of the unlawful act or omission.

33. Record keeping by the designated Aeronautical Search and Rescue agency

The designated Aeronautical Search and Rescue agency shall retain all data relating to every Aeronautical Search and Rescue action undertaken by the rescue coordination centre in an orderly and easily accessible manner for a period of at least twelve calendar months.

34. Failure to comply with direction or instructions

(1) Any person who fails to comply with any direction or instructions given to him or her under these Regulations shall be deemed for the purpose of these Regulations to have contravened that provision.

(2) Any person who becomes aware of a violation of the provisions of any of these Regulations, rules or orders issued thereunder, shall without delay report it to the Authority.

(3) The Authority shall upon being notified of a violation, determine the nature and type of investigation or enforcement action that need to be taken.

35. Appeals to the Tribunal

A person aggrieved with the decision of the Authority under these Regulations may within twenty one days of such decision appeal to the Tribunal.

36. Transition provision

(1) Any person carrying out any activities prescribed in these Regulations immediately before the coming into operation of these Regulations shall, within twelve months from the coming into force thereof, take all necessary measures to ensure full compliance with these Regulations.

(2) A license, certificate, approval or any other document issued prior to the commencement of these Regulations shall continue in force as if it was issued under these Regulations until it expires or is cancelled by the Authority.

SCHEDULE

[r. 29(1)&(2)]

AERONAUTICAL SEARCH AND RESCUE SIGNALS

1. Signals with surface craft

1.1 The following maneuvers performed in sequence by an aircraft mean that the aircraft wishes to direct a surface craft towards an aircraft or a surface craft in distress—

(a) circling the surface craft at least once;

(b) crossing the projected course of the surface craft close ahead at low altitude, but not—

(c) lower than 500 ft above ground level, and

(i) rocking the wings;

(ii) opening and closing the throttle; or

(iii) Changing the propeller pitch

Note —Due to high noise level on board surface craft, the sound signals in (ii) and (iii) may be less effective than the visual signal in (i) and are regarded as alternative means of attracting attention.

(d) heading in the direction in which the surface craft is to be directed.

Note—Repetition of such maneuvers has the same meaning.

1.2 The following maneuvers by an aircraft means that the assistance of the surface craft to which the signal is directed is no longer required—

(a) crossing the wake of the surface craft close astern at a low altitude and—

(i) rocking the wings;

(ii) opening and closing the throttle; or

(iii) changing the propeller pitch.

Note: The following replies may be made by surface craft to the signal in 1.1—

(b) for acknowledging receipt of signals—

(i) the hoisting of the "code pennant" (vertical red and white stripes) close up (meaning understood);

(ii) the flashing of a succession of "T's" by signal lamp in the Morse code;

(iii) the changing of heading to follow the aircraft;

(c) for indicating inability to comply—

(i) the hoisting of the international flag "N" (a blue and white checkered square);

(ii) the flashing of a succession of "N's" in the Morse code.

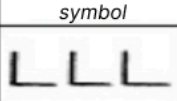
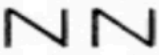
Note.— See Note following 1.1 b), 3).

2. Ground-air visual signal code

2.1 Ground-air visual signal code for use by survivors

No.	*Message*	*Code symbol*
1	Require assistance	
2	Require medical assistance	
3	No or Negative	
4	Yes or Affirmative	
5	Proceeding in this direction	

2.1 Ground-air visual signal code for use by rescue units.

No.	*Message*	*Code symbol*
1	Operation completed	
2	We have found all personnel	
3	We have found only some personnel	
4	We are not able to continue. Returning to base	
5	Have divided into two groups. Each proceeding in direction indicated	
6	Information received that aircraft is in this direction	
7	Nothing found. Will continue to search	

2.2 Symbols shall be at least 2.5 metres (8 feet) long and shall be made as conspicuous as possible.

Note 1.—Symbols may be formed by any means such as: strips of fabric, parachute material, pieces of wood, stones or such like material; marking the surface by tramping, or staining with oil.

Note 2. — Attention to the above signals may be attracted by other means such as radio, flares, smoke and reflected light.

Air-to-ground signals

3.1 The following signals by aircraft mean that the ground signals have been understood —

(a) during the hours of daylight by rocking the aircraft's wings;

(b) during the hours of darkness—

(i) flashing on and off twice the aircraft's landing lights or,

(ii) if not so equipped, by switching on and off twice its navigation lights.

3.2. Lack of the above signal indicates that the ground signal is not understood.

THE CIVIL AVIATION (CONSTRUCTION OF VISUAL AND INSTRUMENT FLIGHT PROCEDURES) REGULATIONS, 2018

ARRANGEMENT OF REGULATIONS

THE CIVIL AVIATION (CONSTRUCTION OF VISUAL AND INSTRUMENT FLIGHT PROCEDURES) REGULATIONS, 2018

[Legal Notice 121 of 2018]

PART I – PRELIMINARY

1. Citation.

These Regulations may be cited as the Civil Aviation (Construction of Visual and Instrument Flight Procedures) Regulations.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"Act" means the Civil Aviation Act, 2013;

"aerodrome operating minima" means the limits of usability of an aerodrome for—

(a) take-off, expressed in terms of runway visual range or visibility and, if necessary, cloud conditions;

(b) landing in precision approach and landing operations, expressed in terms of visibility or runway visual range and decision altitude or height as appropriate to the category of the operation;

(c) landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude or height; and

(d) landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude or height and, if necessary, cloud conditions;

"aerodrome reference point" means the certificated geographical location of an aerodrome;

"aeronautical chart" means a representation of a portion of the earth, its culture and relief, specifically certificated to meet the requirements of air navigation;

"aeronautical data" means a representation of aeronautical facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing;

"aeronautical information" means information resulting from the assembly, analysis and formatting of aeronautical data;

"Aeronautical Information Circular (AIC)" means a notice containing information that does not qualify for the origination of a Notice To Air Men or for inclusion in the Aeronautical Information Publication, but which relates to flight safety, air navigation, technical, administrative or legislative matters;

"aeronautical information publication" means a publication issued by or with the authority of a state and containing aeronautical information of a lasting character essential to air navigation;

"aeronautical information service" means a service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation;

"aeronautical information publication amendment" means permanent change to information contained in the aeronautical information publication;

"aeronautical information publication supplement" means temporary changes to the information contained in the aeronautical information publication which are published by means of special pages;

"air navigation services" means the following services provided for air navigation—

(a) air traffic services or air traffic management;

(b) instrument flight procedure design services;

(c) aeronautical information services or aeronautical information management;

(d) aeronautical cartographic services;

(e) aeronautical telecommunication services; and

(f) aeronautical search and rescue;

"air navigation services provider" means an independent entity established for the purpose of providing one or more of the air navigation services as defined in these Regulations;

"area navigation" means a method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these;

"arrival routes" means routes identified in an instrument approach procedure by which aircraft may proceed from the en-route phase of flight to an initial approach fix;

"air traffic service route" means a specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services;

"Authority" means Kenya Civil Aviation Authority;

"certificate" means the certificate for the provision of air navigation services issued by the Authority under Part II of these Regulations;

"flight procedure design" means either Instrument Flight Procedures or Visual Flight Procedures;

"instrument approach procedure" means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply;

"instrument flight procedure design service" means a service established for the design, documentation, validation, maintenance and periodic review of instrument flight procedures necessary for the safety, regularity and efficiency of air navigation;

"integrated aeronautical information product" means aeronautical data and aeronautical information provided either as digital data sets or as a standardized presentation in paper or electronic media and includes—

(a) aeronautical information publication, including amendments and supplements;

(b) aeronautical information circulars;

(c) aeronautical charts;

(d) notice to air men; and

(e) digital data sets;

"integrity (aeronautical data)" means a degree of assurance that an aeronautical data and its value has not been lost nor altered since the data origination or authorized amendment;

"integrity classification (aeronautical data)" means classification based upon the potential risk resulting from the use of corrupted data classified as—

(a) routine data: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

(b) essential data: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and

(c) critical data: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

"missed approach point" means that point in an instrument approach procedure at or before which the prescribed missed approach procedure must be initiated in order to ensure that the minimum obstacle clearance is not infringed;

"missed approach procedure" means that procedure to be followed if the approach cannot be continued;

"nautical mile" means the length equal to 1 852 metres exactly;

"navigation specification" means a set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace and here are two kinds of navigation specifications—

(a) area Navigation specification — a navigation specification based on area navigation that does not include the requirement for on-board performance monitoring and alerting, certificated by the prefix RNAV; and

(b) required navigation performance specification — a navigation specification based on area navigation that includes the requirement for on-board performance monitoring and alerting, certificated by the prefix RNP;

"obstacle" means all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that—

(a) are located on an area intended for the surface movement of aircraft;

(b) extend above a defined surface intended to protect aircraft in flight; or

(c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation;

"obstacle clearance altitude or obstacle clearance height" means the lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria;

"obstacle free zone" means the airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangibly mounted one required for air navigation purposes;

"obstacle or terrain data collection surface" means a defined surface intended for the purpose of collecting obstacle or terrain data;

"operator" means a person, organization or enterprise engaged in or offering to engage in an aircraft operation;

"operations manual" means a manual prepared by a service provider or a person applying for approval;

"Performance Based Navigation" means area navigation based on performance requirements for aircraft operating along an air traffic service route, on an instrument approach procedure or in a certificated airspace;

"precision approach procedure" means an instrument approach procedure utilizing azimuth and glide path information provided by an Instrument landing system or precision approach radar;

"procedure altitude or height" means a specified altitude/height flown operationally at or above the minimum altitude/height and established to accommodate a stabilized des cent at a prescribed descent gradient/angle in the intermediate or final approach segment;

"procedure turn" means a manoeuvre in which a turn is made away from a certificated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the certificated track;

"quality" means a degree to which a set of inherent characteristics fulfils requirements;

"quality assurance" means part of quality management focused on providing confidence that quality requirements will be fulfilled;

"quality control" means part of quality management focused on fulfilling quality requirements;

"quality management" means coordinated activities to direct and control an organization with regard to quality;

"quality system" means the organisational structure, procedures, processes and resources needed to implement quality management;

"reliability" means the probability that the service will perform its function or functions without failure for a specified period;

"resolution" means a number of units or digits to which a measured or calculated value is expressed and used;

"safety management system" means a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures;

"significant point" means a specified geographical location used in defining an air traffic service route or the flight path of an aircraft and for other navigation and air traffic service purposes;

"state safety programme" means an integrated set of regulations and activities aimed at improving safety;

"terminal arrival altitude" means the lowest altitude that will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an arc of a circle defined by a 46 km (25 NM) radius centred on the initial approach fix, or where there is no initial approach fix on the intermediate approach fix, delimited by straight lines joining the extremity of the arc to the Intermediate Fix. The combined Terminal Arrival Altitude s associated with an approach procedure shall account for an area of 360 degrees around the Intermediate Fix;

"terminal control area" means a control area normally established at the confluence of air traffic services routes in the vicinity of one or more major aerodromes;

"terrain" means the surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles;

"touchdown and lift-off area" means a load bearing area on which a helicopter may touch down or lift off;

"touchdown zone" means the portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway;

"transition altitude" means the altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes;

"visual approach procedure" means a series of predetermined manoeuvres by visual reference, from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, a go-around procedure can be carried out;

"waypoint" means a specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation identified as either—

(a) "fly-by waypoint" meaning a waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure, or

(b) "flyover waypoint" meaning a waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

3. Application

These Regulations shall apply to a person providing Flight Procedure Design Services within certificated airspaces and at aerodromes for civil aviation purposes.

PART II – REQUIREMENTS

4. Requirements for the provision of an Instrument Flight Procedure Design Service

A person shall not provide an Instrument Flight Procedure Design Service within Kenya unless—

(a) that person holds a certificate issued under the Civil Aviation (Certification of Air Navigation Services Provider) Regulations; and

(b) the services are provided in accordance with—

(i) the requirements prescribed in these Regulations or any other publications issued by the Authority; and

(ii) the procedures specified in the service providers' Manual of Air Navigation Service Operations.

5. Designation of Instrument Flight Procedure Design Service Provider

(1) A person shall not design, maintain, review, amend, adapt or publish flight procedures for use in Kenya unless certificated by the Authority and in accordance with these Regulations.

(2) An Instrument Flight Procedure Design Services Provider certificated by the Authority shall—

(a) follow an instrument flight procedure process that encompasses acquisition of data, design and promulgation of procedures;

(b) ensure that the quality and safety of the procedure design product are assured through review, verification, coordination and validation of the procedure at appropriate points in the process; and

(c) ensure that the units of measurement, as specified in the Civil Aviation (units of measurement to be used in air and ground operations) regulations are used in the design of instrument flight procedure.

6. Instrument Flight Procedure Design Operational requirements

(1) The certificated Instrument Flight Procedures Design Service Provider shall—

(a) maintain an appropriate instrument design office to enable the Instrument Flight Procedure designers to carry on design work in Instrument flight Procedures in accordance with these Regulations;

(b) ensure that the designs of instrument flight procedure are in accordance with —

(i) requirements in these Regulations;

(ii) the criteria prescribed by the Authority; and

(c) make provisions for person(s) trained in Instrument Flight Procedure design to check and verify independently the plans of each instrument flight procedure designed.

7. Instrument Flight Procedure Design Service Provider Operations Manual

(1) The certificated service provider shall develop and maintain an operations manual which shall serve to demonstrate compliance with the requirements set out in these Regulations.

(2) The contents of the operations manual shall include but not limited to the following—

(a) the information required of the certificated Instrument Flight Procedures Design service provider as mentioned in these Regulation; and

(b) a description of the instrument flight procedure design Service Provider's office that shows the role, responsibilities and job functions of the Flight Procedure Design office personnel who are responsible for ensuring the compliance of the organization with the requirements in sub-paragraph (a).

(3) The certificated service provider shall—

(a) keep the operations manual in a readily accessible form;

(b) ensure that the instrument flight procedure designer has ready access to the operations manual# and

(c) amend the operations manual whenever necessary to keep its content up to date.

(4) The certificated service provider shall submit a copy of the most current operations manual to the Authority for approval.

8. Employment of personnel

The certificated instrument flight procedure design organization shall—

(a) employ, contract, or engage sufficient personnel to plan, design, verify, and maintain the instrument flight procedures; and

(b) develop job descriptions for its Procedure design technical staff.

9. Instrument Flight Procedure designer training, experience and approval

(1) The certificated service provider shall ensure that a person designing or amending a flight instrument procedure demonstrates required competency level for flight procedure design.

(2) The personnel to be recruited as Instrument Flight Procedure Designer shall have a high level of aviation experience gained from different domains in the aviation industry (Air Traffic Management, Engineers, Aeronautical technicians and pilots or any other equivalent profession).

(3) Instrument Flight Procedure designers shall acquire and maintain this competency level through training and supervised on - the - job training.

(4) The certificated service provider shall ensure that the instrument flight procedure designer is able to demonstrate a basic level of competency through initial and recurrent training at periodic intervals that includes at least the following elements—

(a) knowledge of information contained in manuals pertaining to the design of instrument flight procedures as prescribed by the Authority;

(b) enhancement of knowledge and skills in the design of procedures; and

(c) competency as outlined in the competency framework for flight procedures designers as prescribed by the Authority.

(5) The certificated service provider shall—

(a) develop and implement training programme and a training plan that is commensurate to the technical competence required by its staff; and

(b) shall maintain training records for their instrument flight procedure designers.

(6) Only designers approved by the Authority shall undertake the design, review, validation of Instrument Flight Procedures for operational use.

(7) A person seeking approval as required in subregulation (6) shall—

(a) provide proof of successful completion of the International Civil Aviation Organization PANS-OPS training course applicable to the approval being requested based on the International Civil Aviation Organization PANS-OPS criteria;

(b) demonstrate practical application of theoretical knowledge through the design of two instrument flight procedures under supervision of a qualified designer; and

(c) demonstrate ability to maintain a documented quality assurance process for procedure design.

(8) An approved procedure designer shall only design Instrument Flight Procedures within the scope of their approval.

10. Procedure design data and information acquisition

(1) The certificated service provider shall ensure that the quality characteristics of data acquired for the Flight Procedure Design process are known and adequate, or that, in the case where the data's quality characteristics are unknown or inadequate, that appropriate data verification occurs prior to use.

(2) In the obstacle survey for procedure design, the instrument flight procedure designer shall consider that—

(a) all obstacles be accounted for and items such as trees and heights of tall buildings shall be accounted for either by physical examination of the site or by addition of a suitable margin above terrain contours; and

(b) the accuracy of the vertical and horizontal data obtained may be adjusted by adding an amount equal to the specified survey error to the height of all measured obstructions and by making a corresponding adjustment for specified horizontal error.

(3) The procedure design data and information acquisition shall be coordinated with all relevant stakeholders and integrated into Kenya's airspace design process, taking into account air traffic flows, separation issues, airspace user requirements, infrastructure and legal environmental considerations.

11. Quality assurance

The certificated service provider shall establish and implement a quality assurance process for all instrument flight procedure design functions.

12. Procedure design facility and resource requirements

(1) A certificated service provider shall provide and maintain adequate facilities for carrying on design work on instrument flight procedures under the procedure design certificate, including—

(a) providing premises and equipment appropriate for the design, design verification, flight validation, and maintenance of applicable types of instrument flight procedures;

(b) access to relevant and current data including, but not limited to, aeronautical data, land contour data, and obstacle data for the design, design verification, flight validation, and maintenance of the instrument flight procedure;

(c) the data referred to in paragraph (b) is current, traceable, and meets the required level of accuracy for the design, design verification, flight validation, and maintenance of instrument flight procedures;

(d) access to copies of relevant documentation comprising technical standards, practices, and instructions, and any other documentation that may be necessary for the design, design verification, flight validation, and maintenance of the types of instrument flight procedure;

(e) establish a procedure for controlling all documentation required by subregulation (d) to ensure that—

(i) the documentation is reviewed and authorized by an appropriate person before issue and use;

(ii) current versions of relevant documentation are available to personnel;

(iii) every obsolete document is promptly removed from every point of use; and

(iv) the current version of every item of documentation can be identified to prevent the use of superseded material;

(f) ensuring that Instrument Flight Procedure designers have access to all necessary data for designing the procedures including—

(i) accurate and current databases or charts detailing terrain and obstacle information; and

(ii) accurate and current navigation aid coordinate data; and

(iii) accurate and current aerodrome reference point and threshold data; and

(g) ensuring that if an aeronautical database and aeronautical data are required for designing instrument flight procedure under its certificate, have, and put into effect, procedures to ensure the integrity of the database and the data.

(2) The certificated service provider shall ensure that if an aeronautical database and aeronautical data are required for designing instrument flight procedure under its certificate, have, and put into effect, procedures to ensure the integrity of the database and the data.

13. Control of Documents and records

The certified service provider shall—

(a) establish and put into effect, a system for controlling documents and records relating to the instrument flight procedure and visual flight procedure on which the designer carries on design work, including the policies and procedures for making, amending, preserving and disposing of those documents and records; and

(b) at Authority's request, make the documents and records, or copies of them or extracts from them, available for inspection.

14. Instrument flight procedure design (IFPD)

(1) Instrument flight procedures shall be designed in accordance with these Regulations, and Procedures prescribed by the Authority.

(2) Coordination with all concerned parties shall continue throughout the procedure design and validation process to ensure that the procedure meets the needs of the user community.

(3) The certificated service provider shall ensure that—

(a) each new or revised procedure is verified by a qualified procedure designer other than the one who designed the procedure;

(b) published procedures are subject to periodic review at intervals not exceeding five years to ensure that they continue to comply with changing criteria and user requirements;

(c) designers develop and maintain instrument flight procedures design documentation that includes—

(i) information required for publication in the Aeronautical Information Publication;

(ii) details and assumptions made by the instrument flight procedure designer, such as—

(aa) controlling obstacle for each segment of the procedure;

(ab) effect of environmental considerations on the design of the procedure;

(ac) infrastructure assessment;

(ad) airspace constraints;

(ae) for modifications or amendments to existing procedures, the reasons for any changes;

(af) for any deviation from existing standards, the reasons for such a deviation and details of the mitigations applied to assure continued safe operations; and

(ag) the results of the final verification for accuracy and completeness prior to validation and publication.

(d) the design records are retained for a period not less than the operational lifetime of the procedure;

(e) all calculations and results of calculations are presented in a manner that enables the reader to follow and trace the logic and resultant output;

(f) records of all calculations in paragraph (e) are kept in order to prove compliance to or variation from the standard criteria;

(g) all documentation undergo a final verification for accuracy and completeness prior to validation and publication;

(h) all documentation are retained for a period of not be less than the operational lifetime of the procedure to assist in recreating the procedure in the future in the case of incidents and for periodic review and maintenance;

(i) ground validation is undertaken by a qualified flight procedure designer with appropriate knowledge of validation issues;

(j) Flight validation is conducted whenever the following conditions exist—

(i) the fly ability of a procedure cannot be determined by other means;

(ii) the procedure requires mitigation for deviations from design criteria;

(iii) the accuracy or integrity of obstacle and terrain data cannot be determined by other means;

(iv) new procedures differ significantly from existing procedures; and

(v) for helicopter pins procedures.

15. Competency of flight validation pilots

(1) The certificated service provider shall ensure that a person conducting flight validation including simulator evaluation is a qualified and experienced flight validation pilot.

(2) The qualifications for Flight Validation Pilot shall include—

(a) at least a commercial pilot licence with instrument rating;

(b) a requirement that the licence held by the Flight Validation Pilot shall be for the aircraft category appropriate for the procedure to be validated# and

(c) meet all the experience requirements for the airline transport pilot licence in the relevant category of aircraft as described in personnel licensing regulations except that the Flight Validation Pilot does not have to be the pilot-in-command of the validation flight nor is he required to have the type rating on the aircraft used for the validation flight.

(3) The instrument flight procedures designer shall provide all data required to conduct a flight validation, flight inspection, and flight simulator evaluation to the entity conducting the exercise.

16. Approval of instrument flight procedures

(1) An instrument flight procedure for use by civil aircraft within Kenya shall not be published unless the instrument flight procedure is approved by the Authority.

(2) The Authority shall only accept instrument flight procedures for approval, submitted by approved procedure designers.

(3) For Instrument Flight Procedures designed by approved procedure designers independently outside the certificated organization the submission of approval shall be in line with these regulations.

17. IFPD publication

(1) The certificated service provider shall ensure that instrument flight procedures designs or charts, are provided to the aeronautical information service provider for publication in the Aeronautical Information Publication.

(2) The IFP shall be accompanied by a narrative, which describes the procedure in textual format.

18. Use of automation in procedure design and flight validation

(1) The certificated service provider using an automated flight procedure design tool shall ensure that such tool is validated.

(2) Validation of the software shall be in accordance with the requirements prescribed by the Authority.

(3) The scope of validation shall include compliance with the criteria set out by the Authority.

(4) The flight validation tools required under this section shall include the use of equipment that—

(a) has the precision, and accuracy traceable to appropriate standards, that are necessary for the validation being performed;

(b) has known measurement uncertainties including, but not limited to, the software, firmware and crosswind uncertainties;

(c) records the actual flight path of the validation aircraft;

(d) is checked before being released for use, and at intervals not exceeding the calibration intervals recommended by the manufacturer, to establish that the system is capable of verifying the integrity of the instrument flight procedure; and

(e) is operated in accordance with flight validation system procedures and criteria by persons who are competent and current on the system used.

19. Errors in published instrument flight procedures

(1) The certificated service provider providing an instrument flight procedure service shall establish procedures for recording, investigating, correcting, and reporting, any identified error, and any identified non-conformance or suspected non-conformance with these Regulations.

(2) The procedure required by subregulation (1) shall require that—

(a) an instrument flight procedure is immediately withdrawn from operational use if the error or non-conformance affects, or may affect, the safety of an aircraft operation; and

(b) the error or non-conformance is corrected, and certified by a senior person who is appropriately authorized by the service provider;

(c) the correction required by paragraph (b) is clearly identified and promulgated by the most appropriate means relative to the operational significance of the error or non-conformance;

(d) the source of the error or non-conformance is identified, and—

(i) if possible, eliminated to prevent a recurrence; and

(ii) preventive action is taken to ensure that the source of the error or non-conformance has not affected the integrity of any other instrument flight procedure; and

(iii) the Authority is immediately notified, of a promulgated information incident relating to an error or non-conformance referred to in subparagraph (i) above.

20. Aerodrome operating minima

(1) The requirements for aerodrome operating minima are as specified in the Civil Aviation (Operation of Aircraft) Regulations.

(2) The procedures for the establishment of the aerodrome operating minima shall be prescribed by the Authority.

PART III – EXEMPTIONS

21. Requirements for application for exemption

(1) A person may apply to the Authority for an exemption from any provision of these Regulations.

(2) Unless in case of emergency, a person requiring exemptions from any of these regulations shall make an application to the Authority at least sixty days prior to the proposed effective date, giving the following information—

(a) name and contact address including electronic mail and fax if any;

(b) telephone number;

(c) a citation of the specific requirement from which the applicant seeks exemption;

(d) justification for the exemption;

(e) a description of the type of operations to be conducted under the proposed exemption;

(f) the proposed duration of the exemption;

(g) an explanation of how the exemption would be in the public interest;

(h) a detailed description of the alternative means by which the applicant will ensure a level of safety equivalent to that established by the regulation in question;

(i) a safety risk assessment carried out in respect of the exemption applied for;

(j) an indication whether the exemption would contravene any provision of the Standards and Recommended Practices of the International Civil Aviation Organization; and

(k) any other information that the Authority may require.

(3) Where the applicant seeks emergency processing of an application for exemption, the application shall contain supporting facts and reasons for not filing the application within the time specified in subregulation (2) and satisfactory reason for deeming the application an emergency.

(4) The Authority may in writing, decline an application made under subregulation (3), where in the opinion of the Authority, the reasons given for emergency processing are not satisfactory.

(5) The application for exemption shall be accompanied by fee prescribed by the Authority.

22. Review and publication

(1) The Authority shall review the application for exemption made under these regulations for accuracy and compliance and if the application is satisfactory, the Authority shall publish a detailed summary of the application for comments, within a prescribed time, in either—

(a) the Kenya Gazette;

(b) aeronautical information circular; or

(c) a daily newspaper with national circulation.

(2) Where application requirements have not been fully complied with, the Authority shall request the applicant in writing, to comply prior to publication or making a decision under subregulation (3).

(3) If the request is for emergency relief, the Authority shall publish the decision as soon as possible after processing the application.

23. Evaluation of the request

(1) Where the application requirements have been satisfied,

the Authority shall conduct an evaluation of the request to include—

(a) determination of whether an exemption would be in the public interest;

(b) a determination, after a technical evaluation of whether the applicant's proposal would provide a level of safety equivalent to that established by the regulation, although where the Authority decides that a technical evaluation of the request would impose a significant burden on the Authority's technical resources, the Authority may deny the exemption on that basis;

(c) a determination of whether a grant of the exemption would contravene these Regulations; and

(d) a recommendation based on the preceding elements, of whether the request should be granted or denied, and of any conditions or limitations that should be part of the exemption.

(2) The Authority shall notify the applicant in writing, the decision to grant or deny the request and publish a detailed summary of its evaluation and decision.

(3) The summary referred to in subregulation (2) shall specify the duration of the exemption and any conditions or limitations of the exemption.

(4) If the exemption affects a significant population of the aviation community in Kenya, the Authority shall publish the summary in aeronautical information circular.

24. Validity of an exemption

The validity of any exemption issued under these regulations shall be dependent on the air navigation service provider complying with any condition that Authority may specify in the exemption as being necessary in the interests of safety of air navigation.

25. Compliance with conditions of the exemption

An air navigation service provider shall comply with any condition specified by the Authority in the exemption.

PART IV – OFFENCES AND PENALTIES

26. Contravention of Regulations

A person who contravenes any provision of these Regulations may have his certificate or exemption cancelled or suspended.

27. Penalties

(1) A person who contravenes any provision of these Regulations, orders, notices or proclamations made thereunder shall, upon conviction, be liable to a fine or imprisonment or both, and in the case of a continuing contravention, each day of the contravention shall constitute a separate offence.

(2) Any person who contravenes any provision of these Regulations shall upon conviction be subject to the penalty provisions provided in the Act.

(3) If it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these Regulations, orders, notices or proclamations made there under was due to any cause not avoidable by the exercise of reasonable care by that person, the act or omission shall be deemed not to be a contravention by that person of that provision.

28. Appeal

A person aggrieved by any order made under these Regulations may, within twenty one days of such order being made, appeal against the order to a court of law with competent jurisdiction.

THE CIVIL AVIATION (UNITS OF MEASUREMENT TO BE USED IN AIR AND GROUND OPERATIONS), REGULATIONS 2018

ARRANGEMENT OF REGULATIONS

THE CIVIL AVIATION (UNITS OF MEASUREMENT TO BE USED IN AIR AND GROUND OPERATIONS), REGULATIONS 2018

[Legal Notice 120 of 2018]

PART I – PRELIMINARY

1. Citation

These Regulations may be cited as the Civil Aviation (Units of Measurement to be used in Air and Ground Operations), Regulations.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"ampere (A)" means that constant electric current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 metre apart in a vacuum, would produce between these conductors a force equal to 2×10^{-7} newton per metre of length;

"becquerel (Bq)" means the activity of a radionuclide having one spontaneous nuclear transition per second;

"candela (cd)" means the luminous intensity, in the perpendicular direction, of a surface of 1/600 000 square metre of black body at the temperature of freezing platinum under a pressure of 101 325 newtons per square metre;

"celsius temperature (t°C)" means the Celsius temperature is equal to the difference $t°C = T-T_0$ between two thermodynamic temperatures T and T_0 where T_0 equals 273.15 Kelvin;

"coulomb (C)" means the quantity of electricity transported in 1 second by a current of 1 ampere;

"degree celsius (°C)" means the special name for the unit Kelvin for use in stating values of Celsius temperature;

"farad (F)" means the capacitance of a capacitor between the plates of which there appears a difference of potential of 1 volt when it is charged by a quantity of electricity equal to 1 coulomb;

"foot (ft)" means the length equal to 0.3048 metre exactly;

"gray (Gy)" means the energy imparted by ionizing radiation to a mass of matter corresponding to 1 joule per kilogram;

"henry (H)" means the inductance of a closed circuit in which an electromotive force of 1 volt is produced when the electric current in the circuit varies uniformly at a rate of 1 ampere per second;

"hertz (Hz)" means the frequency of a periodic phenomenon of which the period is 1 second;

"human performance" means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;

"joule (J)" means the work done when the point of application of a force of 1 Newton is displaced a distance of 1 metre in the direction of the force;

"kelvin (K)" means a unit of thermodynamic temperature which is the fraction 1/273.16 of the thermodynamic temperature of the triple point of water;

"kilogram (kg)" means the unit of mass equal to the mass of the international prototype of the kilogram;

"knot (kt)" means the speed equal to 1 nautical mile per hour;

"International System of Units (SI)" means a complete, coherent system which includes three classes of unit's base units, supplementary units; and derived units;

"litre (L)" means a unit of volume restricted to the measurement of liquids and gases which is equal to 1 cubic decimeter;

"lumen (lm)" means the luminous flux emitted in a solid angle of 1 steradian by a point source having a uniform intensity of 1 candela;

"lux (lx)" means the illuminance produced by a luminous flux of 1 lumen uniformly distributed over a surface of 1 square metre;

"metre (m)" means the distance travelled by light in a vacuum during 1/299 792 458 of a second;

"mole (mol)" means the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon-12;

"nautical mile (NM)" means the length equal to 1,852 metres exactly;

"newton (N)" means the force which when applied to a body having a mass of 1 kilogram gives it an acceleration of 1 metre per second squared;

"Ohm (Ω)" means the electric resistance between two points of a conductor when a constant difference of potential of 1 volt, applied between these two points, produces in this conductor a current of 1 ampere, this conductor not being the source of any electromotive force;

"pascal (Pa)" means the pressure or stress of 1 newton per square metre;

"radian (rad)" means the plane angle between two radii of a circle which cut off on the circumference an arc equal in length to the radius;

"second (s)" means the duration of 9 192 631 770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the caesium-133 atom;

"siemens (S)" means the electric conductance of a conductor in which a current of 1 ampere is produced by an electric potential difference of 1 volt;

"sievert (Sv)" means the unit of radiation dose equivalent corresponding to 1 joule per kilogram;

"steradian (sr)" means the solid angle which having its vertex in the centre of a sphere, cuts off an area of the surface of the sphere equal to that of a square with sides of length equal to the radius of the sphere;

"tesla (T)" means the magnetic flux density given by a magnetic flux of 1 weber per square metre;

"tonne (t)" means the mass equal to 1 000 kilograms;

"volt (V)" means the unit of electric potential difference and electromotive force which is the difference of electric potential between two points of a conductor carrying a constant current of 1 ampere, when the power dissipated between these points is equal to 1 watt;

"watt (W)" means the power which gives rise to the production of energy at the rate of 1 joule per second;

"weber (Wb)" means the magnetic flux which, linking a circuit of one turn, produces in it an electromotive force of 1 volt as it is reduced to zero at a uniform rate in 1 second.

3. Application

These Regulations shall apply to all aspects of civil aviation air and ground operations.

PART II – STANDARD APPLICATION OF UNITS OF MEASUREMENT

4. SI Units

(1) The International System of Units developed and maintained by the General Conference of Weights and Measures (CGPM) shall, subject to regulations 5 and 6, be used as the standard system of units of measurement for all aspects of civil aviation air and ground operations.

(2) The prefixes and symbols listed in Table 1 of the Schedule shall be used to form names and symbols of the decimal multiples and submultiples of SI units.

5. Non- SI Units alternative units permitted for temporary use with the SI

The non-SI units listed in Table 3 of the First Schedule shall be permitted for temporary use as alternative units of measurement but only for those specific quantities listed in Table 4.

6. Application of specific units

(1) The application of units of measurement for certain quantities used in civil aviation air and ground operations shall be in accordance with Table 4 of the first schedule of these regulations.

(2) In instances where the mole is used, the elementary entities shall be specified and may be atoms, molecules, ions, electrons, other particles or specified groups of such particles.

7. Design, procedures and training

The means and provisions for design, procedures and training shall be established for operations in environments involving the use of standard and non-SI alternatives of specific units of measurement, or the transition between environments using different units, with due consideration to human performance.

8. Use of alternative non-SI units

The use in civil aviation operations of the alternative non SI units (Knot, Nautical Mile and foot) shall be terminated on the dates to be established by International Civil Aviation.

9. Offence

Any violation to these Regulations shall be subject to the general penalty provisions as provided in section 80 of the Civil Aviation Act.

Schedule

Table 1. SI unit prefixes

Multiplication factor	Prefix	*Symbol*
1 000 000 000 000 000 000 = 10^{18}	exa	E
1 000 000 000 000 000 = 10^{15}	peta	p
1 000 000 000 000 = 10^{12}	tera	T
1000000 000 = 10^{9}	giga	G
1000000 = 10^{6}	mega	M
1 000 = 10^{3}	kilo	k
100 = 10^{2}	hecto	h
10 = 10^{1}	deca	da
0.1 = 10^{-1}	deci	d
0.01 = 10^{-2}	centi	c

$0.001 = 10^{-3}$	milli	m
$0.000\ 001 = 10^{-6}$	micro	μ
$0.000\ 000\ 001 = 10^{-9}$	nano	n
$0.000\ 000\ 000\ 001 = 10^{-12}$	pico	p
$0.000\ 000\ 000\ 000\ 001 = 10^{-15}$	femto	f
$0.000\ 000\ 000\ 000\ 000\ 001 = 10^{-18}$	atto	a

Table 2. Non-SI units for use with the SI

Specific quantities in Table 3-4 related to	*Unit*	*Symbol*	*Definition (in tenns of SI units)*
mass	tonne	t	1 t= 10^3 kg
plane angle	degree	°	$1^0 = (\pi/180)$ rad
	minute	'	$1^1 = (i/60)^0 = (\pi/10\ 800)$ rad
	second	"	1" = (1/60)' = (π/648 000) rad
temperature	degree Celsius	°C	1 unit °C = 1 unit K[a}]
time	minute	min	1 min= 60 s
	hour	h	lh=60min=3600s
	day	d	1 d = 24 h = 86 400 s
	week, month, year	—	
volume	litre	L	1 L = 1 dm^3 = 10^{-3} m^3

Table 3. Non-SI units for temporary use with the SI

Specific quantities in *Table 3-4 related to*	*Unit*	*Symbol*	*Definition (in tenns of SI Units)*
distance (long)	nautical mile	NM	l NM = 1 852 m
distance (vertical)[a)]	foot	ft	1 ft = 0.304 8 m
speed	knot	kt	1 kt=0.514 444 m/s

a) altitude, elevation, height, vertical speed.

Table 4. Standard application of specific units of measurement

Ref No.	*Quantity*	*Primary unit (symbol)*	*Non-SI alternative unit (symbol)*
1.	***Direction/Space/Time***		
1.1	altitude	m	ft
1.2	area	m^2	
1.3	distance (long)[a)]	km	NM
1.4	distance (short)	m	

1.5	elevation	m	ft
1.6	endurance	h and min	
1.7	height	m	ft
1.8	latitude	0 ' "	
1.9	length	m	
1.10	longitude	0 ' "	
1.11	plane angle (when required, decimal subdivisions of the degree shall be used)	0	
1.12	runway length	m	
1.13	runway visual range	m	
1.14	tank capacities (aircraft)[b)]	L	
1.15	time		s min h d week month year
1.16	visibility[c)]		km
1.17	volume		m^3
1.18	wind direction (wind directions other than for a landing and take-off shall be expressed in degrees true; for landing and takeoff wind directions shall be expressed in degrees magnetic)		0
2.	**Mass-related**		
2.1	air density		kg/m^3
2.2	air density		kg/m^2
2.3	cargo capacity		kg
2.4	cargo density		kg/m^3
2.5	density (mass density)		kg/m^3
2.6	fuel capacity (gravimetric)		kg
2.7	gas density		kg/m^3
2.8	gross mass or payload		kg t
2.9	hoisting provisions		kg
2.10	linear density		kg/m
2.11	liquid density		kg/m^3
2.12	mass		kg
2.13	moment of inertia		$kg . m^2$
2.14	moment of momentum		$kg . m^2/s$
2.15	momentum		kg . m/s
3.	**Force-related**		
3.1	air pressure (general)		kPa
3.2	altimeter setting		hPa
3.3	atmospheric pressure		hPa

3.4	bending moment	kN.m
3.5	force	N
3.6	fuel supply pressure	kPa
3.7	hydraulic pressure	kPa
3.8	modulus of elasticity	MPa
3.9	pressure	kPa
3.10	stress	MPa
3.11	surface tension	mN/m
3.12	thrust	kN
3.13	torque	N.m
3.14	vacuum	Pa
4.	**Mechanics**	
4.1	airspeed[d)]	km/h
4.2	angular acceleration	rad/s2
4.3	angular velocity	rad/s
4.4	energy or work	J
4.5	equivalent shaft power	kW
4.6	Frequency	Hz
4.7	groundspeed	km/h
4.8	Impact	J/m^2
4.9	kinetic energy absorbed by brakes	MJ
4.10	linear acceleration	m/s^2
4.11	Power	kW
4.12	rate of trim	°/s
4.13	shaft power	kW
4.14	Velocity	m/s
4.15	vertical speed	m/s
5.	**Flow**	
5.1	engine airflow	kg/s
5.2	engine waterflow	kg/h
5.3	fuel consmnprion (specific)	
	piston engines	kg/(kW · h)
	turbo-shaft engines	kg/(kW · h)
	jet engines	kg/(kN · h)
5.4	fuel flow	kg/h
5.5	fuel rank filling rare (gravimetric)	kg/min
5.6	gas flow	kg/s
5.7	liquid flow (gravimetric)	g/s
5.8	liquid flow (volumetric)	L/s
5.9	mass flow	kg/s
5.10	oil consumption	
	gas turbine	kg/h
	piston engines (specific)	g/(kW · h)
5.11	oil flow	g/s
5. 12	pump capacity	L/min
5.13	ventilation airflow	m^3/min
5.14	viscosity (dynamic)	Pa.s
5.15	viscosity (kinematic)	m^2/s
6.	**Thermodynamics**	

6.1	coefficient of heat transfer	$W/(m^2.K)$
6.2	hear flow per unir area	J/m^2
6.3	hear flow rate	W
6.4	humidity (absolute)	g/kg
6.5	coefficient of linear expansion	$^oC^{-1}$
6.6	quantity of heat	J
6.7	temperature	^oC
7.	**Electricity and magnetism**	
7.1	capacitance	F
7.2	conductance	S
7.3	conductivity	S/m
7.4	current density	A/m^2
7.5	electric cunent	A
7.6	electric field strength	C/m^2
7.7	electric potential	V
7.8	electromotive force	V
7.9	magnetic field strength	A/m
7.10	magnetic flux	Wb
7.11	magnetic flux density	T
7.12	power	W
7.13	quantity of elecltricity	C
7.14	resistance	Q
8.	**Light and related electromagnetic radiations**	
8.1	illuminance	Ix
8.2	luminance	cd/m^2
83	luminous exitance	Im/m^2
8.4	luminous flux	Im
8.5	luminous intensity	cd
8.6	quantity of light	Im · s
8.7	radiant energy	J
8.8	wavelength	m
9.	**Acoustics**	
9.1	frequency	Hz
9.2	mass density	kg/m^3
9.3	noise level	dB[e)]
9.4	period, periodic time	s
9.5	sound intensity	W/m^2
9.6	sound power	W
9.7	sound pressure	Pa
9.8	sound level	dB[f)]
9.9	static pressure (instantaneous)	Pa
9.10	velocity of sound	m/s
9.11	volume velocity (instantaneous)	m^3/s
9.12	wavelength	m
10.	**Nuclear physics and ionizing radiation**	
10.1	absorbed dose	Gy

10.2	absorbed dose rate	Gy/s
10.3	activity of radionuclides	Bq
10.4	dose equivalent	Sv
10.5	radiation exposure	C/kg
10.6	exposure rate	C/kg .s

a) As used in navigation generally in excessof 4 000 m.

b) Such as aircraft fuel, hydraulic fluids, water, oil and high pressure oxygen vessels.

c) Visibility of less than 5 km may be given in m.

d) Airspeed is sometimes reported in flight operations in terms of the ratio MACH number.

e) A conversion of 1 kt = 0.5 m/s is used in ICAO Annexes for the representation of wind speed.

f) The decibel (dB) is a ratio which may be used as a unit for expressing sound pressure level and sound power level. When used, the reference level must be specified.

THE CIVIL AVIATION (CERTIFICATION OF AIR NAVIGATION SERVICE PROVIDERS) REGULATIONS, 2018

ARRANGEMENT OF SECTIONS

THE CIVIL AVIATION (CERTIFICATION OF AIR NAVIGATION SERVICE PROVIDERS) REGULATIONS, 2018

[Legal Notice 125 of 2018]

PART I – PRELIMINARY PROVISIONS

1. Citation

These Regulations may be cited as the Civil Aviation (Certification of Air Navigation Service Providers) Regulations.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"accuracy" means a degree of conformance between the estimated or measured value and the true value;

"Act" means the Civil Aviation Act, 2013;

"aerodrome" means a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

"aeronautical information" means information resulting from the assembly, analysis and formatting of aeronautical data;

"aeronautical Information Circular (AIC)" means a notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters;

"aeronautical Information Publication (AIP)" means a publication issued by or with the authority of the State and containing aeronautical information of a lasting character essential to air navigation;

"aeronautical Information Service (AIS)" means a service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation.

"aircraft" means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface;

"air navigation services" means one or more of the following services provided for air navigation—

Air traffic services;

Instrument flight procedure design (IFPD) services;

Aeronautical Information services (AIS);

Aeronautical Cartographic Services;

Aeronautical Telecommunication Services; and

Search and Rescue Services;

"air navigation services facility" means any facility used, available for use, or designed for use in aid of navigation of aircraft, including airports, landing fields, any structures, mechanisms, lights, beacons, marks, communicating systems, or other instruments or devices used or useful as an aid to the safe taking off, navigation, and landing of aircraft and any combination of such facilities;

"air navigation services provider" means an independent entity established for the purpose of providing one or more of the air navigation services as defined in these Regulations;

"air traffic" means all aircraft in flight or operating on the maneuvering area of an aerodrome;

"air traffic control service"means a service provided for the purpose of—

(a) preventing collisions—

(i) between aircraft; and

(ii) on the manoeuvring area between aircraft and obstructions; and

(b) expediting and maintaining an orderly flow of air traffic;

"air traffic management (ATM)" means the dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) safely, economically and efficiently through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

"air traffic service" means a generic term meaning variously, flight information service, alerting service, air traffic control service (area control service, approach control service or aerodrome control service);

"authority" means the Kenya Civil Aviation Authority established under section 4 of the Act;

"authorised person" means any person authorized by the Authority either generally or in relation to a particular case or class of cases and any reference to an authorised person includes reference to the holder for the time being of an office designated by the Authority;

"certificate" means the certificate for the provision of Air Navigation Services issued by the Authority under Part II of these Regulations;

"designated service provider" means a person or organization designated by the Authority to provide services in accordance with these Regulations;

"quality" means a degree to which a set of inherent characteristics fulfils requirements;

"quality management" means coordinated activities to direct and control an organization with regard to quality;

"quality system" means the organisational structure, procedures, processes and resources needed to implement quality management;

"requirement" means a need or expectation that is stated, generally implied or obligatory.

"Safety management system (SMS)" means a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures;

"state aircraft" means aircraft used by or in the military, customs or police services of Kenya or of any other State or any other civil registered aircraft at the time performing a state function and fully converted to offer services to heads of States, military service, customs or police or to any other State; and

"tribunal" means the National Civil Aviation Administrative Review Tribunal established under section 66 of the Act.

3. Application

(1) These Regulations shall apply to a person providing air navigation services within designated air spaces and at aerodromes.

(2) These Regulations do not apply to state aircraft.

PART II – CERTIFICATION OF AIR NAVIGATION SERVICES PROVIDERS

4. Requirements for the provision of air navigation services

A person shall not provide air navigation services unless he or she holds an Air Navigation Service Providers' (ANSP) certificate issued by the Authority.

5. Application for ANSP certificate

(1) An applicant for an ANSP certificate under regulation 4 shall—

(a) submit an application in the form and manner prescribed by the Authority; and

(b) apply at least one hundred and eighty days before the commencement of operations.

(2) The application for an ANFP certificate shall be accompanied by—

(a) the applicant's Manual of Air Navigation Service Operations;

(b) a written profile of the all the proposed key portfolio holders;

(c) a safety management system manual;

(d) a quality management system manual;

(e) an ANSP's security procedures manual;

(f) proof of financial capability to provide the required service as prescribed by the Authority; and

(g) the fees as may be prescribed by the Authority.

6. Issuance of certificate

(1) The Authority shall, before issuing an ANSP certificate, be satisfied that—

(a) the personnel of the applicant are adequate in number and have the necessary competency to provide the service;

(b) the Manual of Air Service Operations (MANSOPs) prepared by the applicant and submitted with the application contains all the relevant information;

(c) the facilities, services and equipment of the applicant are established in accordance with these Regulations;

(d) the operating procedures make satisfactory provisions for the safety of aircraft

(e) an acceptable safety management system is in place;

(f) an approved quality management system is in place;

(g) the applicant has an acceptable ANSP security procedures manual;

(h) the applicant has the financial capability to provide the service; and

(i) the applicant has insurance policy in force in relation to the services provided.

(2) Subject to subregulation (1), the Authority may impose any other conditions as may be deemed necessary.

(3) The issuance of a certificate shall be subject to compliance with these Regulations and any other conditions as may be specified or notified by the Authority.

(4) The Authority may refuse to issue an ANSP certificate to an applicant if it finds that the applicant does not comply or meet the requirements of these Regulations.

7. Contents of the Certificate

An ANSP certificate shall contain the following information—

(a) the holder's name and physical and mailing address of its principal place of business;

(b) the type of services to be provided;

(c) the location of services to be provided;

(d) for air traffic service, the service to be provided within a particular airspace or controlled aerodrome designated to the provider by the Authority;

(e) the conditions of approval; and

(f) the effective and expiry dates of the certificate.

8. Validity of a certificate

(1) A certificate issued or renewed to an ANSP shall be valid for twenty-four months from the date of issue or renewal, unless a shorter period is specified by the Authority or unless—

(a) the Authority amends, suspends, revokes or otherwise terminates the certificate;

(b) an ANSP certificate holder surrenders it to the Authority;

(c) the Authority establishes that the ANSP certificate holder has suspended operations for more than sixty continuous days; or

(d) the ANSP certificate holder notifies the Authority of the suspension of operations.

(2) An ANSP certificate which is suspended or revoked shall be returned to the Authority.

9. Renewal of a certificate

(1) An application for the renewal of an ANSP certificate shall be made in the form prescribed by the Authority not later than ninety days before the certificate expires and shall be accompanied by—

(a) the Manual of Air Navigation Service Operations (MANSOPs) if significant changes have been made following the initial certification; and

(b) the fee as prescribed by the Authority.

(2) The renewal of an ANSP certificate shall be subject to compliance with these Regulations and any other conditions that may be specified or notified by the Authority.

10. Variation of ANSP certificate

(1) The Authority may vary an ANSP certificate on the application made by the holder of the certificate in the form prescribed by the Authority.

(2) A holder of a certificate applying to the Authority for variation of a certificate under subregulation (1) shall be required to—

(a) attach to the application form two copies of the proposed amendments in the MANSOPs; and

(b) pay such fee as may be prescribed by the Authority.

11. Amendment of ANSP certificate

(1) The Authority may amend or modify an ANSP certificate to correct errors.

(2) A person shall not amend or alter any certificate or exemption issued or required by or under these Regulations without the approval of the Authority.

12. Display of certificate

(1) The holder of an ANSP certificate shall display the certificate or a certified copy of it in a conspicuous place, generally accessible to the public at the certificate holder's principal place of business.

(2) Where a certified copy of the ANSP certificate is displayed under subregulation (1), the holder of the certificate shall produce the original certificate to the Authority for inspection if requested to do so.

13. Transfer of ANSP certificate

An ANSP certificate issued under these Regulations shall not be transferable.

14. Suspension and cancellation of certificates

(1) The Authority may suspend provisionally, pending further investigation, an ANSP certificate issued under these Regulations if it considers that—

(a) a relevant provision of the Act or these Regulations, or a condition in the certificate, has not been or is not being complied with;

(b) false or materially incorrect information was given to the Authority in the application for the certificate; or

(c) it is in the public interest to do so.

(2) The Authority may, on giving reasons to the holder of a certificate, suspend the certificate for a period not exceeding sixty days.

(3) A holder of an ANSP certificate who is notified of a suspension under subregulation (2) may submit a response in writing within a period not exceeding fourteen days from the date of the suspension.

(4) Notwithstanding subregulation (3), the Authority may suspend any or all of the operations of the holder of the ANSP certificate pending receipt of a response from the certificate holder.

(5) The Authority may, upon the completion of an investigation which has shown sufficient ground to the Authority's satisfaction, suspend or cancel any ANSP certificate issued under these Regulations.

(6) A holder or any person having the possession or custody of any ANSP certificate which has been suspended or cancelled under these Regulations shall surrender the certificate to the Authority within fourteen days from the date of suspension or cancellation.

15. Register of certificate holders

(1) The Authority shall keep and maintain a register showing—

(a) name of the holder of the ANSP certificate;

(b) date of issue or renewal of the ANSP certificate;

(c) type of service offered by the holder of the ANSP certificate;

(d) expiry date of the ANSP certificate;

(e) date of variation, replacement, suspension or cancellation of the ANSP certificate, if any;

(f) physical and postal address of the holder of the ANSP certificate; and

(g) any other particulars as may be prescribed by the Authority.

(2) Any changes in the particulars recorded under subregulation (1) shall be entered in the register by the Authority.

(3) The register shall be a public document and any particular entered may be obtained upon payment of such fee as may be prescribed by the Authority.

PART III – MANUAL OF AIR NAVIGATION SERVICES

16. Requirements for the manual of air navigation services operations

(1) The Manual of Air Navigation Services Operations (MANSOPs) submitted under these Regulations shall be in the form prescribed by the Authority.

(2) The MANSOPs shall be submitted to the Authority for approval.

(3) A holder of an ANSP certificate shall keep at least one approved copy of the MANSOPs at the holder's principal place of business.

17. Contents of the MANSOPs

A MANSOPs shall contain all information and instructions necessary to enable the personnel of an air navigation service provider to perform their duties including—

(a) the services to be provided;

(b) the personnel requirements and their responsibilities;

(c) the training and performance assessment of staff;

(d) the Safety Management System and Quality Management System;

(e) the contingency plan;

(f) an ANSP security procedures manual;

(g) the specifications of the facilities and equipment (including the installation and maintenance procedures);

(h) fault and defect reporting;

(i) the maintenance of documents and records;

(j) search and rescue responsibilities and co-ordination, operations, plans and procedures;

(k) the hours of operation;

(l) the systems and procedures in the provision of air navigation services; and

(m) any other information as may be required by the Authority.

18. Amendment of the MANSOPs

(1) For the purposes of maintaining the accuracy of the information in the MANSOPs, the—

(a) holder of an ANSP certificate shall, whenever necessary, amend the manual; or

(b) the Authority may issue a written directive requiring the air navigation services provider to amend the manual.

(2) Notwithstanding subregulation (1), the holder of an ANSP certificate shall submit the proposed amendment to the Authority for approval.

19. Continued Compliance

The holder of an ANSP certificate shall—

(a) demonstrate compliance to applicable regulations and requirements by the Authority to the type of services that have been certificated; and

(b) comply with all procedures and processes detailed in their manual.

20. Air navigation services facilities and standard systems

A holder of an ANSP certificate shall—

(a) provide in the designated portion of airspace and aerodromes, facilities for the provision of air navigation services; and

(b) adopt and put into operation the appropriate standard systems, operational practices and rules as prescribed by the Authority.

21. Approval of Air Navigation Services facilities

A person shall not install, maintain or operate air navigation service facilities in the designated airspaces and aerodromes without the approval of the Authority.

22. Safety inspections and audit of Air Navigation Services

(1) The Authority shall carry out safety inspections and audits of air navigation facilities, services, documents and records of the air navigation service providers to ensure compliance with these Regulations.

(2) The safety inspections and audits under subregulation (1) shall be carried out in accordance with the requirements prescribed by the Authority.

(3) The Authority may impose operating restrictions or sanctions on the operations of a certificate holder in the event of non-conformance with the certification requirements or any unresolved safety concerns.

23. Power of Authority to issue orders, circulars, air navigation services Technical Standards and directives

The Authority may make and issue orders, circulars, air navigation services Technical Standards and directives prescribing any air navigation service matter which, under these

Regulations, may be prescribed, and generally for the better carrying out or enhancing of the objects and purposes of these Regulations.

PART V – GENERAL PROVISIONS

24. Replacement of documents

(1) A person may apply to the Authority in the prescribed form for the replacement of documents issued under these Regulations if such documents have been lost, mutilated or destroyed.

(2) When applying for the replacement of documents under subregulation (1), the holder of a certificate shall submit to the Authority—

(a) the original certificate or a copy thereof in case of loss; and

(b) a court order or any other legal document in support of the application for replacement.

25. Change of address

(1) A holder of an ANSP certificate issued under these Regulations shall notify the Authority of the change in the physical and mailing address within fourteen days of such change.

(2) A person who does not notify the Authority of the change in the physical and mailing address within the time frame specified in subregulation (1) shall not exercise the privileges of the certificate.

26. Use and retention of documents and records

(1) A person shall not mutilate, alter, render illegible or destroy any records, or any entry made therein, required by or under these Regulations to be maintained, or knowingly make, or procure, or assist in the making of, any false entry in any such record, or willfully omit to make a material entry in such record.

(2) All records required to be maintained by or under these Regulations shall be recorded in a permanent and indelible material for a period of not less than six months.

27. Reports of violation

(1) Any person who becomes aware of a violation of any of the provisions of the Act, or any Regulations, rules, or orders issued thereunder, shall report the violation to the Authority.

(2) The Authority may determine the nature and type of investigation or enforcement action that may be taken in relation to a violation reported under subregulation (1).

28. Failure to comply with directions

Any person who fails to comply with any direction given to him by the Authority or by any authorised person under any provision of these Regulations shall be deemed, for the purposes of these Regulations, to have contravened that provision.

29. Aeronautical fees

(1) The Authority shall notify in writing the fees to be charged in connection with the issue, renewal or variation of any certificate, test, inspection or investigation required by, or for the purpose of, these Regulations, any orders, notices or proclamations made thereunder.

(2) Upon an application being made in connection with which any fee is chargeable in accordance with the provisions of subregulation (1), the applicant shall be required, before the application is accepted, to pay the fee so chargeable.

(3) If, after that payment has been made, the application is withdrawn by the applicant or otherwise ceases to have effect or is rejected, the Authority shall not refund the fees paid.

30. Air Navigation

(1) The air navigation services inspector shall carry out independent oversight of Service Inspectors of the ANSP by applying a system of safety approach to the air navigation services operations.

(2) Subject to subregulation (1), the approach shall require safety to be an inherent part of the operational system, dictating continual improvement and requiring a closed loop system for monitoring and corrective action.

(3) Air navigation services inspectors shall be authorised to perform inspections and audits to determine compliance with these Regulations and any other Regulations made under the Act.

(4) In the performance of his or her official duties an air navigation services inspector shall be provided with free and uninterrupted access to air navigation services facilities, records, data and restricted areas governed by the Air Navigation Service Provider.

31. Air navigation Service inspector's credentials

(1) The Authority shall issue air navigation services inspectors with credentials to perform safety oversight duties.

(2) The ANS inspectors once issued with the credentials shall follow the basic guidelines stipulated in the inspector's manual and be governed by the provisions of the Act and these Regulations.

PART VI – MISCELLANEOUS PROVISIONS

32. Contravention of Regulations

The Authority may suspend or revoke the licence, certificate, approval, authorisation, exemption or other document of a person who contravenes any provision of these Regulations.

33. Appeals to the tribunal

A person aggrieved with the decision of the Authority under these Regulations may, within twenty one days of such decision, appeal to the tribunal.

34. Offences

(1) A person who contravenes any provision of these Regulations commits an offense and is liable, upon conviction, to a fine not exceeding one million shillings or to imprisonment for a term not exceeding six months or to both.

(2) If it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these Regulations, orders, notices or proclamations made thereunder, was due to any cause not avoidable by the exercise of reasonable care by that person, that act or omission shall be deemed not to be a contravention by that person of that provision.

35. Revocation of L.N. 78/2013

The Civil Aviation (Air Navigation Services) Regulations, 2013, are repealed.

36. Transitional

(1) A licence, certificate, permit or authorization issued or granted by the Authority before the commencement of these Regulations shall remain operational until it expires or is revoked, annulled or replaced.

(2) Notwithstanding any other provision of these Regulations, a person who, at the commencement of these Regulations, is carrying out any acts, duties or operations affected by these Regulations shall, within one year from the date of commencement, or within such longer time as the Cabinet Secretary may, by notice in the *Gazette* prescribe, comply with the requirements of these Regulations or cease to carry out such acts, duties or operations.

THE CIVIL AVIATION (RULES OF THE AIR) REGULATIONS, 2018

ARRANGEMENT OF REGULATIONS

PART I – PRELIMINARY PROVISIONS

Regulation

PART II – GENERAL RULES OF THE AIR

Flight plans

THE CIVIL AVIATION (RULES OF THE AIR) REGULATIONS, 2018

[Legal Notice 124 of 2018]

PART I – PRELIMINARY PROVISIONS

1. Citation

These Regulations may be cited as the Civil Aviation (Rules of the Air) Regulations.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"acrobatic flight" means manoeuvres intentionally performed by an aircraft involving an abrupt change in its attitude, an abnormal attitude, or an abnormal variation in speed;

"ADS-C agreement" means a reporting plan which establishes the conditions of ADS-C data reporting (including data required by the air traffic services unit and frequency of ADS-C reports which have to be agreed to prior to using ADS-C in the provision of air traffic services);

"Act" means the Civil Aviation Act, 2013;

"advisory airspace" means an airspace of defined dimensions, or designated route, within which air traffic advisory service is available;

"advisory route" means a designated route along which air traffic advisory service is available;

"aerodrome" means a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

"aerodrome control service" means air traffic control service for aerodrome traffic;

"aerodrome control tower" means unit established to provide air traffic control service to aerodrome traffic;

"aerodrome traffic" means all traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity of an aerodrome;

"aerodrome traffic zone" means an airspace of defined dimensions established around an aerodrome for the protection of aerodrome traffic;

"Aeronautical Information Publication (AIP)" means a publication issued by or with the authority of the State and containing aeronautical information of a lasting character essential to air navigation;

"aeronautical mobile service" means a mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate;

"aeronautical station" means land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board a ship or on a platform at sea;

"aeroplane" means a power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight;

"airborne collision avoidance system" means an aircraft system based on secondary surveillance radar transponder signals which operates independently of ground based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with secondary surveillance radar transponders;

"aircraft" means any machine that can derive support in the atmosphere from the reactions of the air, other than the reactions of the air against the earth surface;

"air-ground control radio station" means an aeronautical telecommunication station having primary responsibility for handling communications pertaining to the operation and control of aircraft in a given area;

"air-taxiing" means movement of a helicopter or vertical take-off and landing above the surface of an aerodrome, normally in ground effect and at a ground speed normally less than 37 km/h (20 kts);

"air traffic" means all aircraft in flight or operating on the manoeuvring area of an aerodrome;

"air traffic advisory service" means a service provided within advisory airspace to ensure separation, in so far as practical, between aircraft which are operating on instrument flight rules flight plans;

"air traffic control clearance" means authorisation for an aircraft to proceed under conditions specified by an air traffic control unit;

"air traffic control service" means a service provided for the purpose of—

(a) preventing collisions—

(i) between aircraft; and

(ii) on the manoeuvring area between aircraft and obstructions; and

(b) expediting and maintaining an orderly flow of air traffic;

"air traffic control unit" means an area control centre, approach control unit or aerodrome control tower;

"air traffic service" means flight information service, alerting service, air traffic advisory service, or air traffic control service;

"air traffic services airspaces" means airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified;

"air traffic services reporting office" means a unit established for the purpose of receiving reports concerning air traffic services and flight plans submitted before departure;

"air traffic services route" means a specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services;

"air traffic services unit" includes an air traffic control unit, flight information centre or air traffic services reporting office;

"airway" means a control area or portion thereof established in the form of a corridor;

"alerting service" means a service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required;

"alternate aerodrome" means an aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing and includes the following—

(a) "take-off alternate" means an alternate aerodrome at which an aircraft can land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure;

(b) "en-route alternate" means an aerodrome at which an aircraft would be able to land after experiencing an abnormal or emergency condition while en route;

(c) "extended Range Operation by Turbine-engined Aeroplanes en-route alternate" means a suitable and appropriate alternate aerodrome at which an aeroplane would be able to land after experiencing an engine shutdown or other abnormal or emergency condition while en route in an Extended Range Operation by Turbine-engined Aeroplanes operation; and

(d) "destination alternate" an alternate aerodrome to which an aircraft may proceed should it become either impossible or inadvisable to land at the aerodrome of intended landing;

provided that the aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight;

"Altitude" means the vertical distance of a level, a point or an object considered as a point, measured from mean sea level ;

"anti-collision light" means a flashing red or flashing white light showing in all directions for the purpose of enabling the aircraft to be more readily detected by the pilots of distant aircraft;

"approach control service" means air traffic control service for arriving or departing controlled flights;

"approach control unit" means a unit established to provide air traffic control service to controlled flights arriving at, or departing from, one or more aerodromes;

"appropriate air traffic services (ATS) authority" means the relevant authority designated by the State responsible for providing air traffic services in the airspace concerned;

"appropriate authority"—

(a) in relation to flight over the high seas, means the relevant authority of the State of Registry

(b) in relation to flight other than over the high seas, means the relevant authority of the State having sovereignty over the territory being overflown;

"apron" means a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance;

"area control centre" means a unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction;

"area control service" means air traffic control service for controlled flights in control areas;

"Area navigation (RNAV)" means a method of navigation which permits aircraft operation on any desired flight path within the coverage of ground-or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these;

"ATS route" means a specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services;

"Automatic dependent surveillance — broadcast (ADS-B)" means a means by which aircraft, aerodrome vehicles and other objects can automatically transmit and receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link;

"Automatic dependent surveillance — contract (ADS-C)" means a means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports;

"Authority" means the Kenya Civil Aviation Authority established under section 4 of the Act;

"ceiling" means the height above the ground or water of the base of the lowest layer of cloud below 6 000 metres (20 000 feet) covering more than half the sky;

"changeover point" means the point at which an aircraft navigating on an air traffic services route segment defined by reference to very high frequency omni-directional radio

ranges is expected to transfer its primary navigational reference from the facility behind the aircraft to the next facility ahead of the aircraft;

"clearance limit" means the point to which an aircraft is granted an air traffic control clearance;

"command and control (C2) link" means the data link between the remotely piloted aircraft and the remote pilot station for the purposes of managing the flight;

"competent authority" in relation to Kenya, means the Authority and, in relation to any other state, the authority responsible under the law of that state for promoting the safety of civil aviation;

"control area" means a controlled airspace extending upwards from a specified limit above the earth;

"controlled aerodrome" means an aerodrome at which air traffic control service is provided to aerodrome traffic;

"controlled airspace" means an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification;

"controlled flight" means any flight which is subject to an air traffic control clearance;

"Controller-pilot data link communications (CPDLC)" means a means of communication between controller and pilot, using data link for Air Traffic Control communications;

"control zone" means a controlled airspace extending upwards from the surface of the earth to a specified upper limit;

"Cruise climb" means an aeroplane cruising technique resulting in a net increase in altitude as the aeroplane mass decreases;

"cruising level" means a level maintained during a significant portion of a flight;

"current flight plan" means the flight plan, including changes, if any, brought about by subsequent clearances;

"danger area" means an airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times;

"data link communications" means a form of communication intended for the exchange of messages via a data link;

"Detect and avoid" means the capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action;

"estimated off-block time" means the estimated time at which the aircraft will commence movement associated with departure;

"estimated time of arrival"—

(a) for instrument flight rules flights means the time at which it is estimated that the aircraft will arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the aerodrome, the time at which the aircraft will arrive over the aerodrome;

(b) for visual flight rules flights means the time at which it is estimated that the aircraft will arrive over the aerodrome;

"expected approach time" means the time at which air traffic control expects that an arriving aircraft, following a delay, will leave the holding fix to complete its approach for a landing;

"filed flight plan" means the flight plan as filed with an air traffic services unit by the pilot or a designated representative, without any subsequent changes;

"flight" means in the case of—

(a) an aeroplane or glider, from the moment it first moves for the purpose of taking off until the moment when it next comes to rest after landing;

(b) an airship or free balloon, from the moment when it first becomes detached from the surface until the moment when it next becomes attached thereto or comes to rest thereon;

"flight crew member" means a licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period;

"flight information centre" means a unit established to provide flight information service and alerting service;

"flight information region" means an airspace of defined dimensions within which flight information service and alerting service are provided;

"flight information service" means a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights;

"flight level" means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals;

"flight plan" means specified information provided to air traffic service units, relative to an intended flight or portion of a flight of an aircraft;

"flight visibility" means the visibility forward from the cockpit of an aircraft in flight;

"glider" means a non-power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces, which remain, fixed under given conditions of flight;

"ground visibility" means the visibility at an aerodrome, as reported by an accredited observer;

"heading" means the direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from North (true, magnetic, compass or grid);

"heavier-than-air aircraft" means any aircraft deriving its lift in flight chiefly from aerodynamic forces;

"height" means the vertical distance of a level, a point or an object considered as a point, measured from a specified datum;

"helicopter" means a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axis;

"IFR" means the symbol used to designate the instrument flight rules;

"IFR flight" means a flight conducted in accordance with the instrument flight rules;

"IMC" means the symbol used to designate instrument meteorological conditions;

"instrument approach operations" means an approach and landing using instruments for navigation guidance based on an instrument approach procedure and there are two methods for executing instrument approach operations—

(a) a two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and

(b) a three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance.

"instrument approach procedure" means a series of pre- determined manoeuvres by reference to flight instruments, with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply and is classified as follows—

(a) non-precision approach (NPA) procedure - an instrument approach procedure designed for 2D instrument approach Type A.

(b) approach procedure with vertical guidance (APV) – a performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A.

(c) precision approach procedure (PA) - an instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS Cat I) designed for 3D instrument approach operations Type A or B;

"instrument meteorological conditions" means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions;

"landing area" means that part of a movement area intended for the landing or take-off of aircraft;

"level" means a generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level;

"manoeuvring area" means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons;

"movement area" means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s);

"night" means the time between fifteen minutes after sunset and fifteen minutes before sunrise, sunrise and sunset being determined at surface level, and includes any time between sunset and sunrise when an unlighted aircraft or other unlighted prominent object cannot clearly be seen at a distance of 4,572 metres;

"operator" means a person, organization or enterprise engaged in or offering to engage in an aircraft operation;

"overtaking aircraft" means an aircraft that approaches another from the rear on a line forming an angle of less than 70 degrees with the plane of symmetry of the latter, so that it is in such a position with reference to the other aircraft that at night it should be unable to see either of the aircraft left (port) or right (starboard) navigation lights;

"parascending parachute" means a parachute which is towed by cable in such a manner as to cause it to ascend;

"pilot-in-command" means the pilot designated by the operator, or in the case of general aviation, the owner as being in command and charged with the safe conduct of a flight;

"pressure-altitude" means an atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere;

"problematic use of substances" means the use of one or more psychoactive substances by aviation personnel in a way that—

(a) constitutes a direct hazard to the user or endangers the lives, health or welfare of others; or

(b) causes or worsens an occupational, social, mental or physical problem or disorder;

"prohibited area"means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited;

"psychoactive substances" means alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded;

"radiotelephony" means a form of radio communication primarily intended for the exchange of information in the form of speech;

"remote pilot" means a person charged by the operator with duties essential to the operation of a remotely piloted aircraft and who manipulates the flight controls, as appropriate, during flight time;

"remote pilot station" means the component of the remotely piloted aircraft system containing the equipment used to pilot the remotely piloted aircraft;

"remotely piloted aircraft (RPA)" means an unmanned aircraft which is piloted from a remote pilot station;

"remotely piloted aircraft system (RPAS)" means a remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design;

"repetitive flight plan" means a flight plan related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator for retention and repetitive use by air traffic services units;

"reporting point" means a specified geographical location in relation to which the position of an aircraft can be reported;

"restricted area" means an airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions;

"RPA observer" means a trained and competent person designated by the operator who, by visual observation of the remotely piloted aircraft, assists the remote pilot in the safe conduct of the flight;

"runway" means a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft;

"runway-holding position" means a designated position intended to protect a runway, an obstacle limitation surface, or an Instrument Landing System or Microwave Landing System critical area or sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower;

"safety-sensitive personnel" means persons who might endanger aviation safety if they perform their duties and functions improperly including, but not limited to, crew members, aircraft maintenance personnel and air traffic controllers;

"signal area" means an area on an aerodrome used for the display of ground signals;

"simulated instrument flight" means a flight during which mechanical or optical devices are used in order to reduce the field of vision or the range of visibility from the cockpit of the aircraft;

"special visual flight rules (VFR) flight " means a visual flight rules flight authorized by air traffic control to operate within a control zone in meteorological conditions below the Visual Meteorological Conditions (VMC) or at night;

"secondary surveillance radar" means a surveillance radar system which uses interrogators and transponders;

"taxiing" means movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing;

"taxiway" means a defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including—

(a) aircraft stand taxilane - a portion of an apron designated as a taxiway and intended to provide access to aircraft stands only;

(b) apron taxiway - a portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron;

(c) rapid exit taxiway - a taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times;

"terminal control area" means a control area normally established at the confluence of air traffic services routes in the vicinity of one or more major aerodromes;

"total estimated elapsed time"—

(a) for instrument flight rules flights means the estimated time required from take-off to arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the destination aerodrome, to arrive over the destination aerodrome;

(b) for visual flight rules flights means the estimated time required from take-off to arrive over the destination aerodrome;

"track" means the projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid);

"traffic avoidance advice" means advice provided by an air traffic services unit specifying manoeuvres to assist a pilot to avoid a collision;

"traffic information" means information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision;

"transition altitude" means the altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes;

"tribunal" means the National Civil Aviation Administrative Review Tribunal established under section 66 of the Civil Aviation Act,2013;

"unmanned free balloon" means a non-power-driven, unmanned, lighter-than-air aircraft in free flight;

"VFR" means a symbol used to designate the visual flight rules;

"visual flight rules flight" means a flight conducted in accordance with the visual flight rules;

"visibility" for aeronautical purposes means the greater of—

(a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background;

(b) the greatest distance at which lights in the vicinity of 1000 candelas can be seen and identified against an unlit background;

"visual line-of-sight (VLOS) operation" means an operation in which the remote pilot or RPA observer maintains direct unaided visual contact with the remotely piloted aircraft;

"visual meteorological conditions" means meteorological conditions expressed in terms of visibility distance from cloud, and ceiling, equal to or better than specified minima; and

"VMC" means the symbol used to designate visual meteorological conditions.

3. Application of the rules of the air

(1) These Regulations shall apply—

(a) to every person and every aircraft, including state aircraft;

(b) to all aircraft bearing the nationality and registration marks of Kenya, wherever they may be, to the extent that they do not conflict with the rules published by the State having jurisdiction over the territory overflown: and

(c) in full, to all aircraft flying over the high seas.

(2) For purposes of flight over those parts of the high seas where another Contracting State has accepted, pursuant to a regional air navigation agreement, the responsibility of providing air traffic services, the appropriate ATS Provider designated by that State shall be responsible for providing those services to aircraft registered in Kenya.

(3) Subject to the provisions of subregulation (1), it shall be an offence to contravene, to permit the contravention of, or to fail to comply with, these Regulations.

(4) If any departure from these Regulations is made for the purpose of avoiding immediate danger or in an emergency situation, the pilot-in-command shall cause written particulars of the departure, and of the circumstances giving rise to it, to be given without delay, and in any case within ten days thereafter, to the competent authority of the State in whose territory the departure was made with a copy of it to the Authority and the State of the Operator, and in the case of a State aircraft, if the departure was made over the high seas, to the Authority.

(5) Nothing in these Regulations shall exonerate any person from the consequences of any neglect in the use of lights or signals or of the neglect of any precautions required by ordinary aviation practice or by the special circumstances of the case.

(6) The Authority may, for the purpose of promoting the safety of aircraft, make rules as to special signals and other communications to be made by or on an aircraft, as to the course on which and the height at which an aircraft shall fly and as to any other precautions to be observed in relation to the navigation and control of aircraft which the Authority may consider expedient for the purpose aforesaid and no aircraft shall fly in contravention of any such rules.

4. Compliance with the rules of the air

(1) A pilot in command of an aircraft either in flight or on the movement area of an aerodrome shall comply with the general rules and, in addition, when in flight, shall comply with either the—

(a) visual flight rules; or

(b) instrument flight rules.

(2) A pilot in command of an aircraft shall, when operating under visual flight rules or instrument flight rules in classified air traffic services airspaces, comply with the requirements specified for such airspaces.

(3) A pilot in command of an aircraft may elect to fly in accordance with instrument flight rules in visual meteorological conditions or may be required to do so by the appropriate air traffic services authority.

5. Responsibility for compliance with the rules of the air

The pilot-in-command of an aircraft shall whether manipulating the controls or not, be responsible for the operation of the aircraft in accordance with these Regulations, except that the pilot-in-command may depart from these Regulations in the interest of safety to the extent necessary to—

(a) avoid immediate danger or in an emergency situation; or

(b) comply with the law of any State other than Kenya within which the aircraft then is.

6. Pre-flight information

(1) The pilot-in-command of an aircraft shall before commencing a flight, become familiar with all available information appropriate to the intended operation.

(2) The pilot-in-command shall in addition to subregulation (1) include a careful study of available current weather reports and forecasts, for flights away from the vicinity of an aerodrome and for all flights flying in accordance with instrument flight rules, taking into consideration fuel requirements and an alternative course of action if the flight cannot be completed as planned.

7. Authority of the pilot-in-command of an aircraft

The pilot-in-command of an aircraft shall have final authority as to the disposition of the aircraft while in command.

PART II – GENERAL RULES OF THE AIR

8. Problematic use of psychoactive substance

(1) A safety-sensitive person whose function is critical to the safety of aviation shall not undertake that function while under the influence of any psychoactive substance, by reason of which human performance is impaired.

(2) A person referred to in subregulation (1) shall not engage in any kind of problematic use of substances.

9. Negligent or reckless operation of aircraft

A person shall not wilfully operate an aircraft, negligently or recklessly in a manner so as to endanger life or property.

10. Minimum heights

(1) A person shall not fly an aircraft over the congested areas of cities, towns or settlements or over an open-air assembly of persons, unless at such a height as will permit, in the event of an emergency arising, a landing to be made without undue hazard to persons or property on the surface, except when necessary for take-off or landing, or except by permission from the appropriate authority.

(2) Subject to subregulations (3), (4) and (5)—

(a) a person shall not fly an aircraft over any congested area of a city, town or settlement or over an open air assembly of persons below—

(i) such height as will permit the aircraft to alight clear of the area and without danger to persons or property on the surface, in the event of failure of a power unit; or

(ii) a height of 1,000 feet above the highest fixed object within 600 metres of the aircraft, whichever is the higher;

(b) a person shall not fly a helicopter below such height as would enable it to alight without danger to persons or property on the surface, in the event of failure of a power unit;

(c) except with the permission in writing of the Authority and in accordance with any condition therein specified, a person shall not fly a helicopter over a congested area of a city, town or settlement below a height of 1,000 feet above the highest fixed object within 600 metres of the helicopter;

(d) a person shall not fly an aircraft—

(i) over, or within one thousand metres of any assembly in the open air of more than one thousand persons assembled for the purpose of witnessing or participating in any organised event, except with the permission in writing of the Authority and in accordance with any conditions therein specified and with the consent in writing of the organizers of the event; or

(ii) below such height as would enable it to land clear of the assembly in the event of the failure of a power unit or if such an aircraft is towing a banner the height shall be calculated on the basis that the banner shall not be dropped within one thousand metres of the assembly:

Provided that where a person is charged with an offence under these Regulations by reason of a contravention of this subregulation, it shall be a good defence to prove that the flight of the aircraft over, or within one thousand metres of the assembly was made at a reasonable height and for a reason not connected with the assembly or with the event which was the occasion for the assembly; and

(e) an aircraft shall not fly less than 500 feet above ground or water.

(3) The provisions of subregulation (1) (d) and (e) shall not apply—

(a) to an aircraft which is being used for police purposes;

(b) to the flight of an aircraft over or within 1,000 metres of an assembly of persons gathered for the purpose of witnessing an event which consists wholly or principally of an aircraft race contest or an exhibition of flying, if the aircraft is taking part in such a race, contest or exhibition or is engaged in a flight arranged by, or made with the consent in writing of, the organizers of the event, and the races, contest, exhibition or flight is approved by the Authority.

(4) The provisions of subregulation (1)(e) shall not apply to an aircraft which is being used for aerial work operations related to agriculture, horticulture, or forest preservation in accordance with the operating provisions of the Civil Aviation (Aerial Work) Regulations.

(5) The provisions of subregulation 1(a) shall not apply to—

(a) an aircraft while it is landing or taking-off in accordance with normal aviation practice; or

(b) a glider while it is hill-soaring.

(6) Nothing in this regulation shall prohibit any aircraft from—

(a) taking off, landing or practising approaches to landing; or

(b) flying for the purpose of checking navigational aids or procedures in accordance with normal aviation practice at a licensed or certificated aerodrome in Kenya or at any aerodrome in any other state; or

(c) flying in such a manner as may be necessary for the purpose of saving life:

Provided that in the case of practising approaches to landing, such practising is confined to the airspace customarily used by aircraft when landing or taking off in accordance with normal aviation practice at the aerodrome concerned.

(7) The provisions of this regulation shall not apply to any captive balloon or kite.

11. Cruising levels

(1) Cruising levels at which a flight or a portion of a flight is to be conducted shall be in terms of—

(a) flight levels, for flights at or above the lowest usable flight level or, where applicable, above the transition altitude;

(b) altitudes for flights below the lowest usable flight level or, where applicable, at or below the transition altitude.

(2) Subject to subregulation (4), in order to comply with instrument flight rules, an aircraft when in level flight at or above 1,000 feet over land or water within controlled airspace shall be flown at a level appropriate to its magnetic track as specified in the First Schedule.

(3) Except where otherwise indicated in air traffic control clearances or specified by the Authority, flights conducted under visual flight rules in cruising flight when operated at or above 1000 feet from the ground or water shall be conducted at a flight level appropriate to its magnetic track as described in the First Schedule.

(4) The level of flight shall be measured by an altimeter set according to the system notified, or in the case of flight over a state other than Kenya, otherwise published by the competent authority, in relation to the area over which the aircraft is flying.

(5) An aircraft may be flown in conformity with instructions given by an air traffic control unit or in accordance with notified en- route holding patterns or in accordance with holding procedures notified in relation to an aerodrome.

12. Dropping, spraying, towing and parachute descents

A person shall not—

(a) drop anything or spray any substance from an aircraft in flight;

(b) tow an aircraft or other object; or

(c) make a parachute descent other than an emergency descent, except in accordance with conditions prescribed by the Authority and as indicated by relevant information, advice and clearance from the appropriate air traffic service unit.

13. Acrobatic flight

(1) A person shall not fly an aircraft acrobatically except under conditions prescribed by the Authority and as indicated by relevant information, advice or clearance from the appropriate air traffic services unit.

(2) A person shall not operate an aircraft—

(a) in acrobatic flight—

(i) over any city, town or settlement;

(ii) over an open air assembly of persons;

(iii) below an altitude of 1,500 feet above the surface; or

(iv) when the flight visibility is less than five kilometres; or

(b) in manoeuvres exceeding a bank of sixty degrees or pitch of thirty degrees from level flight attitude unless all occupants of the aircraft are wearing parachutes packed by a qualified parachute rigger in the past twelve months.

14. Formation flights

A person shall not fly an aircraft in a formation flight except by pre-arrangement among the pilots-in-command of the aircraft taking part in the flight and, for a formation flight in controlled airspace, in accordance with the conditions prescribed by the appropriate air traffic services authority, and these conditions include—

(a) the formation operates as a single aircraft with regard to navigation and position reporting;

(b) separation between aircraft in the flight shall be the responsibility of the flight leader and the pilots-in-command of the other aircraft in the flight and shall include periods of transition when aircraft are manoeuvring to attain their own separation within the formation flight and during join-up and break-away; and

(c) a distance not exceeding 1 kilometre (0.5 nautical miles) laterally and longitudinally and 30 metres (100 feet) vertically from the flight leader shall be maintained by each aircraft.

15. Remotely piloted aircraft

A person shall operate a remotely piloted aircraft in such a manner as to minimise hazards to persons, property or other aircraft, and in accordance with the conditions specified in the Second schedule and the Civil Aviation (Remotely Piloted Aircraft Systems) Regulations, 2018.

16. Unmanned free balloons

A person shall operate an unmanned free balloon in such a manner as to minimize hazards to persons, property or other aircraft and in accordance with the conditions specified in the Third Schedule.

17. Prohibited areas, restricted areas and danger areas

A person shall not operate an aircraft in a prohibited area or a restricted area or a danger area, the particulars of which have been duly published in the Kenya Aeronautical Information Publication, except in accordance with the conditions of the restrictions or by permission granted by the Government of Kenya.

18. Avoidance of collisions.

The pilot in command of aircraft is responsible for taking avoidance action and such other action including manouevres based on resolution advisories provided by ACAS equipment to avert collision.

19. Proximity to other aircraft.

A person shall not operate an aircraft in such proximity to other aircraft as to create a collision hazard.

20. Right-of-way

(1) The pilot-in-command of an aircraft that has the right-of- way shall maintain the aircraft heading and speed.

(2) An aircraft that is obliged to keep out of way for another aircraft in regulations 21, 22, 23, 24 and 25 shall avoid passing over, under or in front of the other, unless it passes well clear and taking into account the effect of aircraft wake turbulence.

21. Approaching head-on

When two aircraft are approaching head-on or approximately so and there is danger of collision, each aircraft shall alter its heading to the right.

22. Converging

When two aircraft are converging at approximately the same level, the aircraft that has the other on its right shall give way, except as follows—

(a) power-driven heavier-than-air aircraft shall give way to airships, gliders and balloons;

(b) airships shall give way to gliders and balloons;

(c) gliders shall give way to balloons; or

(d) power-driven aircraft shall give way to aircraft which are seen to be towing other aircraft or objects.

23. Overtaking

An aircraft that is being overtaken has the right-of-way and the overtaking aircraft, whether climbing, descending or in horizontal flight, shall keep out of the way of the other aircraft by altering its heading to the right, and no subsequent change in the relative positions of the two aircraft shall absolve the overtaking aircraft from this obligation until it is entirely past and clear.

24. Landing

(1) An aircraft in flight, or operating on the ground or water, shall give way to aircraft landing or in the final stages of an approach to land.

(2) When two or more heavier-than-air aircraft are approaching an aerodrome for the purpose of landing, aircraft at the higher level shall give way to aircraft at the lower level, but the latter shall not take advantage of this rule to cut in front of another which is in the final stages of an approach to land, or to overtake that aircraft and power- driven heavier-than-air aircraft shall give way to gliders.

25. Emergency landing

An aircraft that is aware that another aircraft is compelled to land shall give way to that aircraft.

26. Taking off

An aircraft taxiing on the manoeuvring area of an aerodrome shall give way to aircraft taking off or about to take off.

27. Surface movement of aircraft

(1) In case of danger of collision between two aircraft taxiing on the movement area of an aerodrome the following shall apply—

(a) when two aircraft are approaching head-on, each aircraft shall stop or where practicable alter its course to the right so as to keep well clear;

(b) when two aircraft are on a converging course, the one which has the other on its right shall give way;

(c) an aircraft which is being overtaken by another aircraft shall have the right-of-way and the overtaking aircraft shall keep well clear of the other aircraft.

(2) An aircraft taxiing on the manoeuvring area shall stop and hold at all runway-holding positions unless otherwise authorised by the aerodrome control tower.

(3) An aircraft taxiing on the manoeuvring area shall stop and hold at all lighted stop bars and may proceed further when the lights are switched off.

28. Surface movement of aircraft and vehicular traffic

(1) This regulation shall apply to aeroplanes and vehicles on the movement area of a land aerodrome.

(2) Notwithstanding any air traffic control clearances, it shall remain the duty of the pilot-in-command of an aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft or with any vehicle.

(3) Emergency vehicles proceeding to the assistance of aircraft in distress shall be afforded priority over all other surface movement traffic.

(4) Subject to subregulations (2) and (3), in case of danger of collision between two aircraft taxiing or other vehicular traffic moving on the movement area of an aerodrome—

(a) aircraft and vehicles shall give way to aircraft which are taking off or landing;

(b) vehicles towing aircraft shall give way to aircraft which are landing, taking off or taxing;

(c) vehicles which are not towing aircraft shall give way to aircraft; and

(d) vehicles shall give way to other vehicles towing aircraft.

29. Lights to be displayed by aircraft

(1) An aircraft in flight shall display lights as provided by subregulation (5) from sunset to sunrise or during any other period which may be prescribed by the authority—

(a) anti-collision lights intended to attract attention to the aircraft; and

(b) navigation lights intended to indicate the relative path of the aircraft to an observer and other lights shall not be displayed if they are likely to be mistaken for these lights.

(2) Except as provided by subregulation (5) from sunset to sunrise or during any other period prescribed by the authority—

(a) all aircraft moving on the movement area of an aerodrome shall display navigation lights intended to indicate the relative path of the aircraft to an observer and other lights shall not be displayed if they are likely to be mistaken for these lights;

(b) unless stationary and otherwise adequately illuminated, all aircraft on the movement area of an aerodrome shall display lights intended to indicate the extremities of their structure;

(c) all aircraft operating on the movement area of an aerodrome shall display lights intended to attract attention to the aircraft; and

(d) all aircraft on the movement area of an aerodrome whose engines are running shall display lights which indicate that fact.

(3) Except as provided by subregulation (5), all aircraft in flight and fitted with anti-collision lights to meet the requirement of subregulation (1) a) shall display such lights outside the period specified in subregulation (1).

(4) Except as provided by subregulation (5), all aircraft—

(a) operating on the movement area of an aerodrome and fitted with anti-collision lights to meet the requirement of subregulation (2) (c); or

(b) on the movement area of an aerodrome and fitted with lights to meet the requirement of subregulation (2) (d); shall display such lights also outside the period specified in subregulation (2).

(5) A pilot shall be permitted to switch off or reduce the intensity of any flashing lights fitted to meet the requirements of subregulations (1), (2), (3) and (4) if they do or are likely to—

(a) adversely affect the satisfactory performance of duties; or

(b) subject an outside observer to harmful dazzle.

(6) The lights specified in subregulation (1), shall meet the requirements of the Civil Aviation Regulations.

30. Simulated instrument flight conditions

A person shall not operate an aircraft in simulated instrument flight conditions unless—

(a) fully functioning dual controls are installed in that aircraft;

(b) a qualified pilot occupies a control seat to act as safety pilot for the person who is flying under simulated instrument conditions; and

(c) the safety pilot has adequate vision forward and to each side of the aircraft, or a competent observer in communication with the safety pilot shall occupy a position in the aircraft from which the observer's field of vision adequately supplements the vision of the safety pilot.

31. Operation on and in the vicinity of an aerodrome

(1) A pilot in command of an aircraft operating on, or in the vicinity of an aerodrome shall, whether or not within an aerodrome traffic zone—

(a) observe other aerodrome traffic for the purpose of avoiding collision;

(b) conform with or avoid the pattern of traffic formed by other aircraft in operation;

(c) make all turns to the left, when approaching for a landing and after taking off, unless otherwise instructed;

(d) land and take off into the wind unless safety, the runway configuration, or air traffic considerations determine that a different direction is preferable.

(2) A person shall not fly within a zone which the pilot-in- command knows or ought reasonably to know to be the aerodrome traffic zone of an aerodrome which does not have an air traffic control unit, except for the purpose of taking off, landing or observing the signals in the signals area with a view to landing.

(3) An aircraft flying within an aerodrome traffic zone for the purpose of observing signals in the signal area of an aerodrome, shall remain clear of cloud and at least 500 feet above the level of the aerodrome.

(4) A person shall not land an aircraft on a runway at such an aerodrome unless the runway is clear of other aircraft.

(5) Where takeoffs and landings are not confined to a runway—

(a) an aircraft when landing shall leave clear on its left any aircraft which has already landed or is already landing or is about to take off, and if such aircraft is obliged to turn, it shall turn to the left after the pilot-in-command of the aircraft has satisfied himself that such action will not interfere with other traffic movements; and

(b) an aircraft about to take off shall take up position and manoeuvre in such a way as to leave clear on its left any aircraft which is already taking off or is about to take off.

(6) An aircraft after landing shall move clear of the landing area in use as soon as it is possible to do so.

32. Operation within an aerodrome traffic zone

(1) A pilot-in-command shall not fly the aircraft within a zone which the he knows or reasonably ought to know to be an aerodrome having an air traffic control unit, unless he has the permission of the appropriate air traffic control unit.

(2) A pilot-in-command of an aircraft flying in the aerodrome traffic zone of an aerodrome having an air traffic control unit or moving on the manoeuvring area of such an aerodrome shall—

(a) cause a continuous watch to be maintained on the appropriate radio frequency notified for air traffic control communications at the aerodrome, or if this is not possible, cause a watch to be kept for such instructions as may be issued by visual means;

(b) not taxi, take off or land except with the permission of the air traffic control unit; and

(c) comply with the provisions of regulation 15 as if the aerodrome did not have an air traffic control unit, unless the pilot-in-command has the permission of the air traffic control unit at the aerodrome, or has been instructed by such unit, to do otherwise.

33. Operations on or in the vicinity of a controlled aerodrome

(1) A person shall not operate an aircraft to, from, through, or on an aerodrome having an operational control tower unless two-way communication is maintained between that person and the control tower.

(2) When arriving at an aerodrome, a pilot-in-command shall establish communications required by subregulation (1), prior to four nautical miles from the aerodrome, when operating from the surface up to and including 2,500 feet.

(3) When departing from an aerodrome, a pilot-in-command shall establish communications with the control tower prior to taxi.

(4) A person shall not at any aerodrome with an operating control tower, operate an aircraft on a runway or taxiway or take-off or land an aircraft, unless an appropriate clearance has been received from the air traffic control unit.

(5) A clearance to—

(a) the take-off runway—

(i) is not a clearance to cross or taxi on to that runway; and

(ii) does not authorize the pilot-in-command to cross other runways during the taxi to the assigned runway;

(b) any other point on the aerodrome is a clearance to cross all runways that intersect the taxi route to the assigned point.

(6) If the radio fails or two-way communication is lost, the pilot- in-command may continue on visual flight rules operation and land if—

(a) the weather conditions are at or above basic visual flight rules minimums; and

(b) clearance to land is received by light signals.

(7) During instrument flight rules operations, the two-way communications failure procedures prescribed in Regulation 45 shall apply.

34. Access to and movement in the manoeuvring area

(1) A person shall not enter the manoeuvring area of an aerodrome or drive a vehicle on the manoeuvring area of an aerodrome without the permission of the aerodrome control tower in the case of a controlled aerodrome, or in the case of an uncontrolled aerodrome, the person in charge of the aerodrome, and in accordance with any conditions subject to which that permission may have been granted.

(2) A person shall not move, or move a vehicle on the manoeuvring area of an aerodrome having an air traffic control unit without the permission of that unit and in accordance with any conditions subject to which that permission may have been granted.

(3) Any permission granted for the purpose of this regulation may be granted either in respect of persons or vehicles generally or in respect of any particular person or vehicle or any class of persons or vehicles.

35. Water operations

(1) An aircraft shall proceed with careful regard to existing circumstances and conditions including limitations of the respective craft when two aircraft or an aircraft and a vessel are approaching one another and there is a risk of collision.

(2) A person operating an aircraft on the water shall, in so far as possible, keep clear of all vessels and avoid impeding their navigation, and shall give way to any vessel or other aircraft that is given the right- of-way by this regulation.

(3) When two aircraft, or an aircraft and a vessel are approaching one another and there is a risk of collision, the aircraft shall proceed with careful regard to existing circumstances and conditions, including the limitations of the respective craft.

(4) Where aircraft, or an aircraft and a vessel, are converging the aircraft or vessel which has another to its right shall give way so as to keep well clear.

(5) Where aircraft, or an aircraft and a vessel, are approaching head-on, or approximately so, each shall alter its heading to the right to keep well clear.

(6) An aircraft or vessel that is being overtaken has the right-of- way, and the one overtaking shall alter its heading to keep well clear.

(7) An aircraft landing on or taking off from water shall, in so far as practicable, keep well clear of all vessels and avoid impeding their navigation.

(8) Aircraft operating on water between sunset and sunrise, shall display lights as required by the International Regulations for Preventing Collisions at Sea unless it is impractical for them to do so, in which case they shall display lights as closely similar as possible in characteristics and position to those required by the International Regulations.

Flight plans

36. Submission of a flight plan

(1) Information relative to an intended flight or portion of a flight, to be provided to air traffic services units, shall be in the form of a flight plan.

(2) A flight plan shall be submitted by a competent person prior to operating—

(a) any flight or portion thereof to be provided with air traffic control service;

(b) any IFR flight within advisory airspace;

(c) any flight within or into designated areas, or along designated routes, when so required by the appropriate ATS authority to facilitate the provision of flight information, alerting and search and rescue services;

(d) any flight within or into designated areas, or along designated routes, when so required by the appropriate ATS authority to facilitate coordination with appropriate military units or with air traffic services units in adjacent States in order to avoid the possible need for interception for the purpose of identification;

(e) any flight across international borders.

(3) A flight plan shall be submitted to an air traffic services reporting office before departure, or, through digital means, or, during flight, transmitted to the appropriate air traffic services unit or air-ground control radio station, unless arrangements have been made for submission of repetitive flight plans.

(4) A flight plan for a flight to be provided with air traffic control service or air traffic advisory service shall be submitted at least sixty minutes before departure, or, if submitted during flight, at a time which will ensure its receipt by the appropriate air traffic services unit at least ten minutes before the aircraft is estimated to reach—

(a) the intended point of entry into a control area or advisory area; or

(b) the point of crossing an airway or advisory route, unless otherwise prescribed by the appropriate ATS authority

(5) Where a Through Flight Plan, containing such particulars as may be notified is submitted to and accepted by an air traffic services unit in respect of a flight through a number of intermediate aerodromes, this regulation shall be deemed to have been satisfied in respect of each sector of the flight.

(6) Subject to subregulations (2), (3), (4) and (5), a flight plan shall be accepted by the receiving Air Traffic Service unit/Reporting office before it is activated

(7) An air traffic control unit may exempt the pilot-in-command from the requirements of this regulation in respect of an intended flight which is to be made in a notified local flying area and in which the aircraft will return to the aerodrome of departure without making an intermediate landing.

(8) In order to comply with the instrument flight rules, before an aircraft either takes off from a point within any controlled airspace, or enters any controlled airspace, or in other circumstances prescribed for this purpose, the pilot-in-command shall cause a flight plan to be communicated to the appropriate air traffic control unit and shall obtain an air traffic control clearance based on such flight plan.

(9) The pilot-in-command after he has flown in controlled airspace shall, unless he has requested the appropriate air traffic control unit to cancel his flight plan, forthwith inform that unit when the aircraft lands within or leaves that controlled airspace.

37. Contents of a flight plan

A flight plan shall comprise information regarding the following items as are considered relevant by the appropriate ATS authority—

(a) Aircraft identification

(b) Flight rules and type of flight

(c) Number and type(s) of aircraft and wake turbulence category

(d) Equipment

(e) Departure aerodrome

(f) Estimated off-block time

(g) Cruising speed(s)

(h) Cruising level(s)

(i) Route to be followed

(j) Destination aerodrome and total estimated elapsed time

(k) Alternate aerodrome(s)

(l) Fuel endurance

(m) Total number of persons on board

(n) Emergency and survival equipment

(o) Other information.

38. Completion of a flight plan

(1) A flight plan shall contain information, as applicable, on relevant items up to and including "Alternate aerodrome(s)" regarding the whole route or the portion thereof for which the flight plan is submitted, whatever the purpose for which it is submitted.

(2) It shall, in addition, contain information, as applicable, on all other items when so prescribed by the appropriate ATS authority or when otherwise deemed necessary by the person submitting the flight plan.

39. Changes to a flight plan

(1) Subject to the provisions of regulation 45 subregulation (1), all changes to a flight plan submitted for an IFR flight, or a VFR flight operated as a controlled flight, shall be reported as soon as practicable to the appropriate air traffic services unit.

(2) Significant changes to a flight plan shall be reported as soon as practicable to the appropriate air traffic services unit for other VFR flights.

(3) Any information submitted prior to departure regarding fuel endurance or total number of persons carried on board, if incorrect at the time of departure, constitutes a significant change to the flight plan and as such shall be reported.

40. Closing a flight plan

(1) A pilot-in-command shall make a report of arrival in person, by radiotelephony or via data link at the earliest possible moment after landing, to the appropriate air traffic services unit at the arrival aerodrome, by any flight for which a flight plan has been submitted covering the entire flight or the remaining portion of a flight to the destination aerodrome unless otherwise prescribed by the appropriate ATS authority.

(2) When a flight plan has been submitted only in respect of a portion of a flight, other than the remaining portion of a flight to destination, it shall, when required, be closed by an appropriate report to the relevant air traffic services unit.

(3) When no air traffic services unit exists at the arrival aerodrome, the arrival report, when required, shall be made as soon as practicable after landing and by the quickest means available to the nearest air traffic services unit.

(4) When communication facilities at the arrival aerodrome are known to be inadequate and alternate arrangements for the handling of arrival reports on the ground are not available, the following action shall be taken—

(a) Immediately prior to landing the aircraft shall, if practicable, transmit to the appropriate air traffic services unit, a message comparable to an arrival report, where such a report is required.

(b) Normally, this transmission shall be made to the aeronautical station serving the air traffic services unit in charge of the flight information region in which the aircraft is operated.

(5) Arrival reports made by aircraft shall contain the following elements of information—

(a) aircraft identification;

(b) departure aerodrome;

(c) destination aerodrome (only in the case of a diversionary landing); arrival aerodrome;

(d) time of arrival.

(6) A pilot-in-command of an aircraft who has caused notice of the aircraft intended arrival at any aerodrome to be given to the air traffic services unit or other authority at that aerodrome shall ensure that the air traffic services unit or other authority at that aerodrome is informed as quickly as possible of any change of intended destination and any estimated delay in arrival of forty five minutes or more.

41. Universal aviation Signals

(1) Upon observing or receiving any of the signals given in Fourth Schedule, aircraft shall take such action as may be required by the interpretation of the signal given in that schedule.

(2) The signals given in the Fourth schedule shall, when used, have the meaning indicated therein and be used only for the purpose indicated.

(3) No other signals likely to be confused with the signals in the Fourth Schedule shall be used.

(4) A marshaller shall be responsible for providing standard marshalling signals to aircraft in a clear and precise manner using the signals shown in Fourth Schedule.

(5) No person shall marshal an aircraft unless trained, qualified and approved by the aerodrome operator to carry out the functions of a marshaller.

(6) The marshaller shall wear a distinctive fluorescent identification vest to allow the flight crew to identify that he or she is the person responsible for the marshalling operation.

(7) Daylight-fluorescent wands, table-tennis bats or gloves shall be used for all signalling by all participating ground staff during daylight hours.

(8) Illuminated wands shall be used at night or in low visibility.

42. Distress signals

The following signals, used either together or separately,mean that grave and imminent danger threatens, and immediate assistance is requested—

(a) a signal made by radiotelegraphy or by any other signalling method consisting of the group SOS in the Morse Code;

(b) a radiotelephony distress signal consisting of the spoken word MAYDAY;

(c) a distress message sent via data link which transmits the intent of the word MAYDAY;

(d) rockets or shells showing red lights, fired one at a time at short intervals;

(e) a parachute flare showing a red light.

43. Urgency signals

(1) The following signals, used either together orseparately, mean that an aircraft wishes to give notice of difficulties which compel it to land without requiring immediate assistance—

(a) the repeated switching on and off of the landing lights; or

(b) the repeated switching on and off of the navigation lights in such manner as to be distinct from flashing navigation lights.

(2) The following signals, used either together or separately,mean that an aircraft has a very urgent message to transmit concerning the safety of a ship, aircraft or other vehicle, or of some person on board or within sight—

(a) a signal made by radiotelegraphy or by any other signalling method consisting of the group XXX;

(b) a signal sent by radiotelephony consisting of the spoken words PAN, PAN;

(c) an urgency message sent via data link which transmits the intent of the words PAN, PAN.

44. Time

(1) Coordinated Universal Time (UTC) shall be used and be expressed in hours and minutes and, when required, seconds of the 24- hour day beginning at midnight.

(2) A time check shall be obtained prior to operating a controlled flight and at such other times during the flight as may be necessary.

(3) Wherever time is utilized in the application of data link communications, it shall be accurate to within 1 second of UTC.

AIR TRAFFIC CONTROL SERVICE

45. Air traffic control clearances

(1) An air traffic control clearance shall be obtained prior to operating a controlled flight, or a portion of a flight as a controlled flight.

(2) Air traffic control clearance shall be requested through the submission of a flight plan to an air traffic control unit.

(3) Whenever an aircraft has requested a clearance involving priority, a report explaining the necessity for such priority shall be submitted, if requested by the appropriate air traffic control unit.

(4) The appropriate air traffic control units shall be so notified by the insertion in the flight plan of information concerning the revised route ,where known, and the revised destination if prior to departure it is anticipated that depending on fuel endurance and subject to re-clearance in flight, a decision may be taken to proceed to a revised destination aerodrome.

(5) An aircraft operated on a controlled aerodrome shall not taxi on the manoeuvring area without clearance from the aerodrome control tower and shall comply with any instructions given by that unit.

(6) The pilot-in-command of an aircraft shall fly in conformity with the air traffic control clearance issued for the flight as amended by any further instructions given by an air traffic control unit, and with the holding and instrument approach procedures, notified in relation to the aerodrome of destination, unless the pilot-in-command—

(a) is able to fly in uninterrupted visual meteorological conditions for so long as he remains in controlled airspace; and

(b) has informed the appropriate air traffic control unit of his intention to continue the flight in compliance with visual flight rules and has requested that unit to cancel his instrument flight rules flight plan:

Provided that if an emergency arises which requires an immediate deviation from an air traffic control clearance, the pilot-in- command of the aircraft shall, as soon as possible, inform the appropriate air traffic control unit of the deviation.

46. Adherence to current light plan

(1) An aircraft shall adhere to the current flight plan or the applicable portion of a current flight plan submitted for a controlled flight unless—

(a) a request for a change has been made and clearance obtained from the appropriate air traffic control unit, or;

(b) an emergency situation arises which necessitates immediate action by the aircraft, in which event as soon as circumstances permit, after such emergency authority is exercised, the appropriate air traffic services unit shall be notified of the action taken and that this action has been taken under emergency authority, except as provided for in subregulation (2) and regulation 47

(2) Unless otherwise authorized by the appropriate ATS authority, or directed by the appropriate air traffic control unit, controlled flights shall, in so far as practicable—

(a) when on an established ATS route, operate along the defined centre line of that route; or

(b) when on any other route, operate directly between the navigation facilities and points defining that route.

(3) Subject to the overriding requirement in subregulation (2), an aircraft operating along an ATS route segment defined by reference to very high frequency omni-directional radio ranges shall change over for its primary navigation guidance from the facility behind the aircraft to that ahead of it at, or as close as operationally feasible to, the changeover point, where established.

(4) Deviation from the requirements in subregulation (2), shall be notified to the appropriate air traffic services unit.

47. Deviations from the current flight plan

(1) In the event that a controlled flight inadvertently deviates from its current flight plan, the following action shall be taken—

(a) Deviation from track: if the aircraft is off track, action shall be taken forthwith to adjust the heading of the aircraft to regain track as soon as practicable.

(b) Deviation from ATC assigned Mach number/indicated airspeed: the appropriate air traffic services unit shall be informed immediately.

(c) Deviation from Mach number or true airspeed: if the sustained Mach number or true airspeed at cruising level varies by plus or minus Mach 0.02 or more, or plus or minus 19 km/h (10 kts) true airspeed or more from the current flight plan, the appropriate air traffic services unit shall be so informed.

(d) Change in time estimate: except where ADS-C is activated and serviceable in airspace where ADS-C services are provided, if the time estimate for the next applicable reporting point, flight information region boundary or destination aerodrome, whichever comes first, changes in excess of 2 minutes from that previously notified to air traffic services, or such other period of time as is prescribed by the appropriate ATS authority or on the basis of regional air navigation agreements, the flight crew shall notify the appropriate air traffic services unit as soon as possible.

(2) When ADS-C services are provided and ADS-C is activated, the air traffic services unit shall be informed automatically via data link whenever changes occur beyond the threshold values stipulated by the ADS event contract.

(3) Requests for current flight plan changes shall include the following information—

(a) Change of cruising level:

(i) aircraft identification;

(ii) requested new cruising level and cruising Mach number or true airspeed at this level;

(iii) revised time estimates at subsequent reporting points or flight information region boundaries.

(b) Change of Mach number or true airspeed—

(i) aircraft identification;

(ii) requested Mach number or true airspeed.

48. Weather deterioration below the VMC

The pilot-in-command of a VFR flight operated as a controlled flight shall, when it becomes evident that flight in VMC in accordance with its current flight plan will not be practicable—

(a) request an amended clearance enabling the aircraft to continue in VMC to destination or to an alternative aerodrome, or to leave the airspace within which an ATC clearance is required; or

(b) if no clearance in accordance with a) can be obtained, continue to operate in VMC and notify the appropriate ATC

unit of the action being taken either to leave the airspace concerned or to land at the nearest suitable aerodrome; or

(c) if operated within a control zone, request authorization to operate as a special VFR flight; or

(d) request clearance to operate in accordance with the instrument flight rules.

49. Position reports

(1) A pilot-in-command of a controlled flight shall report to the appropriate air traffic services unit, as soon as possible—

(a) the time and level of passing each designated compulsory reporting point, together with any other required information unless exempted by the appropriate ATS authority or by the appropriate air traffic services unit under conditions specified by that authority;

(b) any unforecasted weather conditions encountered; and

(c) any other information relating to the safety of flight, such as hazardous weather or abnormal radio station indications.

(2) Position reports shall be made in relation to additional points when requested by the appropriate air traffic services unit.

(3) Position reports shall be made at intervals prescribed by the appropriate ATS authority or specified by the appropriate air traffic services unit in the absence of designated reporting points.

(4) Controlled flights providing position information to the appropriate air traffic services unit via data link communications shall only provide voice position reports when requested.

50. Termination of control

A controlled flight shall, advise the appropriate ATC unit as soon as it ceases to be subject to air traffic control service except when landing at a controlled aerodrome.

51. General Communications

(1) An aircraft operated as a controlled flight shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and establish two-way communication as necessary with, the appropriate air traffic control unit, except as may be prescribed by the appropriate ATS authority in respect of aircraft forming part of aerodrome traffic at a controlled aerodrome.

(2) Aircraft shall comply with the voice communication failure procedures of the Civil Aviation (Communication Procedures) Regulations.

(3) Aircraft shall attempt to establish communications with the appropriate air traffic control unit using all other available means.

(4) Aircraft forming part of the aerodrome traffic at a controlled aerodrome, shall keep a watch for such instructions as may be issued by visual signals.

(5) An aircraft in visual meteorological conditions shall—

(a) continue to fly in visual meteorological conditions; land at the nearest suitable aerodrome; and report its arrival by the most expeditious means to the appropriate air traffic services unit;

(b) complete an IFR flight in accordance with sub regulations (6) if considered advisable.

(6) Aircraft shall, if in instrument meteorological conditions or when the pilot of an IFR flight considers it inadvisable to complete the flight in accordance with sub regulation (5) (a):

(a) maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan unless otherwise prescribed on the basis of regional air navigation agreement, in airspace where radar is not used in the provision of air traffic control;

(b) in airspace where radar is used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 7 minutes following—

(i) the time the last assigned level or minimum flight altitude is reached; or

(ii) the time the transponder is set to Code 7600; or

(iii) the aircraft's failure to report its position over a compulsory reporting point; whichever is later, and thereafter adjust level and speed in accordance with the filed flight plan;

(c) rejoin the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude when being radar vectored or having been directed by ATC to proceed offset using area navigation (RNAV) without a specified limit;

(d) proceed according to the current flight plan route to the appropriate designated navigation aid or fix serving the destination aerodrome and, when required to ensure compliance with (e) below, hold over this aid or fix until commencement of descent;

(e) commence descent from the navigation aid or fix specified in (d) at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

(f) complete a normal instrument approach procedure as specified for the designated navigation aid or fix; and

(g) land within 30 minutes after the estimated time of arrival specified in (e) or the last acknowledged expected approach time.

(7) Where an aeronautical station has been unable to establish contact with a pilot-in-command after calls on the frequencies on which the pilot-in-command is believed to belistening, the station shall—

(a) request other aeronautical stations to render assistance by calling the pilot-in-command and relaying traffic information, if necessary;

(b) request pilot-in-command of other aircraft on the route to attempt to establish communication with the aircraft and relay traffic information, if necessary.

(8) The provisions of subregulation (7) shall also be applied—

(a) on request of the air traffic service unit concerned;

(b) when an expected communication from a pilot-in-command has not been received within a time period such that the occurrence of a communication failure is suspected.

(9) The time period referred to in subregulation (8) (b) shall be prescribed by the Authority.

(10) Where the attempts specified in subregulation (7) fail, the aeronautical station shall transmit messages addressed to the pilot-in- command, other than messages containing air traffic control clearances, by blind transmission on the frequency on which the Pilot-in-command is believed to be listening.

52. Unlawful interference

(1) An aircraft which is being subjected to unlawful interference shall endeavour to notify the appropriate ATS unit of this fact, any significant circumstances associated therewith and any deviation from the current flight plan necessitated by the circumstances, in order to enable the ATS unit to give priority to the aircraft and to minimize conflict with other aircraft.

(2) The pilot-in-command of an aircraft subjected to unlawful interference, shall attempt to land as soon as practicable at the nearest suitable aerodrome or at a dedicated aerodrome assigned by the appropriate authority unless considerations aboard the aircraft dictate otherwise.

(3) A pilot-in-command shall, when and if possible, operate the secondary surveillance radar Mode A Code 7500 to indicate that the aircraft is being subjected to unlawful interference or secondary surveillance radar Mode A, Code 7700 to indicate that it is threatened by grave and imminent danger and requires immediate assistance.

(4) When an air traffic service unit knows or believes that an aircraft is being subjected to unlawful interference, no reference shall be made in air traffic services air-ground communications to the nature of the emergency unless it has first been referred to in communications from the aircraft involved and it is certain that such reference will not aggravate the situation.

(5) The pilot-in-command of an aircraft subjected to unlawful interference shall when unable to notify an air traffic service unit shall attempt to continue flying on the assigned track and at the assigned cruising level at least until able to notify an air traffic service unit or until within radar or ADS-B coverage.

(6) The pilot-in-command of an aircraft subjected to unlawful interference and which must depart from its assigned track or its assigned cruising level without being able to notify an air traffic service unit shall—

(a) attempt to broadcast warnings on the VHF channel in use or on the designated emergency frequency unless considerations aboard the aircraft dictate otherwise;

(b) proceed at a level which differs from the cruising levels normally used for IFR flight by—

(i) 500 ft when flying in an area where vertical separation minimum of 1000 ft is applied

(ii) 1000 ft in an area where vertical separation minimum of 2000 ft is applied Unlawful interference.

53. Interception of Civil Aircraft

(1) Interception of civil aircraft shall be governed by these regulations and any other administrative directives issued by the Authority.

(2) Subject to subregulation (1), the Authority shall undertake, due regard for the safety of navigation of civil aircraft.

(3) The pilot-in-command of a civil aircraft, when intercepted, shall comply with the requirements prescribed in the Fifth Schedule, interpreting and responding to visual signals as specified in Fourth Schedule Interception of Civil Aircraft.

54. Visual meteorological conditions, visibility and distance from cloud minima

VMC visibility and distance from cloud minima shall be as shown in below described in the Sixth Schedule.

PART III – VISUAL FLIGHT RULES

55. Visual flight rules within a control zone

(1) VFR flights shall be conducted so that the aircraft is flown in conditions of visibility and distance from clouds equal to or greater than those specified in regulation 54 except when operating as a special VFR flight,

(2) VFR flights shall not take off or land at an aerodrome within a control zone, or enter the aerodrome traffic zone or traffic pattern when the—

(a) ceiling is less than 1 500 ft; or

(b) ground visibility is less than 5 km; except when a clearance is obtained from an air traffic control unit.

(3) The appropriate ATS authority shall prescribe the conditions that govern the operations of VFR flights between sunset and sunrise, or such other period between sunset and sunrise.

56. Operation of Visual flight rules flights

(1) VFR flights shall not be operated—

(a) above FL 145; or

(b) at night

(2) A VFR flight shall not be flown—

(a) over the congested areas of cities, towns or settlements or over an open-air assembly of persons at a height less than 300 M (1000 ft) above the highest obstacle within a radius of 600 M (2000 ft) from the aircraft;

(b) elsewhere than as specified in subregulation 6 (a), at a height less than 150 M (500 ft) above the ground or water; except when necessary for take-off or landing, or except by permission from the appropriate authority.

(3) VFR flights in level cruising flight when operated above 900 M (3 000 ft) from the ground or water, or a higher datum as specified by the appropriate ATS authority, shall be conducted at a cruising level appropriate to the track as specified in the tables of cruising levels in the First Schedule except where otherwise indicated in air traffic control clearances or specified by the appropriate ATS authority.

(4) VFR flights shall comply with the provisions of regulations 45, 46, 47, 48, 49, 50 and 51 when—

(a) operated within Classes B, C and D airspace;

(b) forming part of aerodrome traffic at controlled aerodromes; or

(c) operated as special VFR flights.

(5) A VFR flight operating within or into areas, or along routes, designated by the appropriate ATS authority in accordance with regulation 36 (2) (c) or (2) (d) shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and report its position as necessary to, the air traffic services unit providing flight information service.

57. Changing from Visual flight rules to Instrument flight rules

A pilot-in-command of an aircraft operated in accordance with the visual flight rules which wishes to change to compliance with the instrument flight rules shall:

(a) if a flight plan was submitted, communicate the necessary changes to be effected to its current flight plan; or

(b) when so required by regulation 36, submit a flight plan to the appropriate air traffic services unit and obtain a clearance prior to proceeding IFR when in controlled airspace.

PART IV – INSTRUMENT FLIGHT RULES

58. Aircraft equipment

A pilot-in-command of an aircraft shall ensure that the aircraft is equipped with suitable instruments and with navigation equipment appropriate to the route to be flown.

59. Minimum levels for IFR flights

(1) An IFR flight shall be flown at a level which is not below the minimum flight altitude established by the Authority or, where no such minimum flight altitude has been established —

(a) over high terrain or in mountainous areas, at a level which is at least 2 000 ft above the highest obstacle located within 8 km of the estimated position of the aircraft;

(b) elsewhere than as specified in (a), at a level which is at least 1 000 ft above the highest obstacle located within 8 km of the estimated position of the aircraft; except when necessary for take-off or landing, or except when specifically authorized by the appropriate authority,

(2) If unable to communicate with air traffic control and there is need to climb to clear an obstacle, a pilot shall climb to a higher minimum instrument flight rules altitude immediately after passing the point beyond which that minimum altitude applies.

60. Change from IFR flight to VFR flight

(1) A pilot-in-command of an aircraft electing to change the conduct of its flight from compliance with the instrument flight rules to compliance with the visual flight rules shall, if a flight plan was submitted, notify the appropriate air traffic services unit specifically that the IFR flight is cancelled and communicate thereto the changes to be made to its current flight plan.

(2) Where a pilot of an aircraft operating under the instrument flight rules is flying in or encounters visual meteorological conditions, he shall not cancel its IFR flight unless it is anticipated, and intended, that the flight will be continued for a reasonable period of time in uninterrupted visual meteorological conditions.

61. Rules applicable to IFR flights within controlled airspace

(1) IFR flights shall comply with the provisions of regulations 45.46, 47, 48, 49, 50 and 51 when operating in controlled airspace.

(2) An IFR flight operating in cruising flight in controlled airspace shall be flown at a cruising level, or, if authorized to employ cruise climb techniques, between two levels or above a level, selected from—

(a) the tables of cruising levels in First Schedule; or

(b) a modified table of cruising levels, when so prescribed in accordance with First Schedule for flight above FL 410.

(3) The correlation of levels to track prescribed in subregulation

(2) shall not apply whenever indicated in air traffic control clearances or specified by the appropriate ATS authority in Aeronautical Information Publications.

RULES APPLICABLE TO IFR FLIGHTS OUTSIDE CONTROLLED AIRSPACE

62. Cruising levels outside controlled airspace

A pilot-in-command of an IFR flight operating in level cruising flight outside of controlled airspace shall be fly the aircraft at a cruising level appropriate to its track as specified in—

(a) the tables of cruising levels in the First Schedule, except when specified by the appropriate ATS authority for flight at or below 900 M (3000 ft) above mean sea level; or

(b) a modified table of cruising levels, when prescribed in accordance with the First Schedule for flight above FL 410.

63. Communications for IFR flights outside controlled airspace

A pilot-in-command of an IFR flight operating outside controlled airspace but within or into areas, or along routes, designated by the appropriate ATS authority in accordance with regulation 36, subregulation (2) (c) or (d) shall maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service.

64. Position Report IFR flights outside controlled airspace orts

A pilot-in-command of an IFR flight operating outside controlled airspace shall report position as specified in regulation 49 for controlled flights when required by the appropriate ATS authority to—

(a) submit a flight plan,

(b) maintain an air-ground voice communication watch on the appropriate communication channel and establish two-way communication, as necessary, with the air traffic services unit providing flight information service.

PART V – GENERAL PROVISIONS

65. Contravention of Regulations

The Authority may suspend or revoke the licence, certificate, approval, authorisation, exemption or other document of a person who contravenes any provision of these regulations.

66. Appeals to the tribunal

A person aggrieved with the decision of the Authority under these regulations may within twenty one days of such decision appeal to the tribunal.

67. Offenses

(1) A person who contravenes any provision of these regulations, commits an offence and is liable on conviction to a fine not exceeding two million shillings, and in the case of a continuing contravention, each day of the contravention shall constitute a separate offence.

(2) If it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these regulations, was due to any cause not avoidable by the exercise of reasonable care by that person, the act or omission shall be deemed not to be a contravention by that person of that provision.

(3) Where a person is charged with contravening a provision of these regulations by reason of his having been a member of the flight crew of an aircraft on a flight for the purpose of commercial air transport operations, the flight shall be treated, without prejudice to the liability of any other person under these Regulations, as not having been for that purpose if he proves that he neither knew nor had reason to know that the flight was for that purpose.

(4) In case an aircraft is involved in a contravention and the contravention is by the owner or operator of the aircraft, the aircraft shall be subject to a lien for the penalty.

(5) Any aircraft subject to alien for the purpose of subregulation

(5) may be seized by and placed in the custody of the Authority;

(6) The aircraft shall be released from custody of the Authority upon—

(a) payment of the penalty or the amount agreed upon in compromise;

(b) deposit of a bond in such amount as the Authority may prescribe, conditioned upon payment of the penalty or the amount agreed upon in compromise;

(c) receiving an order of the court to that effect.

(8) A person who contravenes any provision specified in Part A of the Fifth Schedule to these regulations commits an offence and is liable on conviction to a fine not exceeding one million shillings for each offence or to imprisonment for a term not exceeding one year or to both.

(9) A person who contravenes any provision specified in Part B of the Fifth Schedule to these regulations commits an offence and is liable on conviction to a fine not exceeding two million shillings for each offence and/or to imprisonment for a term not exceeding three years or to both.

68. Revocation

The Civil Aviation (Rules of the Air) Regulations, 2013 are hereby revoked.

69. Transitional

(1) A licence, certificate, permit or authorization issued or granted by the Authority before the commencement of these Regulations shall remain operational until it expires or is revoked, annulled or replaced

(2) Notwithstanding any other provision of these Regulations, a person who at the commencement of these Regulations, is carrying out any acts, duties or operations affected by these Regulations shall, within one (1) year from the date of commencement, or within such longer time that the Cabinet Secretary may, by notice in the *Gazette* prescribe, comply

with the requirements of these Regulations or cease to carry out such acts, duties or operations.

FIRST SCHEDULE

[r. 11, 56, 61, 62]

TABLES OF CRUISING LEVELS

The cruising levels to be observed when so required by these regulations are as follows:

RVSM — FEET

a) In areas where feet are used for altitude and where, in accordance with regional air navigation agreements, a vertical separation minimum of 1000 ft is applied between FL 290 and FL 410 inclusive:*

TRACK**												
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Level			Level			Level			Level		
FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres
010	1 000	300	–	–	–	020	2 000	600	–	–	–
030	3 000	900	035	3 500	1 050	040	4 000	1 200	045	4 500	1 350
050	5 000	1 500	055	5 500	1 700	060	6 000	1 850	065	6 500	2 000
070	7 000	2 150	075	7 500	2 300	080	8 000	2 450	085	8 500	2 600
090	9 000	2 750	095	9 500	2 900	100	10 000	3 050	105	10 500	3 200
110	11 000	3 350	115	11 500	3 500	120	12 000	3 650	125	12 500	3 800
130	13 000	3 950	135	13 500	4 100	140	14 000	4 250	145	14 500	4 400
150	15 000	4 550	155	15 500	4 700	160	16 000	4 900	165	16 500	5 050
170	17 000	5 200	175	17 500	5 350	180	18 000	5 500	185	18 500	5 650
190	19 000	5 800	195	19 500	5 950	200	20 000	6 100	205	20 500	6 250
210	21 000	6 400	215	21 500	6 550	220	22 000	6 700	225	22 500	6 850
230	23 000	7 000	235	23 500	7 150	240	24 000	7 300	245	24 500	7 450
250	25 000	7 600	255	25 500	7 750	260	26 000	7 900	265	26 500	8 100
270	27 000	8 250	275	27 500	8 400	280	28 000	8 550	285	28 500	8 700
290	29 000	8 850				300	30 000	9 150			
310	31 000	9 450				320	32 000	9 750			
330	33 000	10 050				340	34 000	10 350			
350	35 000	10 650				360	36 000	10 950			
370	37 000	11 300				380	38 000	11 600			
390	39 000	11 900				400	40 000	12 200			
410	41 000	12 500				430	43 000	13 100			
450	45 000	13 700				470	47 000	14 350			
490	49 000	14 950				510	51 000	15 550			
etc.	etc.	etc.				etc.	etc.	etc.			

* Except when, on the basis of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1 000ft (300m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.

** Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note. - Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft)

Vertical Separation n|minimum Between FL 290 and FL 410 Inclusive *(Doc 9574)*.

RVSM — METRES

b) In areas where metres are used for altitude and where, in accordance with regional air navigation agreements, a vertical separation minimum of 300 m is applied between 8 900 m and 12 500 m inclusive:*

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Level			Level			Level			Level		
Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet
0030	300	1 000	–	–	–	0060	600	2 000	–	–	–
0090	900	3 000	0105	1 050	3 500	0120	1 200	3 900	0135	1 350	4 400
0150	1 500	4 900	0165	1 650	5 400	0180	1 800	5 900	0195	1 950	6 400
0210	2 100	6 900	0225	2 250	7 400	0240	2 400	7 900	0255	2 550	8 400
0270	2 700	8 900	0285	2 850	9 400	0300	3 000	9 800	0315	3 150	10 300
0330	3 300	10 800	0345	3 450	11 300	0360	3 600	11 800	0375	3 750	12 300
0390	3 900	12 800	0405	4 050	13 300	0420	4 200	13 800	0435	4 350	14 300
0450	4 500	14 800	0465	4 650	15 300	0480	4 800	15 700	0495	4 950	16 200
0510	5 100	16 700	0525	5 250	17 200	0540	5 400	17 700	0555	5 550	18 200
0570	5 700	18 700	0585	5 850	19 200	0600	6 000	19 700	0615	6 150	20 200
0630	6 300	20 700	0645	6 450	21 200	0660	6 600	21 700	0675	6 750	22 100
0690	6 900	22 600	0705	7 050	23 100	0720	7 200	23 600	0735	7 350	24 100
0750	7 500	24 600	0765	7 650	25 100	0780	7 800	25 600	0795	7 950	26 100
0810	8 100	26 600	0825	8 250	27 100	0840	8 400	27 600	0855	8 550	28 100
0890	8 900	29 100				0920	9 200	30 100			
0950	9 500	31 100				0980	9 800	32 100			
1010	10 100	33 100				1040	10 400	34 100			
1070	10 700	35 100				1100	11 000	36 100			
1130	11 300	37 100				1160	11 600	38 100			
1190	11 900	39 100				1220	12 200	40 100			
1250	12 500	41 100				1310	13 100	43 000			
1370	13 700	44 900				1430	14 300	46 900			
1490	14 900	48 900				1550	15 500	50 900			
etc.	etc.	etc.				etc.	etc.	etc.			

*Except when, on the basis of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1 000ft (300m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.

** Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note. - Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive *(Doc 9574)*.

Non-RVSM — FEET

c) In other areas where feet are the primary unit of measurement for altitude:

TRACK*												
From 000 degrees to 179 degrees**						From 180 degrees to 359 degrees**					
IFR Flights Level			VFR Flights Level			IFR Flights Level			VFR Flights Level		
FL	Feet	Meters	FL	Feet	Meters	FL	Feet	Meters	FL	Feet	Meters
010	1000	300	-	-	-	020	2 000	600	-	-	-
030	3 000	900	035	3 500	1 050	040	4 000	1 200	045	4 500	1 350
050	5 000	1 500	055	5 500	1 700	060	6 000	1 850	065	6 500	2 000
070	7 000	2150	075	7 500	2 300	080	8 000	2 450	085	8 500	2 600
090	9 000	2 750	095	9 500	2 900	100	10 000	3 050	105	10 500	3 200
110	11 000	3 350	115	11 500	3 500	120	12 000	3 650	125	12 500	3 800
130	13 000	3 950	135	13 500	4 100	140	14 000	4 250	145	14 500	4 400
150	15.000	4 550	155	15.500	4 700	160	16 000	4 900	165	16 500	5 050
170	17.000	5 200	175	17 500	5 350	180	18 000	5 500	185	18 500	5 650
190	19.000	5 800	195	19 500	5 950	200	20 000	6 100	205	20 500	6 250
210	21 000	6 400	215	21 500	6 550	220	22 000	6 700	225	22 500	6 850
230	23 000	7 000	235	23 500	7 150	240	24 000	7 300	245	24 500	7 450
250	25.000	7 600	255	25 500	7 750	260	26 000	7 900	265	26 500	8 100
270	27.000	8 250	275	27 500	8 400	280	28 000	8 550	285	28 500	8 700
290	29 000	8 850	300	30 000	9 150	310	31 000	9 450	320	32 000	9 750
330	33 000	10 050	340	34 000	10 350	350	35 000	10 650	360	36 000	10 950
370	37 000	11 300	380	38 000	11 600	390	39 000	11 900	400	40 000	12 200
410	41 000	12 500	420	42 000	12 800	430	43 000	13 100	440	44 000	13 400
450	45.000	13 700	460	46.000	14 000	470	47 000	14 350	480	48 000	14 650
490	49 000	14 950	500	50 000	15 250	510	51 000	15 1550	520	52 000	15 850
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.

** Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note. - Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft)

Vertical Separation minimum Between FL 290 and FL 410 Inclusive *(Doc 9574)*.

Non-RVSM — METRES

d) In other areas where metres are the primary unit of measurement for altitude:

TRACK*											
From 000 degrees to 179 degrees**						From 180 degrees to 359 degrees**					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Level			Level			Level			Level		
Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet
0030	300	1 000	–	–	–	0060	600	2 000	–	–	–
0090	900	3 000	0105	1 050	3 500	0120	1 200	3 900	0135	1 350	4 400
0150	1 500	4 900	0165	1 650	5 400	0180	1 800	5 900	0195	1 950	6 400
0210	2 100	6 900	0225	2 250	7 400	0240	2 400	7 900	0255	2 550	8 400
0270	2 700	8 900	0285	2 850	9 400	0300	3 000	9 800	0315	3 150	10 300
0330	3 300	10 800	0345	3 450	11 300	0360	3 600	11 800	0375	3 750	12 300
0390	3 900	12 800	0405	4 050	13 300	0420	4 200	13 800	0435	4 350	14 300
0450	4 500	14 800	0465	4 650	15 300	0480	4 800	15 700	0495	4 950	16 200
0510	5 100	16 700	0525	5 250	17 200	0540	5 400	17 700	0555	5 550	18 200
0570	5 700	18 700	0585	5 850	19 200	0600	6 000	19 700	0615	6 150	20 200
0630	6 300	20 700	0645	6 450	21 200	0660	6 600	21 700	0675	6 750	22 100
0690	6 900	22 600	0705	7 050	23 100	0720	7 200	23 600	0735	7 350	24 100
0750	7 500	24 600	0765	7 650	25 100	0780	7 800	25 600	0795	7 950	26 100
0810	8 100	26 600	0825	8 250	27 100	0840	8 400	27 600	0855	8 550	28 100
0890	8 900	29 100	0920	9 200	30 100	0950	9 500	31 100	0980	9 800	32 100
1010	10 100	33 100	1040	10 400	34 100	1070	10 700	35 100	1100	11 000	36 100
1130	11 300	37 100	1160	11 600	38 100	1190	11 900	39 100	1220	12 200	40 100
1250	12 500	41 100	1280	12 800	42 100	1310	13 100	43 000	1370	13 400	44 000
1370	13 700	44 900	1400	14 000	46 100	1430	14 300	46 900	1460	14 600	47 900
1490	14 900	48 900	1520	15 200	49 900	1550	15 500	50 900	1580	15 800	51 900
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.

* Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note. - Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft)

Vertical Separation minimum Between FL 290 and FL 410 Inclusive *(Doc 9574)*.

SECOND SCHEDULE

[r. 15]

REMOTELY PILOTED AIRCRAFT SYSTEMS

1. General operating rules

1.1 A remotely piloted aircraft system (RPAS) engaged in international air navigation shall not be operated without appropriate authorization from the State from which the take-off of the remotely piloted aircraft (RPA) is made.

1.2 An RPA shall not be operated across the territory of another State without special authorization issued by each State in which the flight is to operate. This authorization may be in the form of agreements between the States involved.

1.3 An RPA shall not be operated over the high seas without prior coordination with the appropriate ATS authority.

1.4 The authorization and coordination referred to in 1.2 and 1.3 shall be obtained prior to take-off if there is reasonable expectation, when planning the operation, that the aircraft may enter the airspace concerned.

1.5 An RPAS shall be operated in accordance with conditions specified by the State of Registry, the State of the Operator, if different, and the State(s) in which the flight is to operate.

1.6 Flight plans shall be submitted in accordance with Regulation 32 of these regulations or as otherwise mandated by the State(s) in which the flight is to operate.

1.7 RPAS shall meet the performance and equipment carriage requirements for the specific airspace in which the flight is to operate.

2. Certificates and licensing

Note 1.— ICAO Assembly Resolution A37-15 Appendix G resolves that pending the coming into force of international Standards respecting particular categories, classes or types of aircraft, certificates issued or rendered valid, under national regulations, by the Contracting State in which the aircraft is registered shall be recognized by other Contracting States for the purposes of flight over their territories, including landings and take-offs.

Note 2.— Certification and licensing Standards are not yet developed. Thus, in the meantime, any certification and licensing need not be automatically deemed to comply with the SARPs of the related Annexes, including Annexes 1, 6 and 8,until such time as the related RPAS SARPs are developed.

Note 3.— Notwithstanding Assembly Resolution A37-15, Article 8 of the Chicago Convention assures each Contracting State of the absolute sovereignty over the authorization for RPA operations over its territory.

2.1 An RPAS shall be approved, taking into account the interdependencies of the components, in accordance with national regulations and in a manner that is consistent with the provisions of related Regulations. In addition:

(a) an RPA shall have a certificate of airworthiness issued in accordance with national regulations and in a manner that is consistent with the provisions of the Air Worthiness regulations; and

(b) the associated RPAS components specified in the type design shall be certificated and maintained in accordance with national regulations and in a manner that is consistent with the provisions of related Annexes.

2.2 An operator shall have an RPAS operator certificate issued in accordance with national regulations and in a manner that is consistent with the provisions of the Operation of Aircraft Regulations.

2.3 Remote pilots shall be licensed, or have their licences rendered valid, in accordance with national regulations and in a manner that is consistent with the provisions Personnel licensing regulations.

3. Request for authorization

3.1 The request for authorization referred to in 1.2 above shall be made to the appropriate authorities of the State(s) in which the RPA will operate not less than seven days before the date of the intended flight unless otherwise specified by the State.

3.2 Unless otherwise specified by the State(s), the request for authorization shall include the following:

(a) name and contact information of the operator;

(b) RPA characteristics (type of aircraft, maximum certificated take-off mass, number of engines, wing span);

(c) copy of certificate of registration;

(d) aircraft identification to be used in radiotelephony, if applicable;

(e) copy of the certificate of airworthiness;

(f) copy of the RPAS operator certificate;

(g) copy of the remote pilot(s) licence;

(h) copy of the aircraft radio station licence, if applicable;

(i) description of the intended operation (to include type of operation or purpose), flight rules, visual line-of-sight (VLOS) operation if applicable, date of intended flight(s), point of departure, destination, cruising speed(s), cruising level(s), route to be followed, duration/ frequency of flight;

(j) take-off and landing requirements;

(k) RPA performance characteristics, including:

1. operating speeds;

2. typical and maximum climb rates;

3. typical and maximum descent rates;

4. typical and maximum turn rates;

5. other relevant performance data (e.g. limitations regarding wind, icing, precipitation); and

6. maximum aircraft endurance;

(1) communications, navigation and surveillance capabilities:

1. aeronautical safety communications frequencies and equipment, including:

(i) ATC communications, including any alternate means of communication;

(ii) command and control links (C2) including performance parameters and designated operational coverage area;

(iii) communications between remote pilot and RPA observer, if applicable;

2. navigation equipment; and

3. surveillance equipment (e.g. SSR transponder, ADS-B out);

(m) detect and avoid capabilities;

(n) emergency procedures, including:

1. communications failure with ATC;

2. C2 failure; and

3. remote pilot/RPA observer communications failure, if applicable;

(a) number and location of remote pilot stations as well as handover procedures between remote pilot stations, if applicable;

(b) document attesting noise certification that is consistent with the provisions of ICAO Annex 16, Volume 1, if applicable;

(c) confirmation of compliance with national security standards in a manner that is consistent with the provisions of Aviation Security Regulations, to include security measures relevant to the RPAS operation, as appropriate;

(d) payload information/description; and

(e) proof of adequate insurance/liability coverage.

3.3 When certificates or other documents identified in 3.2 above are issued in a language other than English, an English translation shall be included.

3.4 After authorization has been obtained from the appropriate State(s), air traffic services notification and coordination shall be completed in accordance with the requirements of the State(s).

Note.— A request for authorization does not satisfy the requirement to file a flight plan with the air traffic services units.

3.5 Changes to the authorization shall be submitted for consideration to the appropriate State(s). If the changes are approved, all affected authorities shall be notified by the operator.

3.6 In the event of a flight cancellation, the operator or remote pilot shall notify all appropriate authorities as soon as possible.

THIRD SCHEDULE

[r. 16]

UNMANNED FREE BALLOONS

1. Classification of unmanned free balloons

Unmanned free balloons shall be classified as:

(a) *light*: an unmanned free balloon which carries a payload of one or more packages with a combined mass of less than 4 kg, unless qualifying as a heavy balloon in accordance with c) 2), 3) or 4) below; or

(b) *medium*: an unmanned free balloon which carries a payload of two or more packages with a combined mass of 4 kg or more, but less than 6 kg, unless qualifying as a heavy balloon in accordance with c) 2), 3) or 4) below; or

(c) *heavy*: an unmanned free balloon which carries a payload which:

1) has a combined mass of 6 kg or more; or

2) includes a package of 3 kg or more; or

3) includes a package of 2 kg or more with an area density of more than 13 g per square centimetre; or

4) uses a rope or other device for suspension of the payload that requires an impact force of 230 N or more to separate the suspended payload from the balloon.

Note 1.— The area density referred to in c) 3) is determined by dividing the total mass in grams of the payload package by the area in square centimetres of its smallest surface.

Note 2.— See Figure A5-1.

2. General operating rules

2.1 An unmanned free balloon shall not be operated without appropriate authorization from the State from which the launch is made.

2.2 An unmanned free balloon, other than a light balloon used exclusively for meteorological purposes and operated in the manner prescribed by the appropriate authority, shall not be operated across the territory of another State without appropriate authorization from the other State concerned.

2.3 The authorization referred to in 2.2 shall be obtained prior to the launching of the balloon if there is reasonable expectation, when planning the operation that the balloon may drift into airspace over the territory of another State. Such authorization may be obtained for a series of balloon flights or for a particular type of recurring flight, e.g. atmospheric research balloon flights.

2.4 An unmanned free balloon shall be operated in accordance with conditions specified by the State of Registry and the State(s) expected to be overflown.

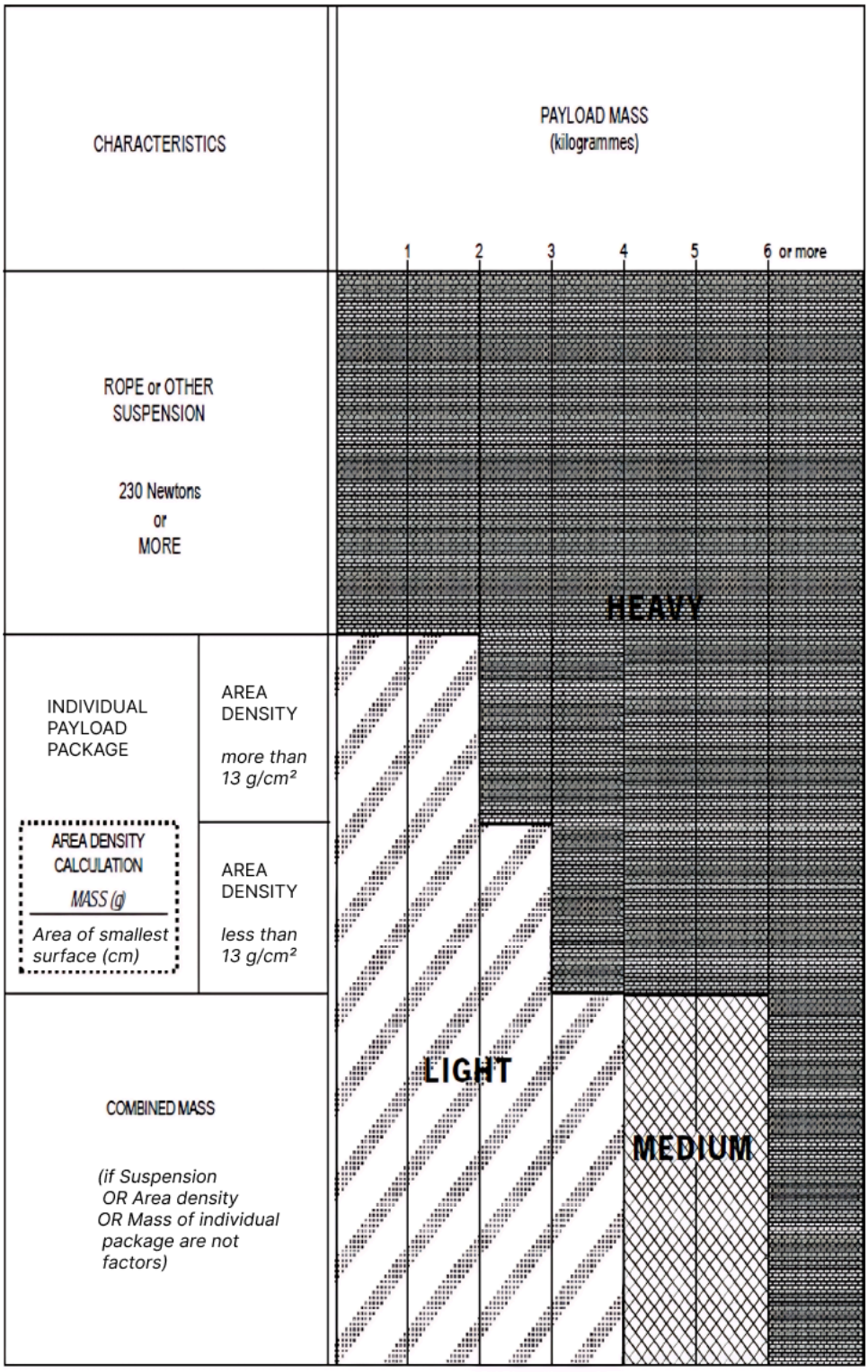

CHARACTERISTICS
PAYLOAD MASS
(kilogrammes)
1
2
3
4
5
6 or more
ROPE or OTHER SUSPENSION
230 Newtons
or
MORE
HEAVY
INDIVIDUAL PAYLOAD PACKAGE
AREA DENSITY
more than 13 g/cm²
AREA DENSITY CALCULATION
MASS (g)
Area of smallest surface (cm)
AREA DENSITY
less than 13 g/cm²
LIGHT
MEDIUM
COMBINED MASS
(if Suspension OR Area density OR Mass of individual package are not factors)

Figure A5-1. Classification of unmanned free balloons

2.5 An unmanned free balloon shall not be operated in such a manner that impact of the balloon, or any part thereof, including its payload, with the surface of the earth, creates a hazard to persons or property not associated with the operation.

2.6 A heavy unmanned free balloon shall not be operated over the high seas without prior coordination with the appropriate ATS authority.

3. Operating limitations and equipment requirements

3.1 A heavy unmanned free balloon shall not be operated without authorization from the appropriate ATS authority at or through any level below 18 000 m (60 000 ft) pressure-altitude at which:

(a) there are clouds or obscuring phenomena of more than four oktas coverage; or

(b) the horizontal visibility is less than 8 km.

3.2 A heavy or medium unmanned free balloon shall not be released in a manner that will cause it to fly lower than 300 m (1 000 ft) over the congested areas of cities, towns or settlements or an open-air assembly of persons not associated with the operation.

3.3 A heavy unmanned free balloon shall not be operated unless:

(a) it is equipped with at least two payload flight-termination devices or systems, whether automatic or operated by telecommand, that operate independently of each other;

(b) for polyethylene zero-pressure balloons, at least two methods, systems, devices, or combinations thereof, that function independently of each other are employed for terminating the flight of the balloon envelope;

Note.—Superpressure balloons do not require these devices as they quickly rise after payload discharge and burst without the need for a device or system designed to puncture the balloon envelope. In this context a superpressure balloon is a simple non- extensible envelope capable of withstanding a differential of pressure, higher inside than out. It is inflated so that the smaller night-time pressure of the gas still fully extends the envelope. Such a superpressure balloon will keep essentially constant level until too much gas diffuses out of it.

(c) the balloon envelope is equipped with either a radar reflective device(s) or radar reflective material that will present an echo to surface radar operating in the 200 MHz to 2 700 MHz frequency range, and/or the balloon is equipped with such other devices as will permit continuous tracking by the operator beyond the range of ground-based radar.

3.4 A heavy unmanned free balloon shall not be operated under the following conditions:

(a) in an area where ground-based SSR equipment is in use, unless it is equipped with a secondary surveillance radar transponder, with pressure-altitude reporting capability, which is continuously operating on an assigned code, or which can be turned on when necessary by the tracking station; or

(b) in an area where ground-based ADS-B equipment is in use, unless it is equipped with an ADS-B transmitter, with pressure-altitude reporting capability, which is continuously operating or which can be turned on when necessary by the tracking station.

3.5 An unmanned free balloon that is equipped with a trailing antenna that requires a force of more than 230 N to break it at any point shall not be operated unless the antenna has coloured pennants or streamers that are attached at not more than15 m intervals.

3.6 A heavy unmanned free balloon shall not be operated below 18 000 m (60 000 ft) pressure-altitude between sunset and sunrise or such other period between sunset and sunrise (corrected to the altitude of operation) as may be prescribed by the appropriate ATS authority, unless the balloon and its attachments and payload, whether or not they become separated during the operation, are lighted.

3.7 A heavy unmanned free balloon that is equipped with a suspension device (other than a highly conspicuously coloured open parachute) more than 15 m long shall not be operated between sunrise and sunset below 18 000 m (60 000 ft) pressure-altitude unless the suspension device is coloured in alternate bands of high conspicuity colours or has coloured pennants attached.

4. Termination

The operator of a heavy unmanned free balloon shall activate the appropriate termination devices required by 3.3 a) and b) above:

(a) when it becomes known that weather conditions are less than those prescribed for the operation;

(b) if a malfunction or any other reason makes further operation hazardous to air traffic or to persons or property on the surface; or

(c) prior to unauthorized entry into the airspace over another State's territory.

5. Flight notification

5.1 Pre-flight notification

5.1.1 Early notification of the intended flight of an unmanned free balloon in the medium or heavy category shall be made to the appropriate air traffic services unit not less than seven days before the date of the intended flight.

5.1.2 Notification of the intended flight shall include such of the following information as may be required by the appropriate air traffic services unit:

(a) balloon flight identification or project code name;

(b) balloon classification and description;

(c) SSR code, aircraft address or NDB frequency, as applicable;

(d) operator's name and telephone number;

(e) launch site;

(f) estimated time of launch (or time of commencement and completion of multiple launches);

(g) number of balloons to be launched and the scheduled interval between launches (if multiple launches);

(h) expected direction of ascent;

(i) cruising level(s) (pressure-altitude);

(j) the estimated elapsed time to pass 18 000 m (60 000 ft) pressure-altitude or to reach cruising level if at or below 18 000 m (60 000 ft), together with the estimated location;

Note.— If the operation consists of continuous launchings, the time to be included is the estimated time at which the first and the last in the series will reach the appropriate level (e.g. 122136Z–130330Z).

(k) the estimated date and time of termination of the flight and the planned location of the impact/recovery area. In the case of balloons carrying out flights of long duration, as a result of which the date and time of termination of the flight and the location of impact cannot be forecast with accuracy, the term "long duration" shall be used.

Note.— If there is to be more than one location of impact/recovery, each location is to be listed together with the appropriate estimated time of impact. If there is to be a series of continuous impacts, the time to be included is the estimated time of the first and the last in the series (e.g. 070330Z–072300Z).

5.1.3 Any changes in the pre-launch information notified in accordance with 5.1.2 above shall be forwarded to the air traffic services unit concerned not less than 6 hours before the estimated time of launch, or in the case of solar or cosmic disturbance investigations involving a critical time element, not less than 30 minutes before the estimated time of the commencement of the operation.

5.2 Notification of launch

Immediately after a medium or heavy unmanned free balloon is launched the operator shall notify the appropriate air traffic services unit of the following:

(a) balloon flight identification;

(b) launch site;

(c) actual time of launch;

(d) estimated time at which 18 000 m (60 000 ft) pressure-altitude will be passed, or the estimated time at which the cruising level will be reached if at or below 18 000 m (60 000 ft), and the estimated location; and

(e) any changes to the information previously notified in accordance with 5.1.2 g) and h).

5.3 Notification of cancellation

The operator shall notify the appropriate air traffic services unit immediately when it is known that the intended flight of a medium or heavy unmanned free balloon, previously notified in accordance with 5.1, has been cancelled.

6. Position recording and reports

6.1 The operator of a heavy unmanned free balloon operating at or below 18 000 m (60 000 ft) pressure-altitude shall monitor the flight path of the balloon and forward reports of the balloon's position as requested by air traffic services. Unless air traffic services require reports of the balloon's position at more frequent intervals, the operator shall record the position every 2 hours.

6.2 The operator of a heavy unmanned free balloon operating above 18 000 m (60 000 ft) pressure-altitude shall monitor the flight progress of the balloon and forward reports of the balloon's position as requested by air traffic services. Unless air traffic services require reports of the balloon's position at more frequent intervals, the operator shall record the position every 24 hours.

6.3 If a position cannot be recorded in accordance with 6.1 and 6.2, the operator shall immediately notify the appropriate air traffic services unit. This notification shall include the last recorded position. The appropriate air traffic services unit shall be notified immediately when tracking of the balloon is re-established.

6.4 One hour before the beginning of planned descent of a heavy unmanned free balloon, the operator shall forward to the appropriate ATS unit the following information regarding the balloon:

(a) the current geographical position;

(b) the current level (pressure-altitude);

(c) the forecast time of penetration of 18 000 m (60 000 ft) pressure-altitude, if applicable;

(d) the forecast time and location of ground impact.

6.5 The operator of a heavy or medium unmanned free balloon shall notify the appropriate air traffic services unit when the operation is ended.

FOURTH SCHEDULE

[r. 41]

SIGNALS

1. DISTRESS AND URGENCY SIGNALS

Note 1.— None of the provisions in this section shall prevent the use, by an aircraft in distress, of any means at its disposal to attract attention, make known its position and obtain help.

Note 2.— For full details of telecommunication transmission procedures for the distress and urgency signals, see Annex 10, Volume II, Chapter 5.

Note 3.— For details of the search and rescue visual signals, see Annex 12.

1.1 Distress signals

The following signals, used either together or separately, mean that grave and imminent danger threatens, and immediate assistance is requested:

(a) a signal made by radiotelegraphy or by any other signalling method consisting of the group SOS (. . .———. . . in the Morse Code);

(b) a radiotelephony distress signal consisting of the spoken word MAYDAY;

(c) a distress message sent via data link which transmits the intent of the word MAYDAY;

(d) rockets or shells throwing red lights, fired one at a time at short intervals;

(e) a parachute flare showing a red light.

Note.— Article 41 of the ITU Radio Regulations (Nos. 3268, 3270 and 3271 refer) provides information on the alarm signals for actuating radiotelegraph and radiotelephone auto-alarm systems:

3268 The radiotelegraph alarm signal consists of a series of twelve dashes sent in one minute, the duration of each dash being four seconds and the duration of the interval between consecutive dashes one second. It may be transmitted by hand but its transmission by means of an automatic instrument is recommended.

3270 The radiotelephone alarm signal consists of two substantially sinusoidal audio frequency tones transmitted alternately. One tone shall have a frequency of 2 200Hz and the other a frequency of 1 300 Hz, the duration of each tone being 250 milliseconds.

3271 The radiotelephone alarm signal, when generated by automatic means, shall be sent continuously for a period of at least thirty seconds but not exceeding one minute;when generated by other means, the signal shall be sent as continuously as practicable over a period of approximately one minute.

1.2 Urgency signals

1.2.1 The following signals used either together or separately, mean that an aircraft wishes to give notice of difficulties which compel it to land without requiring immediate assistance:

(a) the repeated switching on and off of the landing lights; or

(b) the repeated switching on and off of the navigation lights in such manner as to be distinct from flashing navigation lights.

1.2.2 The following signals, used either together or separately, mean that an aircraft has a very urgent message to transmit concerning the safety of a ship, aircraft or other vehicle, or of some person on board or within sight:

(a) a signal made by radiotelegraphy or by any other signalling method consisting of the group XXX;

(b) a radiotelephony urgency signal consisting of the spoken words PAN, PAN;

(c) an urgency message sent via data link which transmits the intent of the words PAN, PAN.

2. SIGNALS FOR USE IN THE EVENT OF INTERCEPTION

2.1 Signals initiated by intercepting aircraft and responses by intercepted aircraft

Series	***INTERCEPTING Aircraft Signals***	***Meaning***	**INTERCEPTED *Aircraft Responds***	***Meaning***
1	DAY or NIGHT - Rocking aircraft and flashing navigational lights at irregular intervals (and landing lights in the case of a helicopter) from a position slightly above and ahead of, and normally to the left of , the intercepted aircraft (or to the right if the intercepted aircraft is a helicopter) and, after acknowledgement, a slow level turn, normally to the left (or to the right in the case of a helicopter) on the desired heading. *Note 1. - Meteorological conditions or terrain may require may require the intercepting aircraft to reverse the positions and direction of turn*	You have been intercepted Follow me.	DAY or NIGHT - Rocking aircraft, flashing navigational lights at irregular intervals and following. *Note. - Additional action required to be taken by intercepted aircraft is prescribed in Chapter 3,3.8.*	Understood, will comply

	given above in Series 1. *Note 2. - If the intercepted aircraft is not able to keep pace with the intercepting aircraft, the latter is expected to fly a series of race track patterns and to rock the aircraft each time it passes the intercepted aircraft.*			
2	DAY or NIGHT - An abrupt breakaway manoeuvre from the intercepted aircraft consisting of a climbing turn of 90 degrees or more without crossing the line of flight of the intercepted aircraft.	You may proceed	DAY or NIGHT - Rocking the aircraft	Understood, will comply
3	DAY or NIGHT - Lowering landing gear (if fitted), showing steady landing lights and overflying runaway in use or, if the intercepted aircraft is a helicopter, overflying the helicopter landing area. In the case of helicopter, the intercepting	Land at this aerodrome	DAY or NIGHT - Lowering landing gear, (if fitted), showing steady landing lights and following the intercepting aircraft and, if, after overflying the runaway in use or helicopter landing area, landing is considered safe,	Understood, will comply

	helicopter makes a landing approach, coming to hover near to the landing area.		proceeding to land.	

2.2 Signals initiated by intercepted aircraft and responses by intercepting aircraft

Series	***INTERCEPTING Aircraft Signals***	***Meaning***	**INTERCEPTED *Aircraft Responds***	***Meaning***
4	DAY or NIGHT - Raising landing gear (if fitted) and flashing landing lights while passing over runaway in use or helicopter landing area at a height exceeding 300 m (1 000 ft) but not exceeding 600m (2 000 ft) (in the case of a helicopter, at a height exceeding 50m (170 ft) but not exceeding 100 m (330ft) above the aerodrome level, and continuing to circle runaway in use or helicopter landing area. If unable to flash landing lights , flash any other lights available.	Aerodrome you have designated is inadequate	DAY or NIGHT - If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate aerodrome, the intercepting aircraft raises its landing gear (if fitted) and uses the Series I signals prescribed for intercepting aircraft. If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	Understood, follow me Understood, you may proceed
5	DAY or NIGHT - Regular switching on and off of all available lights but in such a manner as to	Cannot comply	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood

	be distinct from flashing lights.			
6	DAY or NIGHT - irregular flashing of all available lights	In distress	DAY or NIGHT - Use Series 2 signals prescribed for intercepting aircraft.	Understood

3. VISUAL SIGNALS USED TO WARN AN UNAUTHORIZED AIRCRAFT FLYING IN, OR ABOUT TO ENTER A RESTRICTED, PROHIBITED OR DANGER AREA

By day and by night, a series of projectiles discharged from the ground at intervals of 10 seconds, each showing, on bursting, red and green lights or stars will indicate to an unauthorized aircraft that it is flying in or about to enter a restricted, prohibited or danger area, and that the aircraft is to take such remedial action as may be necessary.

4. SIGNALS FOR AERODROME TRAFFIC

4.1 Light and pyrotechnic signals

4.1.1 instructions

Light	*From Aerodrome Control to:*	
	Aircraft in flight	*Aircraft on the ground*
Directed towards aircraft concerned (see Figure A1-1). — Steady green	Cleared to land	Cleared for take-off
Steady red	Give way to other aircraft and continue circling	Stop
Series of green flashes	Return for landing*	Cleared to taxi
Series of red flashes	Aerodrome unsafe, do not land	Taxi clear of landing area in use
Series of white flashes	Land at this aerodrome and proceed to apron*	Return to starting point
Red pyrotechnic	Notwithstanding any previous instructions. do not land for the time being	on the aerodrome
**Clearances to land and to taxi will be given in due course*		

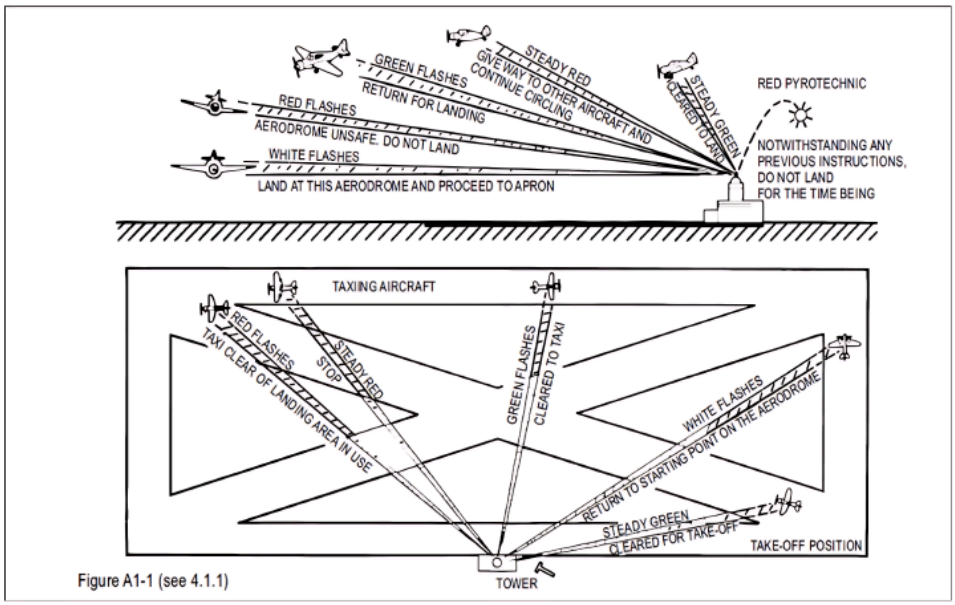


Figure A1-1 (see 4.1.1)

4.1.2 Acknowledgement by an aircraft

(a) *When in flight*:

(1) during the hours of daylight:

— by rocking the aircraft's wings;

Note.— This signal should not be expected on the base and final legs of the approach.

(2) during the hours of darkness:

— by flashing on and off twice the aircraft's landing lights or, if not so equipped, by switching on and off twice its navigation lights.

(b) *When on the ground:*

1) during the hours of daylight:

— by moving the aircraft's ailerons or rudder;

2) during the hours of darkness:

— by flashing on and off twice the aircraft's landing lights or, if not so equipped, by switching on and off twice its navigation lights.

4.2 Visual ground signals

Note.— For details of visual ground aids, see Annex 14.

4.2.1 Prohibition of landing

A horizontal red square panel with yellow diagonals (Figure A1-2) when displayed in a signal area indicates that landings are prohibited and that the prohibition is liable to be prolonged.

Figure A1-2

4.2.2 Need for special precautions while approaching or landing

A horizontal red square panel with one yellow diagonal (Figure A1-3) when displayed in a signal area indicates that owing to the bad state of the manoeuvring area, or for any other reason, special precautions must be observed in approaching to land or in landing.

Figure A1-3

4.2.3 Use of runways and taxiways

4.2.3.1 A horizontal white dumb-bell (Figure A1-4) when displayed in a signal area indicates that aircraft are required to land, take off and taxi on runways and taxiways only.

Figure A1-4

4.2.3.2 The same horizontal white dumb-bell as in 4.2.3.1 but with a black bar placed perpendicular to the shaft across each circular portion of the dumb-bell (Figure A1-5) when displayed in a signal area indicates that aircraft are required to land and take off on runways only, but other manoeuvres need not be confined to runways and taxiways.

Figure A1-5

4.2.4 Closed runways or taxiways

Crosses of a single contrasting colour, yellow or white (Figure A1-6), displayed horizontally on runways and taxiways or parts thereof indicate an area unfit for movement of aircraft.

Figure A1-6

4.2.5 Directions for landing or take-off

4.2.5.1 A horizontal white or orange landing T (Figure A1-7) indicates the direction to be used by aircraft for landing and take-off, which shall be in a direction parallel to the shaft of the T towards the cross arm.

Note.— When used at night, the landing T is either illuminated or outlined in white lights.

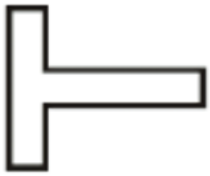


Figure A1-7

4.2.5.2 A set of two digits (Figure A1-8) displayed vertically at or near the aerodrome control tower indicates to aircraft on the manoeuvring area the direction for take-off, expressed in units of 10 degrees to the nearest 10 degrees of the magnetic compass.

Figure A1-8

4.2.6 Right-hand traffic

When displayed in a signal area, or horizontally at the end of the runway or strip in use, a right-hand arrow of conspicuous colour (Figure A1-9) indicates that turns are to be made to the right before landing and after take-off.

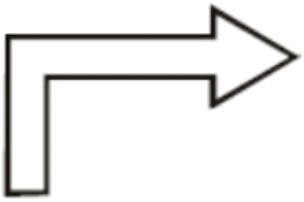


Figure A1-9

4.2.7 Air traffic services reporting office

The letter C displayed vertically in black against a yellow background (Figure A1-10) indicates the location of the air traffic services reporting office.

Figure A1-10

4.2.8 Glider flights in operation

A double white cross displayed horizontally (Figure A1-11) in the signal area indicates that the aerodrome is being used by gliders and that glider flights are being performed.

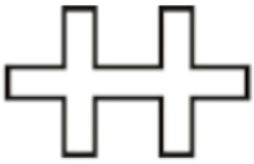


Figure A1-11

5. MARSHALLING SIGNALS

5.1 From a signalman to an aircraft

Note 1.— These signals are designed for use by the signalman, with hands illuminated as necessary to facilitate observation by the pilot, and facing the aircraft in a position:

(a) for fixed-wing aircraft, on left side of aircraft, where best seen by the pilot; and

(b) for helicopters, where the signalman can best be seen by the pilot.

Note 2.— The meaning of the relevant signals remains the same if bats, illuminated wands or torchlights are held.

Note 3.— The aircraft engines are numbered, for the signalman facing the aircraft, from right to left (i.e. No. 1 engine being the port outer engine).

Note 4.— Signals marked with an asterisk (*) are designed for use to hovering helicopters.

Note 5.— References to wands may also be read to refer to daylight-fluorescent table-tennis bats or gloves (daytime only).

Note 6. — References to the signalman may also be read to refer to marshaller.

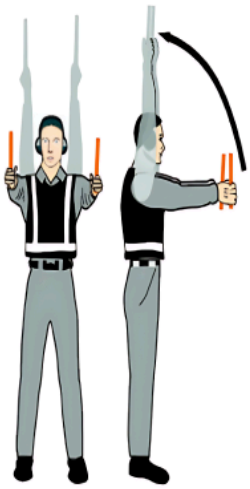
5.1.1 Prior to using the following signals, the signalman shall ascertain that the area within which an aircraft is to be guided is clear of objects which the aircraft, in complying with 3.4.1, might otherwise strike.

Note.— The design of many aircraft is such that the path of the wing tips, engines and other extremities cannot always be monitored visually from the flight deck while the aircraft is being manoeuvred on the ground

1. Wingwalker/guide

Raise right hand above head level with wand pointing up; move left-hand wand pointing down toward body.

Note.— This signal provides an indication by a person positioned at the aircraft wing tip, to the pilot/ marshaller/ push-back operator, that the aircraft movement on/off a parking position would be unobstructed.

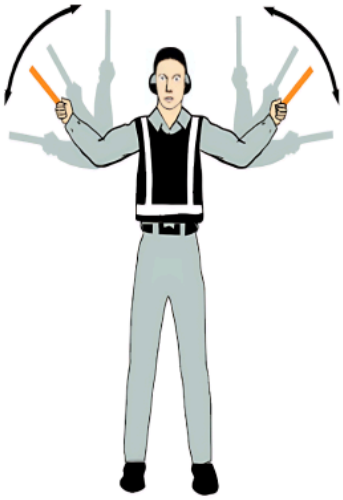


2. Identify gate

Raise fully extended arms straight above head with wands pointing up.

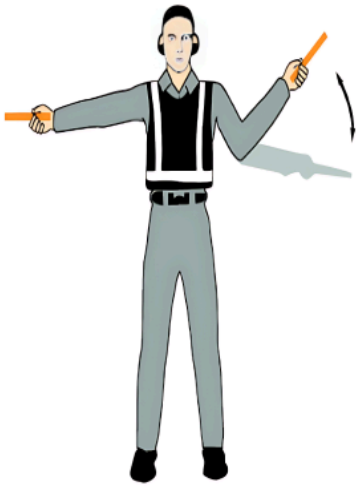
3. Proceed to next signalman or as directed by tower/ground control

Point both arms upward; move and extend arms outward to sides of body and point with wands to direction of next signalman or taxi area.



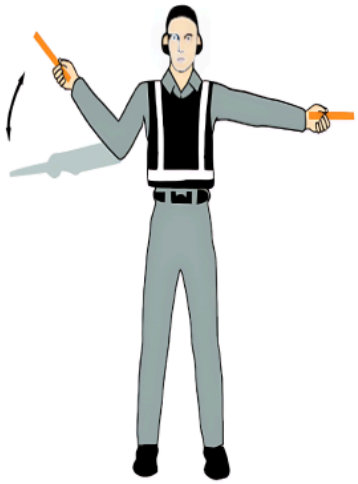
4. Straight ahead

Bend extended arms at elbows and move wands up and down from chest height to head.



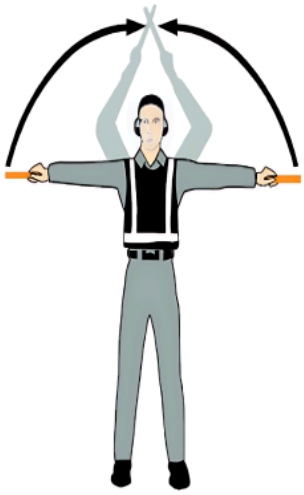
5 a). Turn left
(from pilot's point of view)

With right arm and wand extended at a 90-degree angle to body, make "come ahead" signal with left hand. The rate of signal motion indicates to pilot the rate of aircraft turn.



5 b). Turn right
(from pilot's point of view)

With left arm and wand extended at a 90-degree angle to body, make "come ahead" signal with right hand. The rate of signal motion indicates to pilot the rate of aircraft turn.



6 a). Normal stop

Fully extend arms and wands at a 90-degree angle to sides and slowly move to above head until wands cross.

6 b). Emergency stop

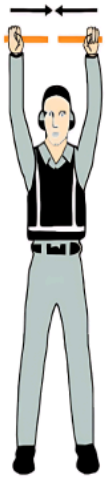
Abruptly extend arms and wands to top of head, crossing wands.

7 a). Set brakes

Raise hand just above shoulder height with open palm. Ensuring eye contact with flight crew, close hand into a fist. **Do not** move until receipt of "thumbs up" acknowledgement from flight crew.

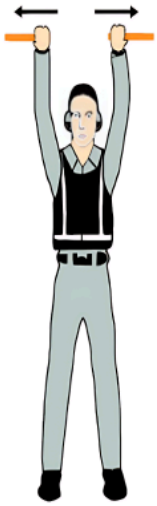
7 b). Release brakes

Raise hand just above shoulder height with hand closed in a fist. Ensuring eye contact with flight crew, open palm. **Do not** move until receipt of "thumbs up" acknowledgement from flight crew.



8 a). Chocks inserted

With arms and wands fully extended above head, move wands inward in a "jabbing" motion until wands touch. **Ensure** acknowledgement is received from flight crew.

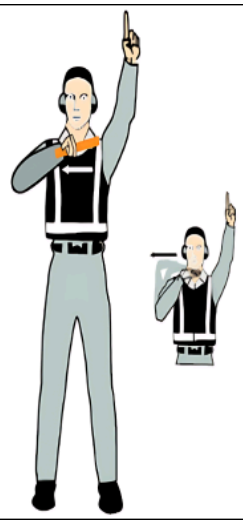


8 b). Chocks removed

With arms and wands fully extended above head, move wands outward in a "jabbing" motion. **Do not** remove chocks until authorized by flight crew.

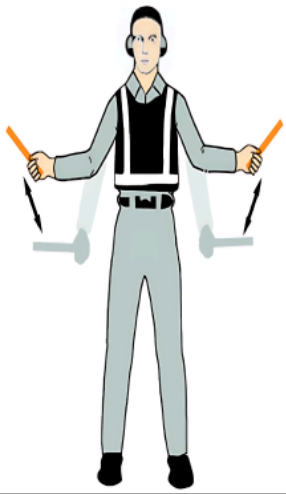
9. Start engine(s)

Raise right arm to head level with wand pointing up and start a circular motion with hand; at the same time, with left arm raised above head level, point to engine to be started.



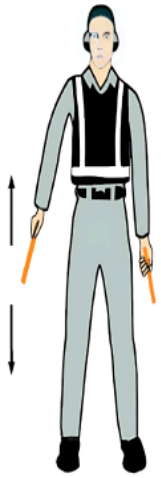
10. Cut engines

Extend arm with wand forward of body at shoulder level; move hand and wand to top of left shoulder and draw wand to top of right shoulder in a slicing motion across throat.



11. Slow down

Move extended arms downwards in a "patting" gesture, moving wands up and down from waist to knees.



12. Slow down engine(s) on indicated side

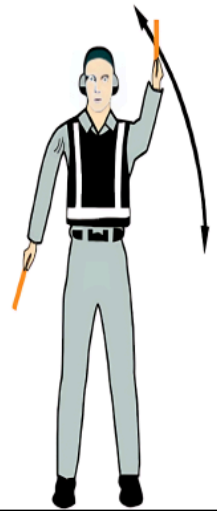
With arms down and wands toward ground, wave either *right* or *left* wand up and down indicating engine(s) on *left* or *right* side respectively should be slowed down.

13. Move back

With arms in front of body at waist height, rotate arms in a forward motion. To stop rearward movement, use signal 6 a) or 6 b).

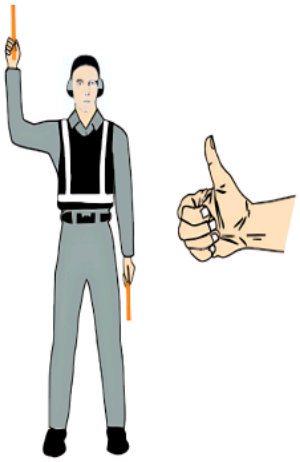
14 a). Turns while backing (for tail to starboard)

Point left arm with wand down and bring right arm from overhead vertical position to horizontal forward position, repeating right-arm movement.



14 b). Turns while backing (for tail to port)

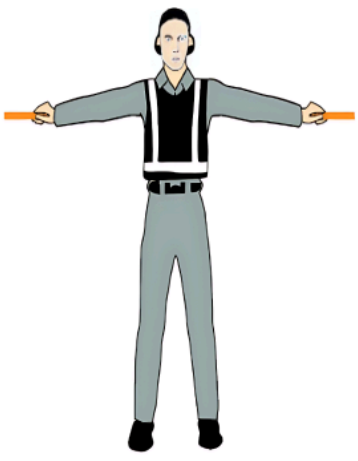
Point right arm with wand down and bring left arm from overhead vertical position to horizontal forward position, repeating left-arm movement.



15. Affirmative/all clear

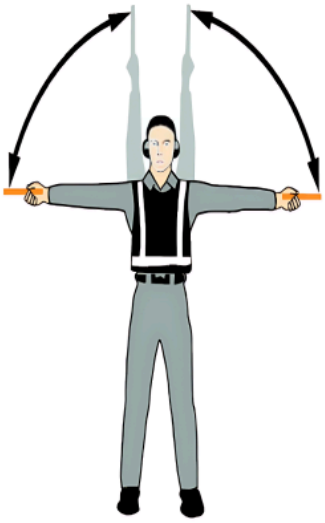
Raise right arm to head level with wand pointing up or display hand with "thumbs up"; left arm remains at side by knee.

Note.— This signal is also used as a technical/ servicing communication signal.



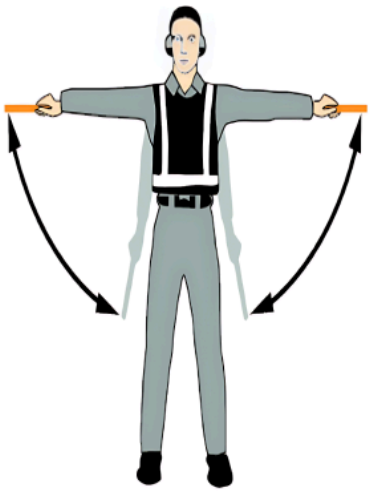
***16. Hover**

Fully extend arms and wands at a 90-degree angle to sides.



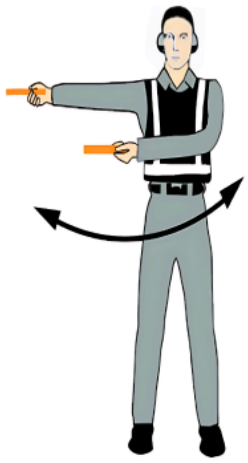
***17. Move upwards**

Fully extend arms and wands at a 90-degree angle to sides and, with palms turned up, move hands upwards. Speed of movement indicates rate of ascent.



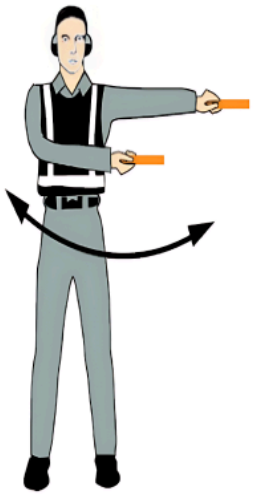
***18. Move downwards**

Fully extend arms and wands at a 90-degree angle to sides and, with palms turned down, move hands downwards. Speed of movement indicates rate of descent.



***19 a). Move horizontally left (from pilot's point of view)**

Extend arm horizontally at a 90-degree angle to right side of body. Move other arm in same direction in a sweeping motion.

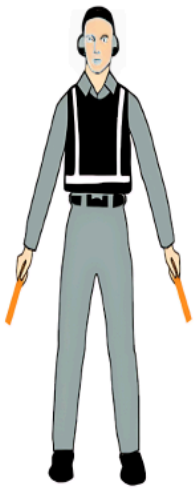


***19 b). Move horizontally right (from pilot's point of view)**

Extend arm horizontally at a 90-degree angle to left side of body. Move other arm in same direction in a sweeping motion.

***20. Land**

Cross arms with wands downwards and in front of body.



21. Hold position/stand by

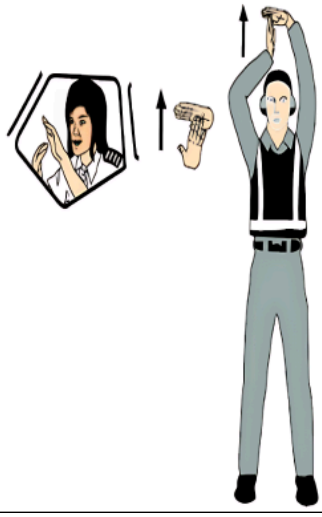
Fully extend arms and wands downwards at a 45-degree angle to sides. Hold position until aircraft is clear for next manoeuvre.

22. Dispatch aircraft

Perform a standard salute with right hand and/or wand to dispatch the aircraft. Maintain eye contact with flight crew until aircraft has begun to taxi.

23. Do not touch controls (technical/servicing communication signal)

Extend right arm fully above head and close fist or hold wand in horizontal position; left arm remains at side by knee.

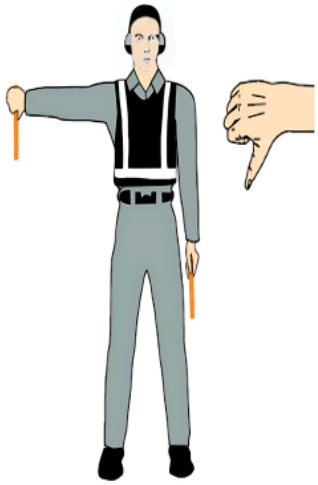


24. Connect ground power (technical/servicing communication signal)

Hold arms fully extended above head; open left hand horizontally and move finger tips of right hand into and touch open palm of left hand (forming a "T"). At night, illuminated wands can also be used to form the "T" above head.

25. Disconnect power (technical/servicing communication signal)

Hold arms fully extended above head with finger tips of right hand touching open horizontal palm of left hand (forming a "T"); then move right hand away from the left. **Do not** disconnect power until authorized by flight crew. At night, illuminated wands can also be used to form the "T" above head.



26. Negative (technical/servicing communication signal)

Hold right arm straight out at 90 degrees from shoulder and point wand down to ground or display hand with "thumbs down"; left hand remains at side by knee.

27. Establish communication via interphone (technical/servicing communication signal)

Extend both arms at 90 degrees from body and move hands to cup both ears.

28. Open/close stairs (technical/servicing communication signal)

With right arm at side and left arm raised above head at a 45-degree angle, move right arm in a sweeping motion towards top of left shoulder.

Note.— This signal is intended mainly for aircraft with the set of integral stairs at the front.

5.2 From the pilot of an aircraft to a signalman

Note 1.— These signals are designed for use by a pilot in the cockpit with hands plainly visible to the signalman, and illuminated as necessary to facilitate observation by the signalman.

Note 2.— The aircraft engines are numbered in relation to the signalman facing the aircraft, from right to left (i.e. No. 1 engine being the port outer engine).

5.2.1 Brakes

Note.— The moment the fist is clenched or the fingers are extended indicates, respectively, the moment of brake engagement or release.

(a) *Brakes engaged:* raise arm and hand, with fingers extended, horizontally in front of face, then clench fist.

(b) *Brakes released*: raise arm, with fist clenched, horizontally in front of face, then extend fingers.

5.2.2 Chocks

(a) *Insert chocks:* arms extended, palms outwards, move hands inwards to cross in front of face.

(b) *Remove chocks:* hands crossed in front of face, palms outwards, move arms outwards.

5.2.3 Ready to start engine(s)

Raise the appropriate number of fingers on one hand indicating the number of the engine to be started.

5.3 Technical/servicing communication signals

5.3.1 Manual signals shall only be used when verbal communication is not possible with respect to technical/servicing communication signals.

5.3.2 Signalmen shall ensure that an acknowledgement is received from the flight crew with respect to technical/servicing communication signals.

Note.— The technical/servicing communication signals are included in Appendix 1 to standardize the use of hand signals used to communicate to flight crews during the aircraft movement process that relate to servicing or handling functions.

6. STANDARD EMERGENCY HAND SIGNALS

The following hand signals are established as the minimum required for emergency communication between the aircraft rescue and firefighting (ARFF) incident commander/ ARFF firefighters and the cockpit and/or cabin crews of the incident aircraft. ARFF emergency hand signals should be given from the left front side of the aircraft for the flight crew.

Note.— In order to communicate more effectively with the cabin crew, emergency hand signals may be given by ARFF firefighters from other positions.

1. Recommend evacuation

Evacuation recommended based on ARFF and incident commander's assessment of external situation.

Arm extended from body and held horizontal with hand upraised at eye level. Execute beckoning arm motion angled backward. Non-beckoning arm held against body.

Night – same with wands.

2. Recommended stop

Recommend evacuation in progress be halted. Stop aircraft movement or other activity in progress.

Arms in front of head, crossed at wrists.

Night – same with wands.

3. Emergency contained

No outside evidence of dangerous conditions or "all-clear."

Arms extended outward and down at a 45-degree angle. Arms moved inward below waistline simultaneously until wrists crossed, then extended outward to starting position (umpire's "safe" signal).

Night – same with wands.

4. Fire

Move right-hand in a "fanning" motion from shoulder to knee, while at the same time pointing with left hand to area of fire.

Night – same with wands.

FIFTH SCHEDULE

[r. 53]

INTERCEPTION OF CIVIL AIRCRAFT

1. Principles to be observed by States

1.1 To achieve the uniformity in regulations which is necessary for the safety of navigation of civil aircraft due regard shall be had by Contracting States to the following principles when developing regulations and administrative directives:

(a) interception of civil aircraft will be undertaken only as a last resort;

(b) if undertaken, an interception will be limited to determining the identity of the aircraft, unless it is necessary to return the aircraft to its planned track, direct it beyond the boundaries of national airspace, guide it away from a prohibited, restricted or danger area or instruct it to effect a landing at a designated aerodrome;

(c) practice interception of civil aircraft will not be undertaken;

(d) navigational guidance and related information will be given to an intercepted aircraft by radiotelephony, whenever radio contact can be established; and

(e) in the case where an intercepted civil aircraft is required to land in the territory overflown, the aerodrome designated for the landing is to be suitable for the safe landing of the aircraft type concerned.

Note.— In the unanimous adoption by the 25th Session (Extraordinary) of the ICAO Assembly on 10 May 1984 of Article 3 bis to the Convention on International Civil Aviation, Contracting States have recognized that "every State must refrain from resorting to the use of weapons against civil aircraft in flight".

1.2 Contracting States shall publish a standard method that has been established for the manoeuvring of aircraft intercepting a civil aircraft. Such method shall be designed to avoid any hazard for the intercepted aircraft.

Note.— Special recommendations regarding a method for the manoeuvring are contained in Attachment A, Section 3.

1.3 Contracting States shall ensure that provision is made for the use of secondary surveillance radar or ADS-B, where available, to identify civil aircraft in areas where they may be subject to interception.

2. Action by intercepted aircraft

2.1 An aircraft which is intercepted by another aircraft shall immediately:

(a) follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with the specifications in *Fourth Schedule*;

(b) notify, if possible, the appropriate air traffic services unit;

(c) attempt to establish radio communication with the intercepting aircraft or with

Table A2-1

Phrases for use by INTERCEPTING aircraft			*Phrases for use by INTERCEPTED aircraft*		
Phrase	*Pronunciation*[1]	*Meaning*	*Phrase*	*Pronunciation*[1]	*Meaning*
CALL SIGN	KOL SA-IN	What is your call sign?	CALL SIGN (call sign)[2]	KOL SA-IN (call sign)	My call sign is (call sign)
FOLLOW	FOL-LO	Follow me	WILCO Will comply	VILL-KO	Understood
DESCEND	DEE-SEND	Descend for landing	CAN NOT	KANN NOTT	Unable to comply
YOU LAND	YOU LAAND	Land at this aerodrome	REPEAT	REE-PEET	Repeat your instruction
PROCEED	PRO-SEED	You may proceed	AM LOST	AM LOSST	Position unknown
			MAYDAY	MAYDAY	I am in distress
			HIJACK[3]	HI-JACK	I have been hijacked
			LAND (place name)	LAAND (place name)	I request to land at (place name)
			DESCEND	DEE-SEND	I require descent

1. *In the second column, syllables to be emphasized are underlined.*

2.*The call sign required to be given is that used in radiotelephony communication with air traffic services units and corresponding to the aircraft identification in the flight plan.*

3. *Circumstances may not always permit, nor make desirable, the use of phrases "HIJACK".*

SIXTH SCHEDULE

[r. 54]

VMC visibility and distance from cloud minima

Altitude band	Airspace class	Flight visibility	Distance from cloud
At and above 3 050 m (10 000 ft) AMSL	A*** B C D E F G	8 km	1,500 m horizontally 300 m (1,000 ft) vertically
Below 3050 m (10000 ft) AMSL and above 900 m (3 000 ft) AMSL, or above 300 m (1 000 ft) above terrain, whichever is the higher	A*** B C D E F G	5 km	1,500 m horizontally 300 m (1,000 ft) vertically
At and below 900 m (3 000 ft) AMSL, or 300 m (1 000 ft) above terrain, whichever is the higher	A*** B C D E	5 km	1,500 m horizontally 300 m (1,000 ft) vertically
	F G	5 km**	Clear of cloud and with the surface in sight

* When the height of the transition altitude is lower than 3 050 m (10 000 ft) AMSL, FL 100 shall be used in lieu of 10 000 ft.

** When so prescribed by the appropriate ATS authority:

(a) flight visibilities reduced to not less than 1 500 m may be permitted for flights operating:

(1) at speeds that, in the prevailing visibility, will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision; or

(2) in circumstances in which the probability of encounters with other traffic would normally be low, e.g. in areas of low volume traffic and for aerial work at low levels.

(b) HELICOPTERS may be permitted to operate *in less than 1 500 m flight visibility*, if manoeuvred at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.

*** The VMC minima in Class A airspace are included for guidance to pilots and do not imply acceptance of VFR flights in Class A airspace.

THE CIVIL AVIATION (AERONAUTICAL TELECOMMUNICATION COMMUNICATION SYSTEMS) REGULATIONS, 2018

ARRANGEMENT OF REGULATIONS

THE CIVIL AVIATION (AERONAUTICAL TELECOMMUNICATION COMMUNICATION SYSTEMS) REGULATIONS, 2018

[Legal Notice 146 of 2018]

PART I – PRELIMINARY PROVISIONS

1. Title

These Regulations may be cited as the Civil Aviation (Aeronautical Telecommunication Communication Systems) Regulations, 2018.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"ADS" means an abbreviation for automatic dependent surveillance;

"aeronautical administrative communications" means Communications necessary for the exchange of aeronautical administrative messages;

"aeronautical operational control" means Communication required for the exercise of authority over the initiation, continuation, diversion or termination of flight for safety, regularity and efficiency reason;

"aeronautical telecommunication network" means a global internetwork architecture that allows ground, air-ground and avionic data sub-networks to exchange digital data for the safety of air navigation and for the regular, efficient and economic operation of air traffic services;

"Air traffic service" means a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service);

"Aircraft address" means a unique combination of 24 bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance;

"aircraft data circuit-terminating equipment" means an aircraft specific data circuit-terminating equipment that is associated with an airborne data link processor. It operates a protocol unique to Mode S data link for data transfer between air and ground;

"aircraft data link processor" means an aircraft-resident processor that is specific to a particular air-ground data link (e.g. Mode S) and which provides channel management, and segments and/or reassembles messages for transfer. It is connected to one side of aircraft elements common to all data link systems and on the other side to the air-ground link itself;

"aircraft earth station" means a mobile earth station in the aeronautical mobile-satellite service located on board an aircraft;

"aircraft/vehicle" means a machine or device capable of atmospheric flight, or a vehicle on the airport surface movement area (i.e. runways and taxiways);

"aircraft" means the term aircraft may be used to refer to Mode S emitters (e.g. aircraft/ vehicles), where appropriate;

"air-initiated protocol" means a procedure initiated by a Mode S aircraft installation for delivering a standard length or extended length downlink message to the ground;

"application entity" means a set of International Standards/ Open Systems Interconnection communication capabilities of a particular application process;

"Aeronautical Telecommunication Network end-system" means an Aeronautical Telecommunication Network host in Internet Protocol Suite terminology;

"Aeronautical Telecommunication Network host" means an Aeronautical Telecommunication Network end-system in Open Systems Interconnection terminology;

"Aeronautical Telecommunication Network security services" means a set of information security provisions allowing the receiving end system or intermediate system to unambiguously identify (i.e. authenticate) the source of the received information and to verify the integrity of that information;

"ATN" means an abbreviation for Aeronautical Telecommunication Network;

"Air Traffic Services inter-facility data communication" means an automated data exchange between air traffic services units in support of flight notification, flight coordination, transfer of control and transfer of communication;

"Air Traffic Services message handling service" means an Aeronautical Telecommunication Network application consisting of procedures used to exchange Air Traffic Services messages in store-and-forward mode over the Aeronautical Telecommunication Network such that the conveyance of an Air Traffic Services message is in general not correlated with the conveyance of another Air Traffic Services message by the service provider;

"Air Traffic Services message handling system" means the set of computing and communication resources implemented by Air Traffic Services organizations to provide the Air Traffic Services message handling service;

"authorized path" means a communication path suitable for a given message category;

"automatic dependent surveillance — contract" means a means by which the terms of an automatic dependent surveillance — contract agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions automatic dependent surveillance — contract reports would be initiated, and what data would be contained in the reports;

"automatic dependent surveillance-broadcast" means a means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link;

"automatic terminal information service" means the automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof;

"BDS" means an abbreviation for Comm-B Data Selector;

"bit error rate" means the number of bit errors in a sample divided by the total number of bits in the sample, generally averaged over many such samples;

"broadcast" means a transmission of information relating to air navigation that is not addressed to a specific station or stations;

"broadcast" means the protocol within the Mode S system that permits uplink messages to be sent to all aircraft in coverage area, and downlink messages to be made available to all interrogators that have the aircraft wishing to send the message under surveillance;

"burst" means a time-defined, contiguous set of one or more related signal units which may convey user information and protocols, signalling, and any necessary preamble;

"capability report" means information identifying whether the transponder has a data link capability as reported in the capability field of an all-call reply or squitter transmission;

"carrier-to-multipath ratio" means the ratio of the carrier power received directly, i.e. without reflection, to the multipath power, i.e. carrier power received via reflection;

"carrier-to-noise density ratio" means the ratio of the total carrier power to the average noise power in a 1 Hertz bandwidth, usually expressed in decibel-Hertz;

"channel rate accuracy" means this is relative accuracy of the clock to which the transmitted channel bits are synchronized. For example, at a channel rate of 1.2 kilobits/s,

maximum error of one part in 106 implies the maximum allowed error in the clock is ±1.2 × 10-3 Hertz;

"channel rate" means the rate at which bits are transmitted over the Radio Frequency channel. These bits include those bits used for framing and error correction, as well as the information bits. For burst transmission, the channel rate refers to the instantaneous burst rate over the period of the burst;

"circuit mode" means a configuration of the communications network which gives the appearance to the application of a dedicated transmission path;

"close-out" means a command from a Mode S interrogator that terminates a Mode S link layer communication transaction;

"cluster of interrogators" means two or more interrogators with the same interrogator identifier (II) code, operating cooperatively to ensure that there is no interference to the required surveillance and data link performance of each of the interrogators, in areas of common coverage;

"coded chip" means a "1" or "0" output of the rate ½ or ¼ convolutional code encoder;

"comm-A" means a 112-bit interrogation containing the 56-bit MA message field. This field is used by the uplink standard length message and broadcast protocols;

"comm-B" means a 112-bit reply containing the 56-bit MB message field. This field is used by the downlink standard length message, ground-initiated and broadcast protocols;

"Comm-B Data Selector" means the 8-bit Comm-B Data Selector code determines the register whose contents are to be transferred in the MB field of a Comm-B reply. It is expressed in two groups of 4 bits each, BDS1 (most significant 4 bits) and BDS2 (least significant 4 bits;

"comm-C" means a 112-bit interrogation containing the 80-bit MC message field. This field is used by the uplink extended length message protocol;

"comm-D" means a 112-bit reply containing the 80-bit MD message field. This field is used by the downlink extended length message protocol;

"connection establishment delay" means connection establishment delay, as defined in ISO 8348, includes a component, attributable to the called subnetwork service user, which is the time between the SN- CONNECT indication and the SN-CONNECT response. This user component is due to actions outside the boundaries of the satellite subnetwork and is therefore excluded from the Aircraft Maintenance Systems(R)S specifications;

"connection" means a logical association between peer-level entities in a communication system.

"controller pilot data link communications" means a means of communication between controller and pilot, using data link for Air Traffic Control communications;

"COSPAS-SARSAT" means Space System for Search of vessels in distress) – (Search and Rescue Satellite-Aided Tracking);

"current slot" means the slot in which a received transmission begins.

"data circuit-terminating equipment" means a network provider equipment used to facilitate communications between data terminal equipment;

"data link capability report" means information in a Comm-B reply identifying the complete Mode S communications capabilities of the aircraft installation;

"data link entity" means a protocol State machine capable of setting up and managing a single data link connection;

"data link flight information services" means the provision of Flight Information Services via data link;

"data link initiation capability" means a data link application that provides the ability to exchange addresses, names and version numbers necessary to initiate data link applications;

"data link service sub-layer" means the sub-layer that resides above the media access control Mean Aerodynamic Chord sub-layer. For Very High Frequency Digital Link Mode 4, the data link service sub-layer resides above the Visual Segment Surface sub-layer. The data link service manages the transmit queue, creates and destroys data link entities for connection oriented communications, provides facilities for the link management entity to manage the data link service and provides facilities for connectionless communications;

"data link-automatic terminal information service" means the provision of automatic terminal information service via data link;

"data signalling rate" means data signalling rate refers to the passage of information per unit of time, and is expressed in bits/second. Data signalling rate is given by the formula:

$$\sum_{i=1}^{i=m} \frac{1}{T_i} \log_2 n_i$$

where m is the number of parallel channels, T_i is the minimum interval for the 1^{th} channel expressed in seconds, ni is the number of significant conditions of the modulation in the 1^{th} channel;

"data terminal equipment" a data terminal equipment is an endpoint of a sub-network connection;

"data transfer delay (95th percentile)" means the 95th percentile of the statistical distribution of delays for which transit delay is the average;

"data transfer delay (95th percentile)" means the 95th percentile of the statistical distribution of delays for which transit delay is the average;

"data transit delay" means in accordance with ISO 8348, the average value of the statistical distribution of data delays. This delay represents the sub-network delay and does not include the connection establishment delay;

"data transit delay" means the average value of the statistical distribution of data delays in accordance with ISO 8348. This delay represents the sub-network delay and does not include the connection establishment delay;

"degree of standardized test distortion" means the degree of distortion of the restitution measured during a specific period of time when the modulation is perfect and corresponds to a specific text;

"designated operational coverage area" means the area in which a particular service is provided and in which the service is afforded frequency protection;

"direct link service" means a data communications service which makes no attempt to automatically correct errors, detected or undetected, at the link layer of the air-ground communications path. (Error control may be effected by end-user systems);

"directory service" means a service, based on the ITU-T X.500 series of recommendations, providing access to and management of structured information relevant to the operation of the ATN and its users;

"doppler shift" means the frequency shift observed at a receiver due to any relative motion between transmitter and receiver;

"downlink extended length message" means extended length downlink communication by means of 112-bit Mode S Comm-D replies, each containing the 80-bit Comm-D message field (MD);

"downlink" means a term referring to the transmission of data from an aircraft to the ground. Mode S air-to-ground signals are transmitted on the 1 090 Megahertz reply frequency channel;

"effective margin" means that margin of an individual apparatus which could be measured under actual operating conditions;

"end-to-end" means pertaining or relating to an entire communication path, typically from (1) the interface between the information source and the communication system at the transmitting end to (2) the interface between the communication system and the information user or processor or application at the receiving end;

"end-user" means an ultimate source and/or consumer of information;

"energy per symbol to noise density ratio" means the ratio of the average energy transmitted per channel symbol to the average noise power in a 1 Hertz bandwidth, usually expressed in decibels. For A- BPSK and A-QPSK, one channel symbol refers to one channel bit;

"equivalent isotropically radiated power" means the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

"extended Golay Code" means an error correction code capable of correcting multiple bit errors;

"extended length message" means a series of Comm-C interrogations (uplink extended length message) transmitted without the requirement for intervening replies, or a series of Comm-D replies (downlink extended length message) transmitted without intervening interrogations;

"flight information service" means a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights;

"FCS" means an abbreviation for frame check sequence;

"forward error correction" means the process of adding redundant information to the transmitted signal in a manner which allows correction, at the receiver, of errors incurred in the transmission;

"frame" means the basic unit of transfer at the link level. In the context of Mode S subnetwork, a frame can include from one to four Comm-A or Comm-B segments, from two to sixteen Comm-C segments, or from one to sixteen Comm-D segments;

"frame" means the link layer frame is composed of a sequence of address, control, FCS and information fields. For Very High Frequency Digital Link Mode 2, these fields are bracketed by opening and closing flag sequences, and a frame may or may not include a variable-length information field;

"frame" means the link layer frame is composed of a sequence of address, control, FCS and information fields. For Very High Frequency Digital Link Mode 2, these fields are bracketed by opening and closing flag sequences, and a frame may or may not include a variable-length information field;

"gain-to-noise temperature ratio" means the ratio, usually expressed in dB/K, of the antenna gain to the noise at the receiver output of the antenna subsystem. The noise is expressed as the temperature that a 1 ohm resistor must be raised to produce the same noise power density;

"gaussian filtered frequency shift keying" means a continuous- phase, frequency shift keying technique using two tones and a Gaussian pulse shape filter;

"general formatter/manager" means the aircraft function responsible for formatting messages to be inserted in the transponder registers. It is also responsible for detecting and handling error conditions such as the loss of input data;

"global signalling channel" means a channel available on a worldwide basis which provides for communication control;

"ground data circuit-terminating equipment" means a ground specific data circuit-terminating equipment associated with a ground data link processor. It operates a protocol unique to Mode S data link for data transfer between air and ground;

"ground data link processor" means a ground-resident processor that is specific to a particular air-ground data link (e.g. Mode S), and which provides channel management, and segments and/or reassembles messages for transfer. It is connected on one side (by means of its DCE) to ground elements common to all data link systems, and on the other side to the air-ground link itself;

"ground earth station" means an earth station in the fixed satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile satellite service;

"ground-initiated Comm-B" means the ground-initiated Comm-B protocol allows the interrogator to extract Comm-B replies containing data from a defined source in the MB field;

"ground-initiated protocol" means a procedure initiated by a Mode S interrogator for delivering standard length or extended length messages to a Mode S aircraft installation;

"HFDL" means an abbreviation for High Frequency Data Link;

"HFNPDU" means an abbreviation for High frequency network protocol data unit;

"high frequency network protocol data unit" means user data packet;

"high performance receiver" means a universal access transceiver receiver with enhanced selectivity to further improve the rejection of adjacent frequency Distance Measuring Equipment interference;

"IPS" means an abbreviation for Internet Protocol Suite;

"link layer" means the layer that lies immediately above the physical layer in the Open Systems Interconnection protocol model. The link layer provides for the reliable transfer of information across the physical media. It is subdivided into the data link sub-layer and the media access control sub-layer;

"link management entity" means a protocol State machine capable of acquiring, establishing and maintaining a connection to a single peer system. A link management entity establishes data link and sub-network connections, "hands-off" those connections, and manages the media access control sub-layer and physical layer. An aircraft link management entity tracks how well it can communicate with the ground stations of a single ground system. An aircraft Very High Frequency Digital Link management entity instantiates an link management entity for each ground station that it monitors. Similarly, the ground Very High Frequency Digital Link management entity instantiates and link management entity for each aircraft that it monitors. A link management entity is deleted when communication with the peer system is no longer viable;

"link protocol data unit" means data unit which encapsulates a segment of an high frequency network protocol data unit;

"link" means a link connects an aircraft data link entity and a ground data link entity and is uniquely specified by the combination of aircraft direct link service address and the ground direct link service address. A different sub-network entity resides above every link endpoint;

"low modulation rates" means modulation rates up to and including 300 bauds;

"M burst" means a management channel data block of bits used in Very High Frequency Digital Link Mode 3. This burst contains signalling information needed for media access and link status monitoring;

"margin" means the maximum degree of distortion of the circuit at the end of which the apparatus is situated which is compatible with the correct translation of all the signals which it may possibly receive;

"M-ary phase shift keying modulation" means a digital phase modulation that causes the phase of the carrier waveform to take on one of a set of M values;

"media access control" means the sub-layer that acquires the data path and controls the movement of bits over the data path;

"media access protocol data unit" means data unit which encapsulates one or more LPDUs;

"medium modulation rates" means modulation rates above 300 and up to and including 3 000 bauds;

"mode 2" means a data-only Very High Frequency Digital Link mode that uses D8PSK modulation and a carrier sense multiple access control scheme;

"mode 3" means a voice and data Very High Frequency Digital Link mode that uses D8PSK modulation and a TDMA media access control scheme;

"mode 4" means a data-only Very High Frequency Digital Link mode using a GFSK modulation scheme and self-organizing time division multiple access;

"mode S air-initiated Comm-B protocol" means a procedure initiated by a Mode S transponder for transmitting a single Comm-B segment from the aircraft installation;

"mode S broadcast protocols" means procedures allowing standard length uplink or downlink messages to be received by more than one transponder or ground interrogator respectively;

"mode S ground-initiated Comm-B protocol" means a procedure initiated by a Mode S interrogator for eliciting a single Comm-B segment from a Mode S aircraft installation, incorporating the contents of one of 255 Comm-B registers within the Mode S transponder;

"mode S multisite-directed protocol" means a procedure to ensure that extraction and close-out of a downlink standard length or extended length message is affected only by the particular Mode S interrogator selected by the aircraft;

"mode S packet" means a packet conforming to the Mode S sub- network standard, designed to minimize the bandwidth required from the air-ground link. ISO 8208 packets may be transformed into Mode S packets and vice-versa;

"mode S specific protocol" means a protocol that provides restricted datagram service within the Mode S sub-network;

"mode S specific services entity" means an entity resident within an XDLP to provide access to the Mode S specific services;

"mode S specific services" means a set of communication services provided by the Mode S system which are not available from other air-ground sub-networks, and therefore not interoperable;

"mode S sub-network" means a means of performing an interchange of digital data through the use of secondary surveillance radar Mode S interrogators and transponders in accordance with defined protocols;

"modulation rate" means the reciprocal of the unit interval measured in seconds. This rate is expressed in bauds;

"M-PSK symbol" means one of the M possible phase shifts of the M-PSK modulated carrier representing a group of log2 M coded chips;

"network" means the word "network" and its abbreviation "N" in ISO 8348 are replaced by the word "sub-network" and its abbreviation

"SN", respectively, wherever they appear in relation to the sub-network layer packet data performance;

"optimum sampling point" means the optimum sampling point of a received universal access transceiver bit stream is at the nominal centre of each bit period, when the frequency offset is either plus or minus 312.5 kilohertz;

"packet" means the basic unit of data transfer among communication devices within the network layer;

"peak envelope power" means the peak power of the modulated signal supplied by the transmitter to the antenna transmission line;

"physical layer protocol data unit" means data unit passed to the physical layer for transmission, or decoded by the physical layer after reception;

"physical layer" means the lowest level layer in the Open Systems Interconnection protocol model. The physical layer is concerned with the transmission of binary information over the physical medium;

"point-to-point" means pertaining or relating to the interconnection of two devices, particularly end-user instruments. A

communication path of service intended to connect two discrete end- users; as distinguished from broadcast or multipoint service;

"power measurement point" means a cable connects the antenna to the UAT equipment. The power measurement point is the end of that cable that attaches to the antenna. All power measurements are considered as being made at the power measurement point unless otherwise specified. The cable connecting the UAT equipment to the antenna is assumed to have 3 decibels of loss;

"pseudorandom message data block" means several UAT requirements State that performance will be tested using pseudorandom message data blocks. Pseudorandom message data blocks should have statistical properties that are nearly indistinguishable from those of a true random selection of bits;

"quality of service" means the information relating to data transfer characteristics used by various communications protocols to achieve various levels of performance for network users;

"RF" means an abbreviation for Radio Frequency;

"reed-Solomon code" means an error correction code capable of correcting symbol errors. Since symbol errors are collections of bits, these codes provide good burst error correction capabilities;

"reliable link service" means a data communications service provided by the sub-network which automatically provides for error control over its link through error detection and requested retransmission of signal units found to be in error;

"required communication performance" means a statement of the performance requirements for operational communication in support of specific Air Traffic Management functions.

"residual error rate" means the ratio of incorrect, lost and duplicate sub-network service data units to the total number of sub- network service data units that were sent;

"segment" means a portion of a message that can be accommodated within a single MA/MB field in the case of a standard length message, or MC/MD field in the case of an extended length message;

"self-organizing time division multiple access" means a multiple access scheme based on time-shared use of a radio frequency channel employing:

(1) discrete contiguous time slots as the fundamental shared resource; and

(2) a set of operating protocols that allows users to mediate access to these time slots without reliance on a master control station;

"service volume" means a part of the facility coverage where the facility provides a particular service in accordance with relevant SARPs and within which the facility is afforded frequency protection;

"SLM" means an abbreviation for standard length message;

"slot" means one of a series of consecutive time intervals of equal duration. Each burst transmission starts at the beginning of a slot;

"slotted aloh" means a random access strategy whereby multiple users access the same communications channel independently, but each communication must be confined to a fixed time slot;

"spot beam" means satellite antenna directivity whose main lobe encompasses significantly less than the earth's surface that is within line-of-sight view of the satellite;

"squitter protocol data unit" means data packet which is broadcast every 32 seconds by a high frequency data link ground station on each of its operating frequencies, and which contains link management information;

"SSR" means an abbreviation for secondary surveillance radar;

"standard length message" means an exchange of digital data using selectively addressed Comm-A interrogations and/or Comm-B replies;

"standard universal access transceiver receiver" means a general purpose universal access transceiver receiver satisfying the minimum rejection requirements of interference from adjacent frequency distance measuring equipment;

"sub network service data unit" means an amount of sub network user data, the identity of which is preserved from one end of a sub network connection to the other;

"SN" means an abbreviation for subnetwork;

"subnetwork connection" means a long-term association between an aircraft data terminal equipment and a ground data terminal equipment using successive virtual calls to maintain context across link handoff;

"subnetwork dependent convergence function" means a function that matches the characteristics and services of a particular subnetwork to those characteristics and services required by the internetwork facility;

"subnetwork entity" means the phrase "ground data circuit-terminating equipment" will be used for the subnetwork entity in a ground station communicating with an aircraft; the phrase "ground data terminal equipment" will be used for the subnetwork entity in a ground router communicating with an aircraft station; and, the phrase "aircraft data terminal equipment" will be used for the subnetwork entity in an aircraft communicating with the station. A subnetwork entity is a packet layer entity as defined in ISO 8208;

"subnetwork layer" means the layer that establishes, manages and terminates connections across a subnetwork;

"subnetwork management entity" means an entity resident within a GDLP that performs subnetwork management and communicates with peer entities in intermediate or end-systems;

"subnetwork service data unit" means an amount of subnetwork user data, the identity of which is preserved from one end of a subnetwork connection to the other;

"subnetwork" means an actual implementation of a data network that employs a homogeneous protocol and addressing plan, and is under the control of a single authority;

"successful message reception" means the function within the universal access transceiver receiver for declaring a received message as valid for passing to an application that uses received universal access transceiver messages;

"synchronous operation" means operation in which the time interval between code units is a constant;

"system" means a Very High Frequency Digital Link-capable entity. A system comprises one or more stations and the associated Very High Frequency Digital Link management entity. A system may either be an aircraft system or a ground system;

"time division multiple access" means a multiple access scheme based on time-shared use of an RF channel employing—

(1) discrete contiguous time slots as the fundamental shared resource; and

(2) a set of operating protocols that allows users to interact with a master control station to mediate access to the channel.

"time division multiplex" means a channel sharing strategy in which packets of information from the same source but with different destinations are sequenced in time on the same channel;

"timeout" means the cancellation of a transaction after one of the participating entities has failed to provide a required response within a pre-defined period of time;

"total voice transfer delay" means the elapsed time commencing at the instant that speech is presented to the aircraft earth station or ground earth station and concluding at the instant that the speech enters the interconnecting network of the counterpart aircraft earth station or ground earth station including vocoder processing time, physical layer delay, RF propagation delay and any other delays within an AMS(R)S sub network;

"transit delay" means in packet data systems, the elapsed time between a request to transmit an assembled data packet and an indication at the receiving end that the corresponding packet has been received and is ready to be used or forwarded;

"universal access transceiver" means a broadcast data link operating on 978 Megahertz, with a modulation rate of 1.041667 Megabytes per second;

"universal access transceiver ADS-B message" means a message broadcasted once per second by each aircraft to convey State vector and other information;

"universal access transceiver ground uplink message" means a message broadcasted by ground stations, within the ground segment of the universal access transceiver frame, to convey flight information such as text and graphical weather data, advisories, and other aeronautical information, to aircraft that are in the service volume of the ground station;

"uplink extended length message" means extended length message uplink communication by means of 112-bit Mode S Comm-C interrogations, each containing the 80-bit Comm-C message field (MC) ;

"uplink" means a term referring to the transmission of data from the ground to an aircraft. Mode S ground-to-air signals are transmitted on the 1 030 Megahertz interrogation frequency channel;

"user group" means a group of ground and/or aircraft stations which share voice and/or data connectivity;

"UTC" means Coordinated Universal Time;

"Very High Frequency Digital Link management entity" means a Very High Frequency Digital Link -specific entity that provides the quality of service requested by the ATN-defined SN_SME. A Very High Frequency Digital Link management entity uses the link management entity (that it creates and destroys) to enquire the quality of service available from peer systems;

"Very High Frequency Digital Link Mode 4 burst" means a Very High Frequency Digital Link Mode 4 burst composed of a sequence of source address, burst ID, information, slot reservation and frame check sequence fields, bracketed by opening and closing flag sequences;

"Very High Frequency Digital Link Mode 4 DLS system" means a Very High Frequency Digital Link system that implements the Very High Frequency Digital LinkMode 4 DLS and subnetwork protocols to carry ATN packets or other packets;

"Very High Frequency Digital Link Mode 4 specific services (VSS) sublayer" means the sublayer that resides above the media access control sublayer and provides VDL Mode 4 specific access protocols including reserved, random and fixed protocols;

"VDL station" means an aircraft-based or ground-based physical entity, capable of VDL Mode 2, 3 or 4;

"VDL" means VHF Digital Link;

"VHF digital link (VDL)" means a constituent mobile subnetwork of the aeronautical telecommunication network, operating in the aeronautical mobile VHF frequency band. In addition, the may provide non-ATN functions such as, for instance, digitized voice;

"VHF" means abbreviation for Very High Frequency;

"vocoder" means a low bit rate voice encoder/decoder;

"voice unit" means device that provides a simplex audio and signalling interface between the user and Very High Frequency Digital Link;

"voice-automatic terminal information service" means the provision of ATIS by means of continuous and repetitive voice broadcasts;

"VSS user" means a user of the Very High Frequency Digital Link Mode 4 specific services;

"XDCE" means a general term referring to both the aircraft data circuit-terminating equipment and the ground data circuit-terminating equipment;

"XDLP" means a general term referring to both the aircraft data link processor and the ground data link processor.

3. Application

(1) These Regulations shall apply to a person providing Communication, Navigation and Surveillance Services within designated air spaces and at aerodromes.

(2) These Regulations do not apply to a person providing Communication, Navigation and Surveillance Services to state aircraft.

4. Requirements for Communication, Navigation and Surveillance Facilities

The minimum requirements for planning, installation, commissioning, training, operations and maintenance of the Communications, Navigation and Surveillance facilities shall conform to these regulations.

PART II – GENERAL REQUIREMENTS

5. Certification of ANS Provider

A person who wishes to provide Air Navigation Services service or operate a facility to support an air traffic service shall have an Air navigation service providers certificate issued in accordance with the Civil Aviation (Certification of Air Navigation Service Providers) Regulations 2017.

6. Approval Requirement

(1) A person shall not provide Air Navigation Services or operate Communication, Navigation and Surveillance facilities or systems in the designated airspace and aerodromes unless the systems or facilities have been approved by the Authority.

(2) An Air Navigation Service Provider shall notify the Authority of its intention to procure, install, use, decommission, upgrade or relocate any communication, navigation and surveillance facility or facilities in the designated airspace and aerodromes not less than thirty (30) days prior to the date of start of the process.

(3) The Authority shall approve installation, use, decommissioning, upgrading or relocation of all the communication, navigation and surveillance facility or facilities in the designated airspace and aerodromes.

7. Inspections and Audits

(1) The Authority shall carry out safety inspections and audits on Communication Navigation and Surveillance facilities, documents and records of the Communication Navigation and Surveillance facilities to determine compliance in accordance with these Regulations.

(2) An inspector of the Authority shall have unrestricted access to the facilities, installations, records and documents of the service provider to determine compliance with these Regulations and required procedures.

8. Siting and Installation

(1) An air navigation service provider shall—

(a) establish procedures to ensure that the communication, navigation and surveillance systems—

(i) are operated, maintained, available and reliable in accordance with the requirements prescribed by the Authority;

(ii) are designed to meet the applicable operational specification for that facility;

(iii) are installed and commissioned as prescribed by the Authority; and

(iv) conform to the applicable system characteristics and specification standards prescribed by the Authority;

(b) determine the site for installation of a new facility based on operational requirements, construction aspects and maintainability.

(2) The facilities in subregulation (1) shall be installed by licensed ait s with relevant ratings for the facilities.

9. Commissioning Requirement

An air navigation service provider shall—

(a) establish procedures to ensure that each new facility—

(i) is commissioned to meet the specifications for that facility; and

(ii) is in compliance with applicable standards.

(b) ensure that the system performance of the new facility has been validated by the necessary tests, and that all parties involved with the operations and maintenance of the facility, including its maintenance contractors have accepted and are satisfied with the results of the tests.

(c) ensure that procedures include documentation of tests conducted on the facility prior to the commissioning, including those that test the compliance of the facility with the applicable standards and any flight check required.

10. Availability and Reliability of CNS facilities

(1) An Air Navigation Services Provider shall be responsible for the provision of communication, navigation and surveillance services and facilities to ensure that the

telecommunication information and data necessary for the safe, regular and efficient operation of air navigation is available.

(2) The functional specification of each of the air navigation service provider's telecommunication services shall include the following values or characteristics for each service—

(a) availability;

(b) reliability;

(c) accuracy;

(d) Integrity;

(e) mean time between failure; and

(f) mean time to repair

(3) The values mentioned in subregulation (2) shall be derived or measured from either or both of—

(a) the configuration of each service; and

(b) the known performance of each service.

(4) The air navigation service provider shall describe in the operations manual the method used to calculate each of the values.

(5) For a radio navigation service, the integrity values or characteristics shall be given for each kind of navigation aid facility that forms part of the service.

(6) The performance of technical facilities shall be monitored, reviewed and reported against these Regulations.

(7) The air navigation service provider shall ensure that a facility is installed with main and standby power supply and adequate air conditioning to ensure continuity of operation appropriate to the service being provided.

11. Interface arrangement for support services

An air navigation service provider shall formalize interface arrangements where applicable with external organizations in the form of service level agreements, detailing the following—

(a) interface and functional specifications of the support service;

(b) service level of the support service such as availability, accuracy, integrity and recovery time of failure of service; and

(c) monitoring and reporting of the operational status of the service to the service provider.

12. Record Keeping and documentation

(1) An air navigation service provider shall—

(a) hold copies of relevant equipment manuals, technical standards, practices, instructions, maintenance procedures, site logbooks, systems backup data, equipment and test gear inventory and any other documentation that are necessary for the provision and operation of the facility;

(b) establish a procedure for the control of the documentation required under these regulations;

(c) keep records under the control of the relevant key personnel;

(d) control access to the records system to ensure appropriate security.

(2) The air navigation service provider shall ensure that data and voice for air navigation service operational systems are recorded continuously and procedures established for the retention and utilization of these recordings for analysis.

(3) An air navigation service provider shall maintain all documents and records which are necessary for the operation and maintenance of the service and make available copies of these documents to personnel where needed.

(4) These documents shall include—

(a) a copy of these regulations;

(b) the air navigation service provider's operations manual;

(c) International Civil Aviation Organization Annex 10 Volumes I to V, International Civil Aviation Organization Document 8071 - Manual on Testing of Radio Navigation Aids, and other relevant International Civil Aviation Organization documents;

(d) records of malfunction and safety incident reports;

(e) records of internal audit reports;

(f) agreements with other organizations;

(g) records of investigation into serious incidents;

(h) records of staff deployment, duty and leave rosters;

(i) records of equipment spares;

(j) records of job description, training programme and plan of each staff member; and

(k) all related air navigation service technical standards and technical guidance material developed by the Authority.

(5) A document retained for this regulation shall be retained for at least three (3) years if paper based and one hundred and eighty (180) days if computer based.

(6) The air navigation service provider shall establish a process for the authorization and amendistance measuring equipment of these documents to ensure that they are constantly updated and ensure that—

(a) the currency of the documentation can be readily determined;

(b) amendistance measuring equipmentnts to the documentation are controlled in accordance with established quality management principles;

(c) only current versions of documents are available; and

(d) the person authorising the creation and any revision is identified.

(7) The air navigation service provider shall ensure that where documents are held as computer based records and where paper copies of computer based records are made, they are subjected to the same control as paper documents.

(8) An air navigation service provider shall establish procedures to identify, collect, index, store, maintain, and dispose records covering—

(a) the performance and maintenance history of each facility;

(b) the establishment of the periodic test programmes for each facility;

(b) each item of test equipment required for the measurement of critical performance parameters;

(c) each reported or detected facility malfunction;

(d) each internal quality assurance review; and

(e) each person who is authorised to place facilities into operational service.

13. Operations Manual

(1) An Air Navigation Services Provider shall develop an operations manual that demonstrates the Air Navigation Services Provider's compliance with these regulations.

(2) The contents of the operations manual shall contain—

(a) the information required of the Air Navigation Services Provider in accordance with these regulations;

(b) an organization chart of the Air Navigation Services Provider and its maintenance contractors, if any, that shows the position of each personnel and the name, qualification, experience, duties and responsibilities of

personnel who are responsible for ensuring the compliance of the organization with the requirements described in these regulations;

(c) an overall operation and maintenance plan for the aeronautical telecommunication service, and for each facility, an operation and maintenance plan, as described in these regulations document;

(d) for each facility, information on the compliance of the facility with these regulations and the applicable aeronautical telecommunication standards; and

(e) the system performance target of each facility, such as its availability and reliability.

(3) The operations manual shall consist of a main manual covering the main areas that need to be addressed, as well as separate supporting documents and manuals (such as the operation and maintenance plan of each facility) that are referred to in the main manual.

(4) An Air Navigation Service provider shall establish an operation and maintenance plan for each facility which shall include- a procedure for the periodic inspection and testing of each facility to verify that it meets the operational and performance specifications of that facility;

(a) details of flight test, if necessary, such as the standards and procedures to be used and flight test interval, which shall be in compliance with guidelines prescribed by the Authority;

(b) the interval between periodic inspection and flight test and the basis for that interval and whenever the interval is changed, the reasons for such change shall be documented;

(c) the operation and maintenance instructions for each facility;

(d) an analysis of the number of personnel required to operate and maintain each facility taking into account the workload required;

(e) the corrective plan and procedures for each facility, including such as whether the repair of modules and component are undertaken in-house or by equipment manufacturers; and the spare support plan for each facility;

(f) The maintenance plan or the operating and maintenance instructions for each facility shall specify the test equipment requirements for all levels of operation and maintenance undertaken.

(5) The air navigation service provider shall control the distribution of the operations manual and ensure that it is amended whenever necessary to maintain the accuracy of the information in the operations manual and to keep its contents up to date.

14. Periodic Inspection, Testing and Security of ANSP facilities

(1) An Air Navigation Services provider shall establish a procedure for the periodic inspection and testing of the communication, navigation and surveillance systems to verify that each facility meets the applicable operational requirements and performance specifications for that facility.

(2) An air navigation service provider shall ensure—

(e) that appropriate inspection, measuring and test equipment are available for staff to maintain the operation of each facility;

(f) the control, calibration and maintenance of such equipment so that they have the precision and accuracy necessary for the measurements and tests to be performed.

(3) Periodic inspection shall include—

(a) security of the facility and site;

(b) adherence to the approved maintenance programme;

(c) upkeep of the equipment, building, site and site services; and

(d) adequacy of facility records and documentation.

(4) The air navigation service provider shall establish a security programme for the communication, navigation and surveillance facility.

(5) The security programme required under sub regulation (4) shall specify the physical security requirements, practices, and procedures to be followed for the purposes of minimising the risk of destruction of, damage to, or interference with the operation of communication, navigation and surveillance facility.

(6) An air navigation service provider shall make a test transmission if—

(a) the transmission is necessary to test a service, facility or equipment; and

(b) within a reasonable time before commencing the transmission, the users have been informed about the transmission;

(c) at the commencement of the transmission, the service provider identifies the transmission as a test transmission;

(d) the transmission contains information identifying it as a test transmission.

(7) An air navigation services provider shall ensure that—

(a) Communication Navigation and Surveillance systems and services are protected against service attacks to a level consistent with the application service requirements;

(b) All end-systems supporting air navigation security services shall be capable of authenticating the identity of peer end-systems, authenticating the source of messages and ensuring the data integrity of the message;

(c) strategies and best practices on the protection of critical information and communications technology systems used for civil aviation purposes are developed and implemented;

(d) policies are established to ensure that, for critical aviation systems—

(i) system architectures are secure by design;

(ii) systems are resilient;

(iii) methods for data transfer are secured, ensuring integrity and confidentiality of data;

(iv) system monitoring, and incident detection and reporting, methods are implemented; and

(v) forensic analysis of cyber incidents is carried out.

15. Flight Inspection and facility check after accident or incident

An Air navigation service provider shall—

(a) ensure that radio navigation aids are available for use by aircraft engaged in air navigation and that the radio navigation aids are subjected to periodic ground and flight inspections; and

(b) establish a procedure to check and accurately record the operating condition of any communication, navigation and surveillance facility that may have been used by an aircraft that is involved in an accident or incident.

16. Communication Navigation Services (CNS) Personnel Training and Other Requirements

(1) An Air Navigation Services Provider shall:—

(a) ensure that it employs sufficient number of personnel who possess the skills and competencies required in the provision of the aeronautical telecommunication service;

(b) provide in the Manual of Air Navigation Services Operations an analysis of the personnel required to perform the Communication Navigation and surveillance services for each facility taking into account the duties and workload required;

(c) develop job descriptions for each of its staff that depict the job purpose, key responsibilities, and outcome to be achieved of each staff;

(d) develop an overall training policy and programme for the organization that shall lay down;

(e) designate an officer in charge of training and/or on-the-job training at the operational stations;

(f) maintain individual training records for each of its staff;

(g) conduct a yearly review of the training plan for each staff at the beginning of the year to identify any gaps in competency and changes in training requirement and prioritize the type of training required for the coming year; and

(h) ensure that the training requirements of these regulations are similarly applied to its maintenance contractors, if any.

(2) The On-the-Job Training officer in subregulation (1f) above shall have satisfactorily completed the On-the-Job Training instructional techniques course.

(3) A person shall not perform a function related to the installation, training, operation or maintenance of any communication, navigation and a surveillance system unless—

(a) that person has successfully completed training in the performance of that function in line with the Air Traffic Safety Electronics Personnel competency based training requirements;

(b) the Air navigation service provider is satisfied that the technical person is competent in performing that function; and

(c) that person has been certified in accordance with requirements of Civil Aviation Regulations.

17. Facility malfunction incident and radio interference reporting and operational status of CNS systems

(1) An air navigation service provider shall establish procedures for the reporting, collection and notification of facility malfunction incidents and safety incidents.

(2) The procedures in subregulation (1) shall be documented in the Manual of Air Navigation Services Operations.

(3) An air navigation service provider shall compile reports of incidents and review such reports periodically with its maintenance contractors to—

(a) determine the cause of the incidents and determine any adverse trends;

(b) implement corrective and preventive actions where necessary to prevent recurrence of the incidents; and

(c) implement any measures to improve the safety performance of the aeronautical telecommunication service.

(4) The air navigation service provider shall—

(a) report any serious service failure or safety incident to the Authority and investigate such incidents in order to establish how and why the incident happened, including possible organizational contributing factors and to recommend actions to prevent a recurrence; and

(b) ensure that information on the operational status of each communication, navigation and surveillance facility that is essential for the enroute, approach, landing, and take-off phases of flight is provided to meet the operational needs of the service being provided.

(5) An air navigation service provider shall—

(a) establish a procedure for the management and protection of aeronautical radio spectrum;

(b) designate a responsible person to control any frequency allocation within the aeronautical radio spectrum to ensure that there will be no conflict and interference to any radio stations or facility;

(c) ensure that there is no wilful transmission of unnecessary or anonymous radio signals, messages or data by any of its radio stations;

(d) establish procedures with the communication authority to address occurrence of radio frequency interference;

(e) ensure that any frequency interference occurrences are reported, investigated and follow-up actions taken to prevent recurrence;

(f) keep updated records of all allocated frequencies; and

(g) ensure that no facility providing radio signals for the purpose of aviation safety shall be allowed to continue in operation, if there is a suspicion or any cause to suspect that the information being provided by that facility is erroneous.

18. Proficiency certification program

(1) An Air navigation service provider shall develop proficiency certification program for Air Traffic Safety Electronics Personnel engaged in the installation, training, operations and maintenance of Communication, Navigation and Surveillance systems in accordance with guidelines prescribed by the Authority.

(2) The Authority shall certify Air Traffic Safety Electronics Personnel involved in the installation, training, operations and maintenance of Communication, Navigation and Surveillance systems in accordance with Civil Aviation Regulations.

19. Safety case, notification of Aeronautical facility status and interruption to service

(1) The air navigation service provider shall ensure that for safety critical systems, including automated air traffic control systems, communication systems and instrument landing systems, the commissioning of such systems shall include the conduct of a safety case or equivalent.

(2) The air navigation service provider shall ensure that human factors principles are observed in the design, operations and maintenance of aeronautical telecommunication facilities.

(3) An air navigation service provider shall, as soon as possible—

(a) forward to the Aeronautical Information Services—

(i) information on the operational details of any new facility for publication in the Aeronautical Information Publication; and

(ii) information concerning any change in the operational status of any existing facility, for the issue of a Notice to Airmen;

(b) ensure that the information forwarded under subparagraph (a) has been accurately published.

(4) An air navigation service provider shall—

(a) establish a procedure to be used in the event of interruption to or when upgrading communication, navigation and surveillance systems; and

(b) specify an acceptable recovery time for each service.

PART III – AERONAUTICAL TELECOMMUNICATION NETWORK.

20. Support of Aeronautical Telecommunication Network Application

(1) An Aeronautical Telecommunication Network shall specifically and exclusively be used to provide digital data communications services to air traffic service provider organizations and aircraft operating agencies in support of—

(a) Air Traffic Services communications with aircraft;

(b) Air Traffic Services Communications between air traffic service units;

(c) Aeronautical Operational Control Communications; and

(d) Aeronautical Administrative Communications.

(2) Aeronautical Telecommunication Network communication services in subregulation (1) shall support Aeronautical Telecommunication Network applications.

21. Requirements for implementation of Aeronautical Telecommunication Network

(1) Requirements for implementation of the Aeronautical Telecommunication Network shall be made on the basis of regional air navigation agreements.

(2) The agreements in subregulation (1) shall specify the area in which the communication standards for the Aeronautical Telecommunication Network/Open System Interconnection or the Aeronautical Telecommunication Network/Internet Protocol Suite are applicable.

(3) The Aeronautical Telecommunication Network shall either use International Organization for Standardization, communication standards for Open Systems Interconnection or use the Internet Society communications standards for the Internet Protocol Suite.

(4) The Aeronautical Fixed Telecommunication Network/Aeronautical Message Handling System gateway shall ensure the interoperability of Aeronautical Fixed Telecommunication Network stations and networks with the Aeronautical Telecommunication Network.

(5) An authorized path(s) for the Aeronautical Fixed Telecommunication Network shall be defined on the basis of a predefined routing policy.

(6) The Aeronautical Telecommunication Network shall—

(a) transmit, relay and deliver messages in accordance with the priority classifications and without discrimination or undue delay;

(b) provide means to define data communications that can be carried only over authorized paths for the traffic type and category specified by the user;

(c) provide communication in accordance with the prescribed Required Communication Performance;

(d) operate in accordance with the communication priorities specified in Table 1 and Table 2 of First Schedule to these Regulations;

(e) enable exchange of application information when one or more authorized paths exist;

(f) notify the appropriate application processes when no authorized path exists;

(g) make provisions for the efficient use of limited bandwidth sub-networks;

(h) enable an aircraft intermediate system to connect to a ground intermediate system via different sub-networks;

(i) enable an aircraft intermediate system to connect to different ground intermediate systems;

(j) enable the exchange of address information between applications;

(k) be accurate to within 1 second of UTC where the absolute time of day is used.

22. Aeronautical Telecommunication Network Applications Requirements

(1) The Aeronautical Telecommunication Network shall support the Data Link Initiation Capability applications when air-ground data links are implemented.

(2) The Aeronautical Telecommunication Network / Open System Interconnection end-system shall support the following Directory Services application functions when Aeronautical Message Handling System and security protocols are implemented—

(a) directory information retrieval; and

(b) directory information modification.

23. Air-ground applications

The Aeronautical Telecommunication Network shall be capable of supporting one or more of the following applications—

(a) Automatic Dependent Surveillance – Contract;

(b) Controller Pilot Data Link Communication; and

(c) Flight Information Service including Automatic Terminal Information Service and Meteorological Reports.

24. Ground-Ground Applications

The Aeronautical Telecommunication Network shall be capable of supporting the following applications—

(a) Air Traffic Service Interfacility Data Communication; and Ground-Ground Applications.

(b) Air Traffic Service Message Handling Services applications.

PART IV – ATN COMMUNICATION SERVICE REQUIREMENTS

25. Aeronautical Telecommunication Network/Internet Protocol Suite upper layer communications service

An Aeronautical Telecommunication Network host shall be capable of supporting the Aeronautical Telecommunication Network/Internet Protocol Suite upper layers including an application layer.

26. Aeronautical Telecommunication Network /Open System Interconnection upper layer communications service

An Aeronautical Telecommunication Network /Open System Interconnection end-system shall be capable of supporting the Open System Interconnection Upper Layer Communications Service including session, presentation and application layers.

27. Aeronautical Telecommunication Network/Internet Protocol Suite communications service

(1) An Aeronautical Telecommunication Network host shall be capable of supporting the Aeronautical Telecommunication Network/Internet Protocol Suite including—

(a) transport layer in accordance with Transmission Control Protocols and User Datagram Protocols; and

(b) network layer in accordance with Internet Protocol version 6.

(2) An Internet Protocol Suite router shall support the Aeronautical Telecommunication Network layer in accordance with Internet Protocol (version 6) and multiprotocol extensions.

28. Aeronautical Telecommunication Network/Open System Interconnection communications service

(1) An Aeronautical Telecommunication Network /Open System Interconnection end-system shall be capable of supporting the Aeronautical Telecommunication Network including the—

(a) transport layer in accordance with International Organization for Standardization Transport Protocol Class 4 and optionally Connectionless Transport Protocol; and

(b) network layer in accordance with International Organization for Standardization, Connectionless Network Protocol.

(2) An ATN Intermediate System shall support the Aeronautical Telecommunication Network layer in accordance with International Organization for Standardization, Connectionless Network Protocol and International Organization for Standardization, Inter-domain routing protocol.

29. Aeronautical Telecommunication Network Naming And Addressing Requirements

(1) The Aeronautical Telecommunication Network shall provide—

(a) provisions for unambiguous application identification and addressing; and Aeronautical Telecommunicatio n Network Naming And Addressing Requirements.

(b) means to unambiguously address all Aeronautical Telecommunication Network end-systems and intermediate systems.

(2) The Aeronautical Telecommunication Network addressing and naming plans shall allow Authority and Organizations to assign addresses and names within their own administrative domains.

30. ATN security requirements

(1) The Aeronautical Telecommunication Network shall—

(a) make provisions whereby only the controlling Air Traffic Services unit may provide Air Traffic Control instructions to aircraft operating in its airspace;

(b) enable the recipient of a message to identify the originator of that message; and

(c) be protected against service attacks to a level consistent with the application service requirements.

(2) Aeronautical Telecommunication Network end-systems supporting Aeronautical Telecommunication Network security services shall be capable of authenticating the identity of peer end-systems, authenticating the source of messages and ensuring the data integrity of the messages.

PART V – AERONAUTICAL MOBILE-SATELLITE (ROUTE) SERVICE

31. Aeronautical Mobile-Satellite (Route) Service

(1) A mobile-satellite system intended to provide Aeronautical Mobile-Satellite (Route) Service shall conform to the requirements of these Regulations.

(2) An Aeronautical Mobile-Satellite (Route) Service system shall support packet data service, voice service or both.

(3) Requirements for mandatory carriage of AMS (R) S system equipment including the level of system capability shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales for the carriage of equipment and the level of system capability shall include the performance of the Aircraft Earth Station, the satellite and the Ground Earth Station.

(4) The agreements specified in sub regulation (3) shall provide at least a notice of two years of mandatory carriage of airborne systems.

(5) The Authority shall coordinate with national authorities and service providers the implementation aspects of an Aeronautical Mobile-Satellite (Route) Service system that permit worldwide interoperability and optimum use, as appropriate.

32. RF Characteristics

(1) When providing Aeronautical Mobile-Satellite (Route) Service communications, an Aeronautical Mobile-Satellite (Route) Service system shall operate only in frequency bands which are appropriately allocated to Aeronautical Mobile-Satellite (Route) Service and protected by the International Telecommunications Union Radio Regulations.

(2) The total emissions of the Aircraft Earth Station necessary to meet designed system performance shall be controlled to avoid harmful interference to other systems necessary to support safety and regularity of air navigation, installed on the same or other aircraft.

(3) Emissions from an Aeronautical Mobile-Satellite (Route) Service system Aircraft Earth Station shall not cause harmful interference to an Aircraft Earth Station providing Aeronautical Mobile-Satellite (Route) Service on a different aircraft.

(4) The Aircraft Earth Station equipment shall operate properly in an interference environment causing a cumulative relative change in its receiver noise temperature ($\Delta T/T$) of 25 per cent.

33. Priority and pre- emptive access

(1) Every aircraft earth station and ground earth station shall be designed to ensure that messages transmitted in accordance with Civil Aviation (Communication Procedures) Regulations including their order of priority, are not delayed by the transmission and reception of other types of messages.

(2) As a means to comply with the sub regulation (1) message types not defined in the Civil Aviation (Communication Procedures) Regulations shall be terminated even without warning, to allow messages specified in the Civil Aviation (Communication Procedures) Regulations 2017 to be transmitted and received.

All Aeronautical Mobile-Satellite (Route) Service data packets and all Aeronautical Mobile-Satellite (Route) Service voice calls shall be identified as to their associated priority.

(3) The system shall provide voice communications priority over data communications within the same message category.

34. Signal acquisition and tracking

(1) The Aircraft Earth Station, Ground Earth Station and satellites shall properly acquire and track service link signals when the aircraft is moving at a ground speed of up to 1 500 km/h (800 knots) along any heading.

(2) The Aircraft Earth Station, Ground Earth Station and satellites shall properly acquire and track service link signals when the component of the aircraft acceleration vector in the plane of the satellite orbit is up to 0.6 g.

Performance Requirements

35. Designated Operational Coverage

An Aeronautical Mobile-Satellite (Route) Service system shall provide Aeronautical Mobile-Satellite (Route) Service throughout its designated Operational coverage.

36. Failure notification

An Aeronautical Mobile-Satellite (Route) Service system shall—

(a) provide timely predictions of the time, location and duration of any resultant outages until full service is restored in the event of a service failure; and

(b) annunciate a loss of communications capability within 30 seconds of the time when it detects such a loss.

37. AES requirements

The Aircraft Earth Station shall meet the relevant performance requirements specified in regulations 39 and 42 for aircraft—

(a) in straight and level flight throughout the designated operational coverage of the satellite system; or

(b) attitudes of +20/-5 degrees of pitch and +/-25 degrees of roll throughout the Designated Operational Coverage of the satellite system.

38. Packet data service performance

(1) If the system provides AMS (R) S packet data service, it shall meet the standards of regulations 40 and 41.

(2) Where an Aeronautical Mobile-Satellite (Route) Service system provides packet data service, it shall be capable of operating as a constituent mobile sub network of the Aeronautical Telecommunication Network.

39. Delay Parameters

(1) Connection establishment delay shall not be greater than 70 seconds.

(2) Data transit delay values shall be based on a fixed sub- network service data unit length of 128 octets in accordance with ISO and shall be defined as average values.

(3) Data transit delay from aircraft shall not be greater than 40 seconds for the highest priority data service.

(4) Data transit delay from aircraft shall not be greater than 28 seconds for the lowest priority data service.

(5) Data transit delay to aircraft shall not be greater than 12 seconds for the highest priority data service.

(6) Data transit delay to aircraft shall not be greater than 28 seconds for the lowest priority data service.

(7) Data transfer delay (95th percentile), shall not be greater than 80 seconds for the highest priority data service.

(8) Data transfer delay (95th percentile) from-aircraft, shall not be greater than 60 seconds for the lowest priority data service.

(9) Data transfer delay (95th percentile) to-aircraft shall not be greater than 15 seconds for the highest priority data service.

(10) Data transfer delay (95th percentile) to-aircraft shall not be greater than 30 seconds for the lowest priority data service.

(11) The connection release delay (95th percentile) shall not be greater than 30 seconds in either direction.

40. Integrity

(1) The residual error rate in the from-aircraft direction shall not be greater than 10-4 per sub-network service data unit.

(2) The residual error rate in the to-aircraft direction shall not be greater than 10-6 per sub-network service data unit.

(3) The probability of a Sub Network Connection provider- invoked Sub Network Connection release shall not be greater than 10-4 over any one-hour interval.

(4) The probability of a sub-network connection provider-invoked reset shall not be greater than 10-1 over any one-hour interval.

41. Voice service performance

The system that provides Aeronautical Mobile-Satellite (Route) Service voice service shall meet the requirements in regulations 43 44 and 45.

42. Call Processing Delay

(1) The 95th percentile of the time delay for a GES to present a call origination event to the terrestrial network interworking interface after a call origination event has arrived at the AES interface shall not be greater than 20 seconds.

(2) The 95th percentile of the time delay for an AES to present a call origination event at its aircraft interface after a call origination event has arrived at the terrestrial network interworking interface shall not be greater than 20 seconds.

43. Voice Quality

(1) The voice transmission shall provide overall intelligibility performance suitable for the intended operational and ambient noise environment.

(2) The total allowable transfer delay within an Aeronautical Mobile-Satellite (Route) Service sub network shall not be greater than 0.485 seconds.

44. Voice Capacity

The Aeronautical Mobile-Satellite (Route) Service system shall have sufficient available voice traffic channel resources such that an Aircraft Earth Stationor Ground Earth Station originated Aeronautical Mobile-Satellite (Route) Service voice call presented to the system shall experience a probability of blockage of no more than 10^{-2}.

45. Security

The Aeronautical Mobile-Satellite (Route) Service system shall provide features for the protection—

(a) of messages in transit from tampering.

(b) against denial of service, degraded performance characteristics, or reduction of system capacity when subjected to external attacks; or

(c) unauthorized entry.

46. System Interfaces

An Aeronautical Mobile-Satellite (Route) Service system shall allow sub-network users to address Aeronautical Mobile-Satellite (Route) Service communications to specific aircraft by means of the ICAO 24-bit aircraft address.

47. Packet data service interfaces

A system that provides Aeronautical Mobile-Satellite (Route) Service packet data service shall provide—

(a) an interface to the Aeronautical Telecommunication Network; and

(b) a Connectivity Notification function.

PART VI – SECONDARY SURVEILLANCE RADAR MODE S AIR- GROUND DATA LINK

48. Air Ground Data Link Communication

Where air ground data link communication is used by the SSR Mode S, the following shall be implemented—

(a) the Mode S characteristics shall be as specified in Second Schedule to these Regulations;

(b) the DCE and XDCE state tables shall be as specified in the Third Schedule to these Regulations;

(c) the Mode S packet formats shall be as specified in the Fourth Schedule to these Regulations.

PART VII – VERY HIGH FREQUENCY AIR-GROUND DIGITAL LINK

49. Radio channels and functional channels

(1) An aircraft station shall be capable of tuning to any of the channels in the range specified in regulation 52 within 100 milliseconds after the receipt of an autotune command.

(2) An aircraft station for Very High Frequency Digital Link Mode 3, shall be able to tune to any channel in the range specified in regulation 52 within 100 milliseconds after the receipt of any tuning command.

(3) A ground station shall be capable of operating on its assigned channel within the radio frequency range detailed in regulation 52.

(4) Frequency 136.975Megahertz shall be reserved as a worldwide common signalling channel for VHF Air-Ground Digital Link Mode 2.

50. System Capabilities

(1) The Very High Frequency Air-Ground Digital Link system shall provide code-independent and byte-independent transfer of data.

(2) The Very High Frequency Air-Ground Digital Link system shall provide link layer data broadcast services Mode 2 or voice and data broadcast services Mode 3.

(3) For Very High Frequency Air-Ground Digital Link Mode 3, the data broadcast service shall support network multicasting capability originating from the ground.

(4) The Very High Frequency Air-Ground Digital Link system shall establish and maintain a reliable communications path between the aircraft and the ground system while allowing but not requiring manual intervention.

(5) A Very High Frequency Air-Ground Digital Link -equipped aircraft shall transition from one ground station to another when circumstances dictate.

(6) The Very High Frequency Air-Ground Digital Link Mode 3 system shall support a transparent, simplex voice operation based on a "Listen-Before-Push-To-Talk" channel access.

51. Air-ground VHF digital link communications system characteristics

(1) The radio frequencies used for Air-ground VHF digital link communications shall be selected from the radio frequencies in the band 117.975–137 Megahertz.

(2) The lowest assignable frequency used for Air-ground Very High Frequency digital link communications shall be 118.000 Megahertz, and the highest assignable frequency shall be 136.975 Megahertz and the separation between assignable frequencies shall be 25 kiloHertz.

(3) The design polarization of emissions shall be vertical.

52. System characteristics of the ground installations for VHF Air-Ground Digital Link

The Very High Frequency Air ground Digital link system characteristics for ground installation shall be as specified in the Fifth Schedule to these Regulations.

53. System characteristics of the aircraft installation

The Very High Frequency Air ground Digital link system characteristics for aircraft installation shall be as specified in the Sixth Schedule to these Regulations.

54. Physical Layer Protocols and services

The Very High Frequency Air ground Digital Link systems physical layer protocols and services shall—

(a) be as specified in the Seventh Schedule to these Regulations for aircraft and ground stations; and Physical Layer Protocols and services.

(b) be as specified in the Tenth Schedule to these Regulations for both mobile and ground stations of Mode 4 unless otherwise stated.

56. Link Layer Protocols and services

The Very High Frequency Air ground Digital Link systems link layer protocols and services shall be as specified in the Eighth Schedule to these Regulations.

57. Sub-network Layer Protocols and services

The Very High Frequency Air ground Digital Link systems sub-network layer protocols and services shall be as specified in the Ninth Schedule to these Regulations.

58. The Very High Frequency Data Link Mobile Sub Network Dependent Convergence Function

(1) The Very High Frequency Digital Link Mode 2 mobile Sub Network Dependent Convergence Function shall be the standard mobile Sub Network Dependent Convergence Function.

(2) The Very High Frequency Digital Link Mode 2 mobile Sub Network Dependent Convergence Function shall—

(a) support maintaining context across sub network calls;

(b) use the same context across all Switched Virtual Circuits negotiated to a Data Terminal Equipment, when negotiated with the same parameters; or

(c) support at least 2 Switched Virtual Circuits sharing a context.

59. VDL Mode 3 Sub Network Dependent Convergence Function

The Very High Frequency Digital Link Mode 3 shall support—

(a) the standard International Standard Organization, ISO 8208 Sub Network Dependent Convergence Function as prescribed by the Authority; and

(b) the denoted frame-based Sub Network Dependent Convergence Function.

60. Voice Unit for Mode 3 Services.

(1) The voice unit shall provide for a simplex, "push-to-talk" audio and signalling interface between the user and the Very High Frequency Digital Link and two separate mutually exclusive voice circuit types shall be supported.

(2) The two separate mutually exclusive voice circuit types in sub regulation (1) are—

(a) Dedicated circuits; and

(b) Demand assigned circuits.

(3) Dedicated circuits in sub regulation (2) (a) shall provide service to a specific user group on an exclusive basis with no sharing of the circuit with other users outside the group and access shall be based on a "listen-before-push-to-talk" discipline

(4) Demand assigned circuits in sub regulation (2) shall provide voice circuit access which is arbitrated by the ground station in response to an access request received from the aircraft station and allow dynamic sharing of the channel resource increasing trunking efficiency.

(5) The voice unit operation shall support a priority override access for authorized ground users.

(6) The voice unit operation shall support notification to the user of the source of a received message.

(7) The voice unit shall support a coded squelch operation that offers some degree of rejection of undesired co-channel voice messages based on the burst time of arrival.

61. Voice Unit for Mode 3 speech encoding, parameters and procedure

The Very High Frequency Digital Link Mode 3 shall use the Advanced Multi-Band Excitation, 4.8 kilobits per second encoding or decoding algorithm, version number AMBE-ATC-10, developed by Digital Voice Systems, Incorporated for voice communications.

62. VDL Mode 4 radio channels

(1) A Very High Frequency Digital Link Mode 4 transmitter or receiver shall be capable of tuning to any of the 25 kiloHertz channels from 112 Megahertz to 137 Megahertz.

(2) A Very High Frequency Digital Link Mode 4 station shall be capable of receiving two channels simultaneously.

(3) Very High Frequency Digital Link Mode 4 stations shall use two assigned frequencies as Global Signalling Channels, to support user communications and link management functions.

63. VDL Mode 4 System capabilities

(1) The Very High Frequency Digital Link Mode 4 system shall—

(a) support ATN/IPS-compliant sub network services;

(b) provide code-independent and byte-independent transfer of data;

(c) provide link layer broadcast services;

(d) provide link layer point-to-point services;

(e) provide air-air communications, without ground support, as well as air-ground communications;

(f) establish and maintain a reliable communications path between the aircraft and the ground system while allowing, but not requiring, manual intervention when supporting air-ground operations; and

(g) provide the capability for deriving time from time-of-arrival measurements of received Very High Frequency Digital Link Mode 4 transmissions whenever externally derived estimates of time are unavailable.

(2) A mobile Very High Frequency Digital Link Mode 4 DLS station shall transition from one ground Very High Frequency Digital Link Mode 4 DLS station to another as required.

(3) Mobile and ground Very High Frequency Digital Link Mode 4 stations shall access the physical medium operating in simplex mode.

64. Coordination of channel utilization

Transmissions shall be scheduled relative to UTC, to ensure efficient use of shared channels and to avoid unintentional slot re-use on a regional basis.

PART VIII – AERONAUTICAL FIXED TELECOMMUNICATION NETWORK

65. Characteristics of Interregional Aeronautical Fixed Service circuits

Interregional Aeronautical Fixed Service circuits being implemented or upgraded shall employ high quality telecommunications service and the modulation rate shall take into account traffic volumes expected under both normal and alternate route conditions.

66. Technical provisions relating to international ground-ground data interchange at medium and higher signalling rates

The technical provisions related to international ground – ground data interchange at medium and higher signalling rates for AFTN networks shall be as specified in the Eleventh Schedule to these Regulations.

67. Aircraft Addressing System

(1) The aircraft address shall be one of 16 777 214 twenty- four-bit aircraft addresses allocated by International Civil Aviation Organization to the State of Registry or common mark registering authority and assigned as specified in the Twelfth Schedule to these Regulations.

(2) Non-aircraft transponders that are installed on aerodrome surface vehicles, obstacles or fixed Mode S target detection devices for surveillance or radar monitoring purposes shall be assigned 24-bit aircraft addresses.

(3) Mode S transponders used in accordance with sub regulation (2) shall not have any negative impact on the performance of existing Air Traffic Services surveillance systems and ACAS.

PART IX – POINT-TO-MULTIPOINT COMMUNICATIONS

68. Service via satellite for the dissemination of Aeronautical Information

Point-to-multipoint telecommunication service via satellite to support the dissemination of Aeronautical Information shall be based on full-time, non-pre-emptible, protected services

as defined in the relevant Telecommunication Standardization Sector of the International Telecommunications Union Recommendations.

69. Service via satellite for the dissemination of World Area Forecast System products

System characteristics shall include the following—

(a) frequency — C-band, earth-to-satellite, 6 Gigahertz band, satellite-to-earth, 4 Gigahertz band;

(b) capacity with effective signalling rate of not less than 9 600 bits/s;

(c) bit error rates — better than 1 in 10^7;

(d) forward error correction; and

(e) availability 99.95 per cent.

PART X – HIGH FREQUENCY DATA LINK SYSTEM

70. System architecture

The High Frequency Data Link system shall—

(a) consist of one or more ground and aircraft station subsystems, which implement the High Frequency Data Link protocol specified in regulation 73; and

(b) include a ground management subsystem regulations 74.

71. Aircraft and Ground Station Subsystems

The High Frequency Data Link aircraft station subsystem and the High Frequency Data Link ground station subsystem shall include the following functions—

(a) High Frequency transmission and reception;

(b) data modulation and demodulation; and

(c) High Frequency Data Link protocol implementation and frequency selection.

72. Operational coverage

Frequency assignments for High Frequency Data Link shall be protected throughout their Designated Operational Coverage area.

73. Requirements for carriage of HFDL equipment

(1) Requirements for mandatory carriage of High Frequency Data Link equipment shall be made on the basis of regional air navigation agreements that specify the airspace of operation and the implementation timescale.

(2) The agreement in sub regulation (1) shall provide advance notice of at least two years for the mandatory carriage of airborne systems.

74. Ground station networking

High Frequency Data Link ground station subsystems shall interconnect through a common ground management subsystem.

75. Ground station synchronization

(1) Synchronization of High Frequency Data Link ground station subsystems shall be to within ±25 ms of UTC.

(2) For any station not operating within ±25 ms of UTC, appropriate notification shall be made to all aircraft and ground station subsystems to allow for continued system operation.

76. Quality of service

(1) The undetected error rate for a network user packet which contains between 1 and 128 octets of user data shall be equal to or less than 1 in 10^6.

(2) Transit and transfer delays for network user packets of 128 octets shall not exceed the values of the specifications in Table 11-1 as provided in the Fifteenth Schedule to these Regulations.

77. HF Data Link Protocol

The High Frequency Data Link protocol shall consist of a physical layer, a link layer, and a sub-network layer, as specified in the Thirteenth Schedule to these Regulations.

78. Ground Management Subsystem

The ground management subsystem shall—

(a) perform the functions necessary to establish and maintain communications channels between the High Frequency Data Link ground and aircraft station subsystems.

(b) interface with the ground station subsystem in order to exchange control information required for frequency management, system table management, log status management, channel management, and Quality of Service data collection.

PART XI – UNIVERSAL ACCESS TRANSCEIVER

79. Universal Access Transceiver system characteristics of aircraft and ground stations

The Universal Access Transmitter physical layer and system characteristics of aircraft and ground stations shall be as specified in the Fourteenth Schedule to these Regulations.

80. Mandatory carriage requirements

Requirements for mandatory carriage of Universal Access Transmitter equipment shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales for the carriage of equipment, including the appropriate lead time.

PART XII – AERONAUTICAL MOBILE SERVICE

81. Air-Ground VHF Communication System characteristics

(1) The characteristics of the air-ground Very High Frequency communication system used in the International Aeronautical Mobile Service shall be in conformity with the specifications contained in the Fifteenth Schedule to these Regulations.

(2) The systems characteristics for both ground and airborne installation shall conform to the specifications of the Fifteenth Schedule to these Regulations.

82. Single side band High Frequency Communication System Characteristics

The characteristics of the air-ground High Frequency Single Side Band system, where used in the Aeronautical Mobile Service, shall be in conformity with the specifications of the Fifteenth Schedule to these Regulations.

83. Selcal System

(1) Where a Select - Calling system is installed, the system characteristics contained in the Sixteenth Schedule to these Regulations shall be applied.

(2) Aeronautical Stations which are required to communicate with Select - Calling equipped aircraft shall have Select - Calling encoders in accordance with the red group specified in the table of tone frequencies in the Sixteenth Schedule to these Regulations as from 1 September 1985.

(3) Select - Calling codes using the tones Red P, Red Q, Red R, and Red S shall be assigned after 1 September 1985.

PART XIII – AERONAUTICAL SPEECH CIRCUITS

84. Technical provisions relating to International Aeronautical speech circuit switching and signalling for ground-ground applications

(1) The use of circuit switching and signalling to provide speech circuits to interconnect Air Traffic Services units not interconnected by dedicated circuits shall be by agreement between the Administrations concerned.

(2) The application of aeronautical speech circuit switching and signalling shall be made on the basis of regional air navigation agreements.

(3) The Air Traffic Control communication requirements defined in the Civil Aviation (Air Traffic Services) Regulations 2017 shall be met by implementation of one or more of the following basic three call types—

(a) instantaneous access;

(b) direct access; and

(c) indirect access

(4) Subject to sub regulation (3), the following functions shall be provided in order to meet the requirements specified in Civil Aviation (Air Traffic Services) Regulations, 2017—

(a) means of indicating the calling or called party identity;

(b) means of initiating urgent or priority calls; and

(c) conference capabilities.

(5) The characteristics of the circuits used in aeronautical speech circuit switching and signalling shall conform to appropriate international standards and Telecommunication Standardization Sector of the International Telecommunications Union recommendations.

(6) Digital signalling systems shall be used wherever their use can be justified in terms of any of the following—

(a) improved quality of service;

(b) improved user facilities; or

(c) reduced costs where quality of service is maintained.

(7) The characteristics of supervisory tones to be used such as ringing, busy, number unobtainable shall conform to appropriate Telecommunication Standardization Sector of the International Telecommunications Union, recommendations.

(8) To take advantage of the benefits of interconnecting regional and national aeronautical speech networks, the international aeronautical telephone network numbering scheme shall be used.

PART XIV – EMERGENCY LOCATOR TRANSMITTER FOR SEARCH AND RESCUE

85. Operating frequencies

(1) All installations of emergency locator transmitters operating on 406 Megahertz shall meet the provisions specified in regulation 88.

(2) All installations of emergency locator transmitters operating on 121.5 Megahertz shall meet the provisions specified in regulation 87.

(3) Emergency locator transmitters shall operate on 406 Megahertz and 121.5 Megahertz simultaneously.

(4) All emergency locator transmitters installed on or after 1 January 2002 shall operate simultaneously on 406 Megahertz and 121.5 Megahertz.

(5) The technical characteristics for the 406 Megahertz component of an integrated emergency locator transmitters shall be in accordance with regulation 88.

(6) The technical characteristics for the 121.5 Megahertz component of an integrated emergency locator transmitters shall be in accordance with regulation 87.

86. Emergency Locator transmitters Register

(1) The Authority shall make arrangements to have a 406 Megahertz Emergency Locator transmitters register and shall ensure that the register is updated whenever necessary.

(2) Register information regarding the Emergency Locator transmitters shall be immediately available to search and rescue authorities.

(3) Emergency Locator transmitters register information shall include the following—

(a) transmitter identification expressed in the form of an alphanumerical code of 15 hexadecimal characters;

(b) transmitter manufacturer, model and serial number;

(c) COSPAS-SARSAT type approval number;

(d) name, address and emergency telephone number of the owner and operator;

(e) name, address and telephone number of other emergency contacts to whom the owner or the operator is known;

(f) aircraft manufacturer and type; and

(g) colour of the aircraft.

87. Specification for the 121.5 Megahertz component of Emergency Locator Transmitter

(1) Emergency Locator Transmitters shall operate on 121.5 Megahertz and the frequency tolerance shall not exceed plus or minus 0.005 per cent.

(2) The emission from an Emergency Locator transmitters under normal conditions and attitudes of the antenna shall be vertically polarized and essentially omni-directional in the horizontal plane.

(3) Over a period of 48 hours of continuous operation, at an operating temperature of minus 20°C, the Peak Effective Radiated Power shall at no time be less than 50 mW.

(4) The type of emission shall be A3X and any other type of modulation that meets the requirements of sub regulations (5), (6) and (7) shall be used provided that the emission does not prejudice precise location of the beacon by homing equipment.

(5) The carrier shall be amplitude modulated at a modulation factor of at least 0.85.

(6) The modulation applied to the carrier shall have a minimum duty cycle of 33 per cent.

(7) The emission shall have a distinctive audio characteristic achieved by amplitude modulating the carrier with an audio frequency sweeping downward over a range of not less than 700 Hertz within the range 1 600 Hertz to 300 Hertz and with a sweep repetition rate of between 2 Hertz and 4 Hertz.

(8) The emission shall include a clearly defined carrier frequency distinct from the modulation sideband components; in particular, at least 30 per cent of the power shall be contained at all times within plus or minus 30 Hertz of the carrier frequency on 121.5 Megahertz.

88. Specification for the 406 Megahertz component of Emergency Locator Transmitter

(1) Emergency Locator Transmitters shall operate on one of the frequency channels assigned for use in the frequency band 406.0 to 406.1 Megahertz.

(2) The period between transmissions shall be 50 seconds plus or minus 5 per cent.

(3) Over a period of 24 hours of continuous operation at an operating temperature of –20°C, the transmitter power output shall be within the limits of 5 W plus or minus 2 dB.

(4) The 406 Megahertz Emergency Locator Transmitters shall be capable of transmitting a digital message.

89. Transmitter identification coding

(1) Emergency locator transmitters operating on 406 Megahertz shall be assigned a unique coding for identification of the transmitter or aircraft on which it is carried.

(2) The emergency locator transmitter shall be coded in accordance with either the aviation user protocol or one of the serialized user protocols specified in the Seventeenth Schedule to these Regulations and shall be registered with the appropriate the Authority.

PART XV – EXEMPTIONS

90. Requirements for application for exemption

(1) A person may apply to the Authority for an exemption from any provision of these Regulations.

(2) Unless in case of emergency, a person requiring exemptions from any of these Regulations shall make an application to the Authority at least sixty days prior to the proposed effective date, giving the following information—

(a) name and contact address including electronic mail and fax if any;

(b) telephone number;

(c) a citation of the specific requirement from which the applicant seeks exemption;

(d) justification for the exemption;

(e) a description of the type of operations to be conducted under the proposed exemption;

(f) the proposed duration of the exemption;

(g) an explanation of how the exemption would be in the public interest;

(h) a detailed description of the alternative means by which the applicant will ensure a level of safety equivalent to that established by the regulation in question;

(i) A safety risk assessment carried out in respect of the exemption applied for;

(j) if the applicant handles international operations and seeks to operate under the proposed exemption, an indication whether the exemption would contravene any provision of the Standards and Recommended Practices of the International Civil Aviation Organization; and

(k) any other information that the Authority may require.

(3) Where the applicant seeks emergency processing of an application for exemption, the application shall contain supporting facts and reasons for not filing the application within the time specified in sub regulation (2) and satisfactory reason for deeming the application an emergency.

(4) The Authority may in writing, refuse an application made under sub regulation (3), where in the opinion of the Authority, the reasons given for emergency processing are not satisfactory.

(5) The application for exemption shall be accompanied by fee prescribed by the Authority.

91. Review and publication

(1) The Authority shall review the application for exemption made under regulation 52 for accuracy and compliance and if the application is satisfactory, the Authority shall publish a detailed summary of the application for comments, within a prescribed time, in either—

(a) The Kenya *Gazette* ; or

(b) aeronautical information circular; or

(c) daily newspaper with national circulation.

(2) Where application requirements have not been fully complied with, the Authority shall request the applicant in writing, to comply prior to publication or making a decision under sub regulation (3).

(3) If the request is for emergency relief, the Authority shall publish the decision as soon as possible after processing the application.

92. Evaluation of the request

(1) Where the application requirements have been satisfied, the Authority shall conduct an evaluation of the request to include—

(a) determination of whether an exemption would be in the public interest;

(b) a determination, after a technical evaluation of whether the applicant's proposal would provide a level of safety equivalent to that established by the regulation, although where the Authority decides that a technical evaluation of the request would impose a significant burden on the Authority's technical resources, the Authority may deny the exemption on that basis;

(c) a determination of whether a grant of the exemption would contravene these Regulations; and

(d) a recommendation based on the preceding elements, of whether the request should be granted or denied, and of any conditions or limitations that should be part of the exemption.

(2) The Authority shall notify the applicant in writing of, the decision to grant or deny the request and publish a detailed summary of its evaluation and decision.

(3) The summary referred to in subregulation (2) shall specify the duration of the exemption and any conditions or limitations of the exemption.

(4) If the exemption affects a significant population of the aviation community of the Kenya the Authority shall publish the summary in aeronautical information circular.

PART XVI – GENERAL PROVISIONS

93. Drug and alcohol testing and reporting

(1) Any person who performs any function prescribed by these Regulations directly or by contract under the provisions of these Regulations may be tested for drug or alcohol usage.

(2) A person who—

(a) refuses to submit to a test to indicate the percentage by weight of alcohol in the blood; or

(b) refuses to submit to a test to indicate the presence of narcotic drugs, marijuana, or depressant or stimulant drugs or substances in the body, when requested by a law enforcement officer or the Authority, or refuses to furnish or to authorise the release of the test results requested by the Authority shall—

(i) be denied any licence, certificate, rating, qualification, or authorisation issued under these Regulations for a period of up to one year from the date of that refusal; or

(ii) have their licence, certificate, rating, qualification, or authorisation issued under these Regulations suspended or revoked.

(3) Any person who is convicted for the violation of any local or national statute relating to the growing, processing, manufacture, sale, disposition, possession, transportation, or importation of narcotic drugs, marijuana, or depressant or stimulant drugs or substances, shall—

(a) be denied any license, certificate, rating, qualification, or authorisation issued under these Regulations for a period of up to one year after the date of conviction; or

(b) have their licence, certificate, rating, qualification, or authorisation issued under these Regulations suspended or revoked.

94. Change of Name

(1) An Air Navigation Services Provider holder of a certificate issued under these Regulations may apply to the Authority for—

(a) replacement of the certificate if lost or destroyed;

(b) change of name on the certificate; or

(c) an endorsement on the certificate.

(2) When applying under paragraph (1), the holder of a certificate shall submit to the Authority—

(a) the original certificate or a copy thereof in case of loss; and

(b) a court order, or other legal document verifying the name change.

(3) The Authority shall return to the holder of a certificate, with the appropriate changes applied for, if any, the originals specified under paragraph (2) and, where necessary, retain copies thereof.

95. Change of address

(1) A holder of a air navigation services provider certificate issued under these Regulations shall notify the Authority of the change in the physical and mailing address within fourteen days of such change.

(2) A person who does not notify the Authority of the change in the physical and mailing address within the time frame specified in subregulation (1) shall not exercise the privileges of the certificate.

96. Replacement of documents

A person may apply to the Authority in the prescribed form for replacement of documents issued under these Regulations if such documents are lost or destroyed.

97. Use and retention of documents and records

(1) A person shall not—

(a) use any certificate or exemption issued or required by or under these Regulations which has been forged, altered, cancelled, or suspended, or to which he is not entitled; or

(b) forge or alter any certificate or exemption issued or required by or under these Regulations; or

(c) lend any certificate or exemption issued or required by or under these Regulations to any other person; or

(d) make any false representation for the purpose of procuring for himself or any other person the grant, issue, renewal or variation of any such certificate or exemption;

(e) mutilate, alter, render illegible or destroy any records, or any entry made therein, required by or under these Regulations to be maintained, or knowingly make, or procure or assist in the making of, any false entry in any such record, or wilfully omit to make a material entry in such record.

(2) All records required to be maintained by or under these Regulations shall be recorded in a permanent and indelible material.

(3) A person shall not issue any certificate or exemption under these Regulations unless he is authorised to do so by the Authority.

(4) A person shall not issue any certificate referred to in subregulation (3) unless he has satisfied himself that all statements in the certificate are correct, and that the applicant is qualified to hold that certificate.

98. Reports of violation

(1) Any person who knows of a violation of the Act, or any Regulations, rules, or orders issued there under, shall report it to the Authority.

(2) The Authority may determine the nature and type of investigation or enforcement action that need to be taken.

99. Failure to comply with direction

Any person who fails to comply with any direction given to him by the Authority or by any authorised person under any provision of these Regulations shall be deemed for the purposes of these Regulations to have contravened that provision.

100. Aeronautical fees

(1) The Authority shall notify in writing the fees to be charged in connection with the issue, renewal or variation of any certificate, test, inspection or investigation required by, or for the purpose of these Regulations any orders, notices or proclamations made there under.

(2) Upon an application being made in connection with which any fee is chargeable in accordance with the provisions of subregulation (1), the applicant shall be required, before the application is accepted, to pay the fee so chargeable.

(3) If, after that payment has been made, the application is withdrawn by the applicant or otherwise ceases to have effect or is refused, the Authority shall not refund the payment made.

PART XVII – OFFENCES AND PENALTIES

101. Contravention of Regulations

A person who contravenes any provision of these Regulations may have his certificate or exemption cancelled or suspended.

102. Penalties

(1) A person who contravenes any provision of these Regulations, orders, notices or proclamations made there under shall, upon conviction, be liable to a fine not exceeding One million shillings or to imprisonment for a term not more than six months or both, and in the case of a continuing contravention, each day of the contravention shall constitute a separate offence.

(2) If it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these Regulations, orders, notices or proclamations made there under was due to any cause not avoidable by the exercise of reasonable care by that person, the act or omission shall be deemed not to be a contravention by that person of that provision.

103. Appeal

Where any person is aggrieved by any order made under these Regulations the person may, within twenty one days of such order being made, appeal against the order to a National Civil Aviation Administrative Review Tribunal established under the Act.

104. Transitional Provisions

For the purposes of this Part "prior regulations" means the regulations governing Communication Systems that were in force immediately before the coming into force of this Regulation; Except as otherwise provided this regulations applies to all Communication Systems within its scope, including prior Communication Systems.

FIRST SCHEDULE

[Regulation 22 (6)(d)]

1.1 Tables for Aeronautical Telecommunications Network (ATN) Mapping—

1.2. Table 1: Mapping of ATN communication priorities

Message categories	***ATN application***	***Corresponding protocol priority***	
		Transport layer priority	***Network layer priority***
Network/systems management		0	14
Distress communications		1	13
Urgent communications		2	12
High-priority flight safety messages	CPDLC, ADS-C	3	11
Normal-priority flight safety messages	AIDC, ATIS	4	10
Meteorological communications	METAR	5	9
Flight regularity communications	DLIC, ATSMHS	6	8
Aeronautical information services messages		7	7
Network/systems administration	DIR	8	6
Aeronautical administrative messages		9	5
<unassigned>		10	4
Urgent-priority administrative and U.N. Charter communications		11	3
High-priority administrative and State/Government communications		12	2
Normal-priority administrative communications		13	1
Low-priority administrative communications and aeronautical passenger communications		14	0

Note - The network layer priorities shown in the table apply only to connectionless network priority and do not apply to subnetwork priority

Note.— The network layer priorities shown in the table apply only to connectionless network priority and do not apply to sub-network priority.

1.3. Table 2. Mapping of ATN network priority to mobile sub-network priority

Message categories	***ATN network layer priority***	***AMSS***	**VDL Mode 2**	**VDL Mode 3**	**VDL Mode 4**	**SSR Mode S**	***HFDL***
Network/ systems management	14	14	see Note 1	3	14	high	14
Distress communications	13	14	see Note 1	2	13	high	14
Urgent communications	12	14	see Note 1	2	12	high	14
High-priority flight safety messages	11	11	see Note 1	2	11	high	11
Normal-priority flight safety messages	10	11	see Note 1	2	10	high	11
Meteorological communications	9	8	see Note 1	1	9	low	6
Flight regularity communications	8	7	see Note 1	1	8	low	7
Aeronautical information service messages	7	6	see Note 1	0	7	low	6
Network/ system administrative messages	6	5	see Note 1	0	6	low	5
Aeronautical administrative messages	5	5	not allowed	not allowed	not allowed	not allowed	
<unassigned>	4	unassigned	unassigned	unassigned	unassigned	unassigned	
Urgent-priority administrative and UN Charter communications	3	3	not allowed	not allowed	not allowed	not allowed	
High-priority administrative and State/	2	2	not allowed	not allowed	not allowed	not allowed	

Government communications						
Normal - priority administrative communications	1	1	not allowed	not allowed	not allowed	not allowed
Low - priority administrative communications and aeronautical passenger communications	0	0	not allowed	not allowed	not allowed	not allowed

Note 1. - VDL Mode 2 has no specific subnetwork priority mechanisms.
Note 2 - The AMSS SARPs specify mapping of message categories to subnetwork priority without capacity referencing network ATN layer priority.
Note 3 - The term "not allowed" means that only communications related to safety regularity of flight are authorized to pass over this subnetwork as defined in the subnetwork S.A.R.Ps.
Note 4. - Only those mobile subnetwork are listed for which subnetworks SARPs exist and for which explicit support is provided by the ATN boundary intermediate system (BIS) technical provisions.

SECOND SCHEDULE Regulation 49(a)

SSR MODE S AIR GROUND DATA LINK

1. MODE S CHARACTERISTICS

1.1 General provisions

Note 1.— Reference ISO document. When the term "ISO 8208" is referred to in this standard, it means the ISO Standard "Information technology — Data communications — X.25 Packet Layer Protocol for Data Terminal Equipment, Reference Number ISO/IEC 8208: 1990(E)".

Note 2.— The overall architecture of the Mode S sub-network is presented in the diagram on the following page.

Note 3.— The processing splits into three different paths. The first consists of the processing of switched virtual circuits (SVCs), the second consists of the processing of Mode S specific services, and the third consists of the processing of sub-network management information. SVCs utilize the reformatting process and the ADCE or GDCE function. Mode S specific services utilize the Mode S specific services entity (SSE) function.

1.1.1 *Message categories.* The Mode S subnetwork shall only carry aeronautical communications classified under categories of flight safety and flight regularity as specified in ANS Technical Standards, Part II, Volume II, Chapter 5, 5.1.8.4 and 5.1.8.6.

1.1.2 *Signals in space.* The signal-in-space characteristics of the Mode S subnetwork shall conform to the provisions contained in ANS Technical Standards, Part II, Volume IV, Chapter 3, 3.1.2.

1.1.3 *Code and byte independency.* The Mode S subnetwork shall be capable of code and byte independent transmission of digital data.

1.1.4 *Data transfer.* Data shall be conveyed over the Mode S data link in segments using either standard length message (SLM) protocols or extended length message (ELM) protocols as defined in 3.1.2.6.11 and 3.1.2.7 of ANS Technical Standards, Part II, Volume IV.

Note 1.— An SLM segment is the contents of one 56-bit MA or MB field. An ELM segment is the contents of one 80-bit MC or MD field.

Note 2.— An SLM frame is the contents of up to four linked MA or MB fields. An ELM frame is the contents of 2 to 16 MC or 1 to 16 MD fields.

1.1.5 *Bit numbering.* In the description of the data exchange fields, the bits shall be numbered in the order of their transmission, beginning with bit 1. Bit numbers shall continue through the second and higher segments of multi-segment frames. Unless otherwise Stated, numerical values encoded by groups (fields) of bits shall be encoded using positive binary notation and the first bit transmitted shall be the most significant bit (MSB) (3.1.2.3.1.3 of ANS Technical Standards, Part II, Volume IV).

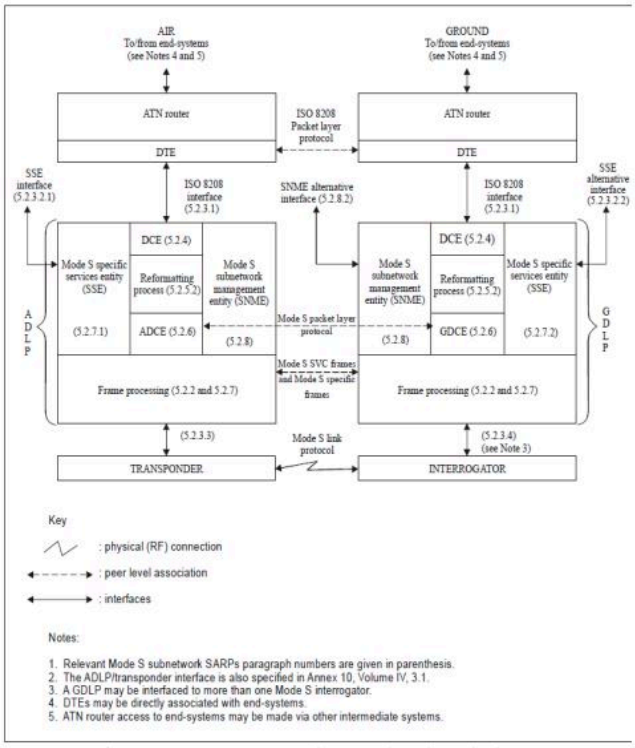
1.1.6 Unassigned bits. When the length of the data is not sufficient to occupy all bit positions within a message field or subfield, the unassigned bit positions shall be set to 0.

1.2. Frames

1.2.1 UPLINK FRAMES

1.2.1.1 *SLM frame.* An uplink SLM frame shall be composed of up to four selectively addressed Comm-A segments.

Functional elements of the Mode S subnetwork



Reference to ICAO Annex 10 and ANS Technical Standards, Part II

Note1 — Each Comm-A segment (MA field) received by the ADLP is accompanied by the first 32 bits of the interrogation that delivered the segment (3.1.2.10.5.2.1.1 of ANS Technical Standards, Part II, Volume IV). Within these 32 bits is the 16-bit special designator (SD) field (3.1.2.6.1.4 of ANS Technical Standards, Part II, Volume IV).

Note 2- In this figure the references

5.2.3.1 = 1.3.1

5.2.6 = 1.6

5.2.5.2 = 1.5.2

5.2.3.3 = 1.3.3

5.2.2 = 1.2

5.2.8.2 = 1.8.2.

1.2.1.1.1 *SD field*. When the designator identification (DI) field (bits 14-16) has a code value of 1 or 7, the special designator (SD) field (bits 17-32) of each Comm-A interrogation shall be used to obtain the interrogator identifier subfield (IIS, bits 17-20) and the linked Comm-A subfield (LAS, bits 30-32). The action to be taken shall depend on the value of LAS. The contents of LAS and IIS shall be retained and shall be associated with the Comm-A message segment for use in assembling the frame as indicated below. All fields other than the LAS field shall be as defined in the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

Note: The SD field structure is shown in Figure 5-1 in the Second Schedule to these Regulations.

1.2.1.1.2 *LAS coding*. The 3-bit LAS subfield shall be coded as follows:

LAS	**MEANING**
0	single segment
1	linked, 1st segment
2	linked, 2nd but not final segment
3	linked, 3rd but not final segment
4	linked, 4th and final segment
5	linked, 2nd and final segment
6	linked, 3rd and final segment
7	unassigned

1.2.1.1.3 Single segment SLM frame. If LAS = 0, the data in the MA field shall be considered a complete frame and shall be made available for further processing.

1.2.1.1.4 Multiple segment SLM frame. The ADLP shall accept and assemble linked 56-bit Comm-A segments associated with all sixteen possible interrogator identifier (II) codes. Correct linking of Comm-A segments shall be achieved by requiring that all Comm-A segments have the same value of IIS. If LAS = 1, through 6, the frame shall consist of two to four Comm-A segments as specified in the following paragraphs.

1.2.1.1.4.1 Initial segment. If LAS = 1, the MA field shall be assembled as the initial segment of an SLM frame. The initial segment shall be stored until all segments of the frame have been received or the frame is cancelled.

1.2.1.1.4.2 Intermediate segment. If LAS = 2 or 3, the MA field shall be assembled in numerical order as an intermediate segment of the SLM frame. It shall be associated with previous segments containing the same value of IIS.

1.2.1.1.4.3 Final segment. If LAS = 4, 5 or 6, the MA field shall be assembled as the final segment of the SLM frame. It shall be associated with previous segments containing the same value of IIS.

1.2.1.1.4.4 Frame completion. The frame shall be considered complete and shall be made available for further processing as soon as all segments of the frame have been received.

1.2.1.1.4.5 Frame cancellation. An incomplete SLM frame shall be cancelled if one or more of the following conditions apply:

a) a new initial segment (LAS = 1) is received with the same value of IIS. In this case, the new initial segment shall be retained as the initial segment of a new SLM frame;

b) the sequence of received LAS codes (after the elimination of duplicates) is not contained in the following list:

1)	LAS = 0
2)	LAS = 1,5
3)	LAS = 1,2,6
4)	LAS = 1,6,2
5)	LAS = 1,2,3,4
6)	LAS = 1,3,2,4
7	LAS = 1,2,4,3
8)	LAS = 1,3,4,2
9)	LAS = 1,4,2,3
10)	LAS = 1,4,3,2

c) Tc seconds have elapsed since the last Comm-A segment with the same value of IIS was received (Table 5-1).

1.2.1.1.4.6 Segment cancellation. A received segment for an SLM frame shall be discarded if it is an intermediate or final segment and no initial segment has been received with the same value of IIS.

1.2.1.1.4.7 *Segment duplication.* If a received segment duplicates a currently received segment number with the same value of IIS, the new segment shall replace the currently received segment.

Note.— The action of the Mode S subnetwork protocols may result in the duplicate delivery of Comm-A segments.

1.2.1.2 *ELM frame.* An uplink ELM frame shall consist of from 20 to 160 bytes and shall be transferred from the interrogator to the transponder using the protocol defined in the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations. The first 4 bits of each uplink ELM segment (MC field) shall contain the interrogator identifier (II) code of the Mode S interrogator transmitting the ELM. The ADLP shall check the II code of each segment of a completed uplink ELM. If all of the segments contain the same II code, the II code in each segment shall be deleted and the remaining message bits retained as user data for further processing. If all of the segments do not contain the same II code, the entire uplink ELM shall be discarded.

Note.— An uplink ELM frame consists of two to sixteen associated Comm-C segments, each of which contains the 4-bit II code. Therefore, the capacity for packet transfer is 19 to 152 bytes per uplink ELM frame.

1.2.2 DOWNLINK FRAMES

1.2.2.1 *SLM frame.* A downlink SLM frame shall be composed of up to 4 Comm-B segments. The MB field of the first Comm-B segment of the frame shall contain a 2-bit linked Comm-B subfield (LBS, bits 1 and 2 of the MB field).

This subfield shall be used to control linking of up to four Comm-B segments.

Note.— The LBS uses the first 2-bit positions in the first segment of a multi or single segment downlink SLM frame. Hence, 54 bits are available for Mode S packet data in the

first segment of a downlink SLM frame. The remaining segments of the downlink SLM frame, if any, have 56 bits available.

1.2.2.1.1 *LBS coding.* Linking shall be indicated by the coding of the LBS subfield of the MB field of the initial Comm-B segment of the SLM frame. The coding of LBS shall be as follows:

LBS	MEANING
0	single segment
1	initial segment of a two-segment SLM frame
2	initial segment of a three-segment SLM frame
3	initial segment of a four-segment SLM frame

1.2.2.1.2 *Linking protocol*

1.2.2.1.2.1 In the Comm-B protocol, the initial segment shall be transmitted using the air-initiated or multisitedirected protocols. The LBS field of the initial segment shall indicate to the ground the number of additional segments to be transferred (if any). Before the transmission of the initial segment to the transponder, the remaining segments of the SLM frame (if any) shall be transferred to the transponder for transmission to the interrogator using the ground-initiated Comm-B protocol. These segments shall be accompanied by control codes that cause the segments to be inserted in ground-initiated Comm-B registers 2, 3 or 4, associated respectively with the second, third, or fourth segment of the frame.

1.2.2.1.2.2 Close-out of the air-initiated segment that initiated the protocol shall not be performed until all segments have been successfully transferred.

Note.— The linking procedure including the use of the ground-initiated Comm-B protocol is performed by the ADLP.

1.2.2.1.3 Directing SLM frames. If the SLM frame is to be multisite-directed, the ADLP shall determine the II code of the Mode S interrogator or cluster of interrogators that shall receive the SLM frame.

1.2.2.2 ELM FRAME

Note.— A downlink ELM consists of one to sixteen associated Comm-D segments.

1.2.2.2.1 *Procedure*. Downlink ELM frames shall be used to deliver messages greater than or equal to 28 bytes and shall be formed using the protocol defined in the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

1.2.2.2.2 *Directing ELM frames.* If the ELM frame is to be multisite-directed, the ADLP shall determine the II code of the Mode S interrogator or cluster of interrogators that shall receive the ELM frame.

1.2.3 *XDLP frame processing.* Frame processing shall be performed on all Mode S packets (except for the MSP packet) as specified in 2.1.3 to 2.1.5. Frame processing for Mode S specific services shall be performed as specified in 1.7.

1.2.3.1 *Packet length.* All packets (including a group of packets multiplexed into a single frame) shall be transferred in a frame consisting of the smallest number of segments needed to accommodate the packet. The user data field shall be an integral multiple of bytes in length. A 4-bit parameter (LV) shall be provided in the Mode S DATA, CALL REQUEST, CALL ACCEPT, CLEAR REQUEST and INTERRUPT packet headers so that during unpacking no additional bytes are added to the user data field. The LV field shall define the number of full bytes used in the last segment of a frame. During LV calculations, the 4-bit II code

in the last segment of an uplink ELM message shall be (1) ignored for uplink ELM frames with an odd number of Comm-C segments and (2) counted for uplink ELM frames with an even number of Comm-C segments. The value contained in the LV field shall be ignored if the packet is multiplexed.

Note.— A specific length field is used to define the length of each element of a multiplexed packet. Therefore the LV field value is not used. LV field error handling is described in Tables 5-16 and 5-19.

1.2.3.2 *Multiplexing.* When multiplexing multiple Mode S packets into single SLM on ELM frame, the following procedures shall be used. Multiplexing of the packets within the ADLP shall not be applied to packets associated with SVCs of different priorities.

Note.— Multiplexing is not performed on MSP packets.

1.2.3.2.1 *Multiplexing optimization*

When multiple packets are awaiting transfer to the same XDLP, they shall be multiplexed into a single frame in order to optimize throughput, provided that packets associated with SVCs of different priorities are not multiplexed together.

1.2.3.2.2 *Structure.* The structure of the multiplexed packets shall be as follows:

HEADER:6 or 8	**LENGTH:8**	**1ST PACKET :v**	**LENGTH:8**	**2ND PACKET : v**

Note.— A number in the field signifies the field length in bits; "v" signifies that the field is of variable length.

1.2.3.2.2.1 *Multiplexing header*. The header for the multiplexed packets shall be as follows:

DP:1	**MP:1**	**SP:2**	**ST:2**	**FILL2:0 or 2**

Where,

Data packet type (DP) = 0

MSP packet type (MP) = 1

Supervisory packet (SP) = 3

Supervisory type (ST) = 2

1.2.3.2.2.2 *Length.* This field shall contain the length of the following packet in bytes. Any error detected in a multiplexed DATA packet, such as inconsistency between length as indicated in the LENGTH field and the length of the frame hosting that packet, shall result in the discarding of the packet unless the error can be determined to be limited to the LENGTH field, in which case a REJECT packet with the expected PS value can be sent.

1.2.3.2.2.2.1 For multiplex packets, if the entire packet cannot be de-multiplexed, then the first constituent packet shall be treated as a format error, and the remainder should be discarded.

1.2.3.2.2.3 *Termination.* The end of a frame containing a sequence of multiplexed packets shall be determined by one of the following events:

a) a length field of all zeros; or

b) less than eight bits left in the frame.

1.2.3.3 MODE S CHANNEL SEQUENCE PRESERVATION

1.2.3.3.1 *Application.* In the event that multiple Mode S frames from the same SVC are awaiting transfer to the same XDLP, the following procedure shall be used.

1.2.3.3.2 *Procedure*

1.2.3.3.2.1 *SLM frames.* SLM frames awaiting transfer shall be transmitted in the order received.

1.2.3.3.2.2 *ELM frames.* ELM frames awaiting transfer shall be transmitted in the order received.

1.2.4 GDLP FRAME PROCESSING

1.2.4.1 *GENERAL PROVISIONS*

1.2.4.1.1 The GDLP shall determine the data link capability of the ADLP/transponder installation from the data link capability report before performing any data link activity with that ADLP.

1.2.4.1.2 GDLP frame processing shall provide to the interrogator all data for the uplink transmission that are not provided directly by the interrogator.

1.2.4.2 *Delivery status.* GDLP frame processing shall accept an indication from the interrogator function that a specified uplink frame that was previously transferred to the interrogator has been successfully delivered over the ground-to air link.

1.2.4.3 *Aircraft address.* GDLP frame processing shall receive from the interrogator along with the data in each downlink SLM or ELM frame, the 24-bit address of the aircraft that transmitted the frame. GDLP frame processing shall be capable of transferring to the interrogator the 24-bit address of the aircraft that is to receive an uplink SLM or ELM frame.

1.2.4.4 *Mode S protocol type identification.* GDLP frame processing shall indicate to the interrogator the protocol to be used to transfer the frame: standard length message protocol, extended length message protocol or broadcast protocol.

1.2.4.5 *Frame determination.* A Mode S packet (including multiplexed packets but excluding MSP packets) intended for uplink and less than or equal to 28 bytes shall be sent as an SLM frame. A Mode S packet greater than 28 bytes shall be sent as an uplink ELM frame for transponders with ELM capability, using M-bit processing as necessary). If the transponder does not have ELM capability, packets greater than 28 bytes shall be sent using the M-bit or S-bit assembly procedures as necessary and multiple SLM frames.

Note.— The Mode S DATA, CALL REQUEST, CALL ACCEPT, CLEAR REQUEST and INTERRUPT packets are the only Mode S packets that use M-bit or S-bit sequencing.

1.2.5 ADLP FRAME PROCESSING

1.2.5.1 *General provisions.* With the possible exception of the last 24 bits (address/parity), ADLP frame processing shall accept from the transponder the entire content of both 56-bit and 112-bit received uplink transmissions, excluding all call and ACAS interrogations. ADLP frame processing shall provide to the transponder all data for the downlink transmission that is not provided directly by the transponder.

1.2.5.2 *Delivery status.* ADLP frame processing shall accept an indication from the transponder that a specified downlink frame that was previously transferred to the transponder has been closed out.

1.2.5.3 *Interrogator identifier.* ADLP frame processing shall accept from the transponder, along with the data in each uplink SLM and ELM, the interrogator identifier (II) code of the interrogator that transmitted the frame. ADLP frame processing shall transfer to the transponder the II code of the interrogator or cluster of interrogators that shall receive a multisite-directed frame.

1.2.5.4 *Mode S protocol type identification.* ADLP frame processing shall indicate to the transponder the protocol to be used to transfer the frame: ground-initiated, air-initiated, broadcast, multisite-directed, standard length or extended length.

1.2.5.5 *Frame cancellation.* ADLP frame processing shall be capable of cancelling downlink frames previously transferred to the transponder for transmission but for which a

close-out has not been indicated. If more than one frame is stored within the transponder, the cancellation procedure shall be capable of cancelling the stored frames selectively.

1.2.5.6 *Frame determination.* A Mode S packet (including multiplexed packets but excluding MSP packets) intended for downlink and less than or equal to 222 bits shall be sent as an SLM frame. A Mode S packet greater than 222 bits shall be sent as a downlink ELM frame for transponders with ELM capability using M- bit processing as necessary. When M-bit processing is used, all ELM frames containing M = 1 shall contain the maximum number of ELM segments that the transponder is capable of transmitting in response to one requesting interrogation (UF = 24). If the transponder does not have ELM capability, packets greater than 222 bits shall be sent using the M-bit or S-bit assembly procedures and multiple SLM frames.

1.2.6 PRIORITY MANAGEMENT

1.2.6.1 ADLP priority management. Frames shall be transferred from the ADLP to the transponder in the following order of priority (highest first):

a) Mode S specific services;

b) search requests;

c) frames containing only high priority SVC packets; and

d) frames containing only low priority SVC packets.

1.2.6.2 GDLP PRIORITY MANAGEMENT

Uplink frames shall be transferred in the following order of priority (highest first):

a) Mode S specific services;

b) frames containing at least one Mode S ROUTE packet;

c) frames containing at least one high priority SVC packet; and

d) frames containing only low priority SVC packets.

1.3 Data exchange interfaces

1.3.1 THE DTE ISO 8208 INTERFACE

1.3.1.1 General provisions. The interface between the XDLP and the DTE(s) shall conform to ISO 8208 packet layer protocol (PLP). The XDLP shall support the procedures of the DTE as specified in ISO 8208. As such, the XDLP shall contain a DCE.

1.3.1.2 Physical and link layer requirements for the DTE/DCE interface. The requirements are:

(a) the interface shall be code and byte independent and shall not impose restrictions on the sequence, order, or pattern of the bits transferred within a packet; and

(b) the interface shall support the transfer of variable length network layer packets.

1.3.1.3 DTE ADDRESS

1.3.1.3.1 Ground DTE address. The ground DTE address shall have a total length of 3 binary coded decimal (BCD) digits, as follows:

X0X1X2

X0 shall be the most significant digit. Ground DTE addresses shall be decimal numbers in the range of 0 through 255 coded in BCD. Assignment of the DTE address shall be a local issue. All DTEs connected to GDLPs having overlapping coverage shall have unique addresses. GDLPs which have a flying time less than Tr (Table 5-1) between their coverage areas shall be regarded as having overlapping coverage.

1.3.1.3.2 Mobile DTE address. The mobile DTE address shall have a total length of 10 BCD digits, as follows:

X0X1X2X3X4X5X6X7X8X9

X0 shall be the most significant digit. The digits X0 to X7 shall contain the octal representation of the aircraft address coded in BCD. The digits X8X9 shall identify a sub--address for specific DTEs on board an aircraft. This sub-address shall be a decimal number in the range of 0 and 15 coded in BCD. The following sub-address assignments shall be used:

00 ATN router

01 to 15 Unassigned

1.3.1.3.3 Illegal DTE addresses. DTE addresses outside of the defined ranges or not conforming to the formats for the ground and mobile DTE addresses specified in 1.3.1.3.1 and 1.3.1.3.2 shall be defined to be illegal DTE addresses. The detection of an illegal DTE address in a CALL REQUEST packet shall lead to a rejection of the call as specified in 1.5.1.5.

1.3.1.3.4 PACKET LAYER PROTOCOL REQUIREMENTS OF THE DTE/DCE INTERFACE

1.3.1.4.1 Capabilities. The interface between the DTE and the DCE shall conform to ISO 8208 with the following capabilities:

(a) expedited data delivery, i.e. the use of INTERRUPT packets with a user data field of up to 32 bytes;

(b) priority facility (with two levels;

(c) fast select; and

(d) Called/calling address extension facility, if required by local conditions (i.e. the XDLP is connected to the DTE via a network protocol that is unable to contain the Mode S address as defined). Other ISO 8208 facilities and the D-bit and the Q-bit shall not be invoked for transfer over the Mode S packet layer protocol.

1.3.1.4.2 Parameter values. The timer and counter parameters for the DTE/DCE interface shall conform to the default ISO 8208 values.

1.3.2 MODE S SPECIFIC SERVICES INTERFACE

Note.— Mode S specific services consist of the broadcast Comm-A and Comm- B, GICB and MSP.

1.3.1.1 ADLP

1.3.1.1.1 General provisions. The ADLP shall support the accessing of Mode S specific services through the provision of one or more separate ADLP interfaces for this purpose.

1.3.1.1.2 Functional capability. Message and control coding via this interface shall support all of the capabilities specified in 1.7.1.

1.3.1.2 GDLP

1.3.1.2.1 General provisions. The GDLP shall support the accessing of Mode S specific services through the provision of a separate GDLP interface for this purpose and/or by providing access to these services through the DTE/DCE interface.

1.3.1.2.2 Functional capability. Message and control coding via this interface shall support all of the capabilities specified in 1.7.2.

1.3.2 ADLP/TRANSPONDER INTERFACE

1.3.2.1 TRANSPONDER TO ADLP

1.3.2.1.1 The ADLP shall accept an indication of protocol type from the transponder in connection with data transferred from the transponder to the ADLP. This shall include the following types of protocols:

(a) surveillance interrogation;

(b) Comm-A interrogation;

(c) Comm-A broadcast interrogation; and

(d) uplink ELM.

The ADLP shall also accept the II code of the interrogator used to transmit the surveillance, Comm-A or uplink ELM.

Note.— Transponders will not output all-call and ACAS information on this interface.

1.3.2.1.2 The ADLP shall accept control information from the transponder indicating the status of downlink transfers. This shall include:

(a) Comm-B close-out;

(b) Comm-B broadcast timeout; and

(c) downlink ELM close-out.

1.3.2.1.3 The ADLP shall have access to current information defining the communication capability of the Mode S transponder with which it is operating. This information shall be used to generate the data link capability report.

1.3.2.2 ADLP TO TRANSPONDER

1.3.2.2.1 The ADLP shall provide an indication of protocol type to the transponder in connection with data transferred from the ADLP to the transponder. This shall include the following types of protocols:

(a) ground-initiated Comm-B;

(b) air-initiated Comm-B;

(c) multisite-directed Comm-B;

(d) Comm-B broadcast;

(e) downlink ELM; and

(f) multisite-directed downlink ELM.

The ADLP shall also provide the II code for transfer of a multisite-directed Comm-B or downlink ELM and the Comm-B data selector (BDS) code (3.1.2.6.11.2 of Manual of ANS standards Part II , Volume IV) for a ground-initiated Comm-B.

1.3.2.2.2 The ADLP shall be able to perform frame cancellation as specified in 1.2.5.5.

1.3.3 GDLP/MODE S INTERROGATOR INTERFACE

1.3.3.1 INTERROGATOR TO GDLP

1.3.3.1.1 The GDLP shall accept an indication of protocol type from the interrogator in connection with data transferred from the interrogator to the GDLP. This shall include the following types of protocols:

(a) ground-initiated Comm-B;

(b) air-initiated Comm-B;

(c) air-initiated Comm-B broadcast; and

(d) downlink ELM.

The GDLP shall also accept the BDS code used to identify the ground-initiated Comm--B segment.

1.3.3.1.2 The GDLP shall accept control information from the interrogator indicating the status of uplink transfers and the status of the addressed Mode S aircraft.

1.3.3.2 GDLP to interrogator. The GDLP shall provide an indication of protocol type to the interrogator in connection with data transferred from the GDLP to the interrogator. This shall include the following types of protocols:

(a) Comm-A interrogation;

(b) Comm-A broadcast interrogation;

(c) uplink ELM; and

(d) ground-initiated Comm-B request.

The GDLP shall also provide the BDS code for the ground-initiated Comm-B protocol.

1.4 DCE operation

Note.— The DCE process within the XDLP acts as a peer process to the DTE. The DCE supports the operations of the DTE with the capability specified in 1.3.1.4 . The following requirements do not specify format definitions and flow control on the DTE/DCE interface. The specifications and definitions in ISO 8208 apply for these cases.

1.4.1 State transitions. The DCE shall operate as a State machine. Upon entering a State, the DCE shall perform the actions specified in Table 5-2. State transitions and additional action(s) shall be as specified in Table 5-3 through Table 5-12.

Note.— The next State transition (if any) that occurs when the DCE receives a packet from the DTE is specified by Table 5-3 through Table 5-8. These tables are organized according to the hierarchy illustrated in Figure 5-2. The same transitions are defined in Table 5-9 through Table 5-12 when the DCE receives a packet from the XDCE (via the reformatting process).

1.4.2 5.2.4.2 DISPOSITION OF PACKETS

1.4.2.1 Upon receipt of a packet from the DTE, the packet shall be forwarded or not forwarded to the XDCE (via the reformatting process) according to the parenthetical instructions contained in Tables 5-3 to 5-8. If no parenthetical instruction is listed or if the parenthetical instruction indicates "do not forward", the packet shall be discarded.

1.4.2.2 Upon receipt of a packet from the XDCE (via the reformatting process), the packet shall be forwarded or not forwarded to the DTE according to the parenthetical instructions contained in Tables 5-9 to 5-12. If no parenthetical instruction is listed or if the parenthetical instruction indicates "do not forward", the packet shall be discarded.

1.5 Mode S packet layer processing

1.5.1 GENERAL REQUIREMENTS

1.5.1.1 BUFFER REQUIREMENTS

1.5.1.1.1 ADLP buffer requirements

1.5.1.1.1.1 The following requirements apply to the entire ADLP and shall be interpreted as necessary for each of the main processes (DCE, reformatting, ADCE, frame processing and SSE).

1.5.1.1.1.2 The ADLP shall be capable of maintaining sufficient buffer space for fifteen SVCs:

(a) maintain sufficient buffer space to hold fifteen Mode S subnetwork packets of 152 bytes each in the uplink direction per SVC for a transponder with uplink ELM capability or 28 bytes otherwise;

(b) maintain sufficient buffer space to hold fifteen Mode S subnetwork packets of 160 bytes each in the downlink direction per SVC for a transponder with downlink ELM capability or 28 bytes otherwise;

(c) maintain sufficient buffer space for two Mode S subnetwork INTERRUPT packets of 35 bytes each (user data field plus control information), one in each direction, for each SVC;

(d) maintain sufficient resequencing buffer space for storing thirty-one Mode S subnetwork packets of 152 bytes each in the uplink direction per SVC for a transponder with uplink ELM capability or 28 bytes otherwise; and

(e) maintain sufficient buffer space for the temporary storage of at least one Mode S packet of 160 bytes undergoing M-bit or S-bit processing in each direction per SVC.

(f) 2.2.1.1.1.3 The ADLP shall be capable of maintaining a buffer of 1 600 bytes in each direction to be shared among all MSPs.

1.5.1.1.1.3 *GDLP buffer requirements*

1.5.1.1.2.1 The GDLP shall be capable of maintaining sufficient buffer space for an average of 4 SVCs for each Mode S aircraft in the coverage area of the interrogators connected to it, assuming all aircraft have ELM capability.

1.5.1.2 CHANNEL NUMBER POOLS

1.5.1.2.1 The XDLP shall maintain several SVC channel number pools; the DTE/DCE (ISO 8208) interface uses one set. Its organization, structure and use shall be as defined in the ISO 8208 standard. The other channel pools shall be used on the ADCE/GDCE interface.

1.5.1.2.2 The GDLP shall manage a pool of temporary channel numbers in the range of 1 to 3, for each ground DTE/ADLP pair. Mode S CALL REQUEST packets generated by the GDLP shall contain the ground DTE address and a temporary channel number allocated from the pool of that ground DTE. The GDLP shall not reuse a temporary channel number allocated to an SVC that is still in the CALL REQUEST State.

Note 1.— The use of temporary channel numbers allows the GDLP to have up to three call requests in process at the same time for a particular ground DTE and ADLP combination. It also allows the GDLP or ADLP to clear a channel before the permanent channel number is assigned.

Note 2.— The ADLP may be in contact with multiple ground DTEs at any one time. All the ground DTEs use temporary channel numbers ranging from 1 to 3.

1.5.1.2.3 The ADLP shall use the ground DTE address to distinguish the temporary channel numbers used by the various ground DTEs. The ADLP shall assign a permanent channel number (in the range of 1 to 15) to all SVCs and shall inform the GDLP of the assigned number by including it in the Mode S CALL REQUEST by ADLP or Mode S CALL ACCEPT by ADLP packets. The temporary channel number shall be included in the Mode S CALL ACCEPT by ADLP together with the permanent channel number in order to define the association of these channel numbers. The ADLP shall continue to associate the temporary channel number with the permanent channel number of an SVC until the SVC is returned to the READY (p1) State, or else, while in the DATA TRANSFER (p4) State, a Mode S CALL REQUEST by GDLP packet is received bearing the same temporary channel number. A non-zero permanent channel number in the Mode S CLEAR REQUEST by ADLP, CLEAR REQUEST by GDLP, CLEAR CONFIRMATION by ADLP or CLEAR CONFIRMATION by GDLP packet shall indicate that the permanent channel number shall be used and the temporary channel number shall be ignored. In the event that an XDLP is required to send one of these packets in the absence of a permanent channel number, the permanent channel number shall be set to zero, which shall indicate to the peer XDLP that the temporary channel number is to be used.

1.5.1.2.4 The channel number used by the DTE/DCE interface and that used by the ADCE/GDCE interface shall be assigned independently. The reformatting process shall maintain an association table between the DTE/DCE and the ADCE/GDCE channel numbers.

1.5.1.3 Receive ready and receive not ready conditions. The ISO 8208 interface and the ADCE/GDCE interface management procedures shall be independent operations since each system must be able to respond to separate receive ready and receive not ready indications.

1.5.1.4 *PROCESSING OF M-BIT AND S-BIT SEQUENCE*

Note.— M-bit processing applies to the sequencing of the DATA packet. S-bit processing applies to the sequencing of Mode S CALL REQUEST, CALL ACCEPT, CLEAR REQUEST and INTERRUPT packets.

1.5.1.4.1 M-bit processing

Note.— The packet size used on the DTE/DCE interface can be different from that used on the ADCE/GDCE interface.

1.5.1.4.1.1 M-bit processing shall be used when DATA packets are reformatted. M-bit processing shall utilize the specifications contained in the ISO 8208 standard. The M-bit sequence processing shall apply on a per channel basis.

The M-bit set to 1 shall indicate that a user data field continues in the subsequent DATA packet. Subsequent packets in an M-bit sequence shall use the same header format (i.e. the packet format excluding the user data field).

1.5.1.4.1.2 If the packet size for the XDCE interface is larger than that used on the DTE/DCE interface, packets shall be combined to the extent possible as dictated by the M--bit, when transmitting a Mode S DATA packet. If the packet size is smaller on the XDCE interface than that defined on the DTE/DCE interface, packets shall be fragmented to fit into the smaller Mode S packet using M-bit assembly.

1.5.1.4.1.3 A packet shall be combined with subsequent packets if the packet is filled and more packets exist in the M-bit sequence (M-bit = 1). A packet smaller than the maximum packet size defined for this SVC (partial packet) shall only be allowed when the M-bit indicates the end of an M-bit sequence. A received packet smaller than the maximum packet size with M-bit equal to 1 shall cause a reset to be generated as specified in ISO 8208 and the remainder of the sequence should be discarded.

1.5.1.4.1.4 In order to decrease delivery delay, reformatting shall be performed on the partial receipt of an M-bit sequence, rather than delay reformatting until the complete M--bit sequence is received.

1.5.1.4.2 *S-bit processing.* S-bit processing shall apply only to Mode S CALL REQUEST, CALL ACCEPT, CLEAR REQUEST and INTERRUPT packets. This processing shall be performed as specified for M-bit processing (2.2.1.4.1) except that the packets associated with any S-bit sequence whose reassembly is not completed in Tq seconds (Tables 2.2--1 and 2.2-13) shall be discarded and receipt of a packet shorter than the maximum packet size with S = 1 shall cause the entire S-bit sequence to be treated as a format error in accordance with Table 2.2-16.

1.5.1.5 *MODE S SUBNETWORK ERROR PROCESSING FOR ISO 8208 PACKETS*

1.5.1.5.1 *D-bit*. If the XDLP receives a DATA packet with the D-bit set to 1, the XDLP shall send a RESET REQUEST packet to the originating DTE containing a cause code (CC) = 133 and a diagnostic code (DC) = 166. If the D-bit is set to 1 in a CALL REQUEST packet, the D-bit shall be ignored by the XDLP. The D-bit of the corresponding CALL ACCEPT packet shall always be set to 0. The use of CC is optional.

1.5.1.5.2 *Q-bit.* If the XDLP receives a DATA packet with the Q-bit set to 1, the XDLP shall send a RESET REQUEST packet to the originating DTE containing CC = 133 and DC = 83. The use of CC is optional.

1.5.1.5.3 *Invalid priority*. If the XDLP receives a call request with a connection priority value equal to 2 through 254, the XDLP shall clear the virtual circuit using DC = 66 and CC = 131. The use of CC is optional.

1.5.1.5.4 *Unsupported facility.* If the XDLP receives a call request with a request for a facility that it cannot support, the XDLP shall clear the virtual circuit using DC = 65 and C = 131. The use of CC is optional.

1.5.1.5.5 *Illegal calling DTE address.* If the XDLP receives a call request with an illegal calling DTE address, the XDLP shall clear the virtual circuit using DC = 68 and CC = 141. The use of CC is optional.

1.5.1.5.6 *Illegal called DTE address.* If the XDLP receives a call request with an illegal called DTE address, the XDLP shall clear the virtual circuit using DC = 67 and CC = 141. The use of CC is optional.

1.5.2 REFORMATTING PROCESS

Note.— The reformatting process is divided into two subprocesses: uplink formatting and downlink formatting. For the ADLP, the uplink process reformats Mode S packets into ISO 8208 packets and the downlink process reformats ISO 8208 packets into Mode S packets. For the GDLP, the uplink process reformats ISO 8208 packets into Mode S packets and the downlink process reformats Mode S packets into ISO 8208 packets.

1.5.1.1 *CALL REQUEST BY ADLP*

1.5.1.1.1 *Translation into Mode S packets*

1.5.1.1.1.1 *Translated packet format*. Reception by the ADLP reformatting process of an ISO 8208 CALL REQUEST packet from the local DCE shall result in the generation of corresponding Mode S CALL REQUEST by ADLP packet(s) (as determined by S-bit processing (2.2.1.4.2)) as follows:

DP:1	MP:1	SP:2	ST:2	FILL2:0 or 2	P:1	FILL:1	SN:6	CH:4	AM:4	AG:8	S:1	FS:2	F:1	LV:4	UD:v

1.5.1.1.1.2 Data packet type (DP). This field shall be set to 0.

1.5.1.1.1.3 MSP packet type (MP). This field shall be set to 1.

1.5.1.1.1.4 Supervisory packet (SP). This field shall be set to 1.

1.5.1.1.1.5 Supervisory type (ST). This field shall be set to 0.

1.5.1.1.1.6 *Priority (P).* This field shall be set to 0 for a low priority SVC and to 1 for a high priority SVC. The value for this field shall be obtained from the data transfer field of the priority facility of the ISO 8208 packet, and shall be set to 0 if the ISO 8208 packet does not contain the priority facility or if a priority of 255 is specified. The other fields of the priority facility shall be ignored.

1.5.1.1.1.7 *Sequence number (SN).* For a particular SVC, each packet shall benumbered

1.5.1.1.1.8 *Channel number (CH).* The channel number shall be chosen from the pool of SVC channel numbers available to the ADLP. The pool shall consist of 15 values from 1 through 15. The highest available channel number shall be chosen from the pool. An available channel shall be defined as one in State p1 The correspondence between the channel number used by the Mode S subnetwork and the number used by the DTE/DCE interface shall be maintained while the channel is active.

1.5.1.1.1.9 *Address, mobile (AM).* This address shall be the mobile DTE sub-address in the range of 0 to 15. The address shall be extracted from the two least significant digits of the calling DTE address contained in the ISO 8208 packet and converted to binary representation.

1.5.1.1.1.10 *Address, ground (AG).* This address shall be the ground DTE address in the range of 0 to 255. The address shall be extracted from the called DTE address contained in the ISO 8208 packet and converted to binary representation.

1.5.1.1.1.11 *Fill field.* The fill field shall be used to align subsequent data fields on byte boundaries. When indicated as "FILL:n", the fill field shall be set to a length of "n" bits. When indicated as "FILL1: 0 or 6", the fill field shall be set to a length of 6 bits for a non-multiplexed packet in a downlink SLM frame and 0 bit for all other cases. When indicated as "FILL2: 0 or 2", the fill field shall be set to a length of 0 bit for a non-multiplexed packet in adownlink SLM frame or for a multiplexing header and 2 bits for all other cases.

1.5.1.1.1.12 *S field (S).* A value of 1 shall indicate that the packet is part of an S-bit sequence with more packets in the sequence to follow. A value of 0 shall indicate that the sequence ends with this packet. This field shall be set as specified in 2.2.1.4.2.

1.5.1.1.1.13 *FS field (FS).* A value of 0 shall indicate that the packet does not contain fast select data. A value of 2 or 3 shall indicate that the packet contains fast select data. A value of 2 shall indicate normal fast select operation. A value of 3 shall indicate fast select with restricted response. An FS value of 1 shall be undefined.

1.5.1.1.1.14 *First packet flag (F).* This field shall be set to 0 in the first packet of an S-bit sequence and in a packet that is not part of an S-bit sequence. Otherwise it shall be set to 1.

1.5.1.1.1.15 *User data length (LV).* This field shall indicate the number of full bytes used in the last SLM or ELM segment.

1.5.1.1.1.16 *User data field (UD).* This field shall only be present if optional CALL REQUEST user data (maximum 16 bytes) or fast select user data (maximum 128 bytes) is contained in the ISO 8208 packet. The user data field shall be transferred from ISO 8208 packet unchanged using S-bit processing as specified in 2.2.1.4.2.

1.5.1.1.2 *Translation into ISO 8208 packets*

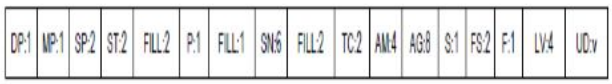
1.5.1.1.2.1 *Translation.* Reception by the GDLP reformatting process of a Mode S CALL REQUEST by ADLP packet (or an S-bit sequence of packets) from the GDCE shall result in the generation of a corresponding ISO 8208 CALL REQUEST packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.1.1 with the exceptions as specified in 2.2.2.1.2.2.

1.5.1.1.2.2 *Called DTE, calling DTE address and length fields*. The calling DTE address shall be composed of the aircraft address and the value contained in the AM field of the Mode S packet, converted to BCD. The called DTE address shall be the ground DTE address contained in the AG field of the Mode S packet, converted to BCD. The length field shall be as defined in ISO 8208.

1.5.1.2 *CALL REQUEST BY GDLP*

1.5.1.2.1 *Translation into Mode S packets*

1.5.1.2.1.1 *General*. Reception by the GDLP reformatting process of an ISO 8208 CALL REQUEST packet from the local DCE shall result in the generation of corresponding Mode S CALL REQUEST by GDLP packet(s) (as determined by S-bit processing (2.2.1.4.2)) as follows:



Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1.

1.5.1.2.1.2 Data packet type (DP). This field shall be set to 0.

1.5.1.2.1.3 MSP packet type (MP). This field shall be set to 1.

1.5.1.2.1.4 Supervisory packet (SP). This field shall be set to 1.

1.5.1.2.1.5 Supervisory type (ST). This field shall be set to 0.

1.5.1.2.1.6 *Temporary channel number field (TC)* This field shall be used to distinguish multiple call requests from a GDLP. The ADLP reformatting process, upon receipt of a temporary channel number, shall assign a channel number from those presently in the READY State, p1.

1.5.1.2.1.7 *Address, ground (AG)*. This address shall be the ground DTE address (in the range of 0 to 255. The address shall be extracted from the calling DTE address contained in the ISO 8208 packet and converted to binary representation.

1.5.1.2.1.8 *Address, mobile (AM)*. This address shall be the mobile DTE sub-address in the range of 0 to 15. The address shall be extracted from the two least significant digits of the called DTE address contained in the ISO 8208 packet and converted to binary representation.

1.5.1.2.2 *Translation into ISO 8208 packets*

1.5.1.2.2.1 *Translation*. Reception by the ADLP reformatting process of a Mode S CALL REQUEST by GDLP packet (or an S-bit sequence of packets) from the ADCE shall result in the generation of a corresponding ISO 8208 CALL REQUEST packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.2.1 with the exceptions as specified in 2.2.2.2.2.2.

1.5.1.2.2.2 *Called DTE, calling DTE address and length fields*. The called DTE address shall be composed of the aircraft address and the value contained in the AM field of the Mode S packet, converted to BCD. The calling DTE address shall be the ground DTE address contained in the AG field of the Mode S packet, converted to BCD. The length field shall be as defined in ISO 8208.

1.5.1.3 *CALL ACCEPT BY ADLP*

1.5.1.3.1 *Translation into Mode S packets*

1.5.1.3.1.1 *Translated packet format*. Reception by the ADLP reformatting process of an ISO 8208 CALL ACCEPT packet from the local DCE shall result in the generation of corresponding Mode S CALL ACCEPT by ADLP packet(s) (as determined by S-bit processing (2.2.1.4.2)) as follows:

DP:1 MP:1 SP:2 ST:2 FILL:2 TC:2 SN:6 CH:4 AM:4 AG:8 S:1 FILL:2 T:1 LV:4 UD:v
or 2

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1.

1.5.1.3.1.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.1.3.1.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.1.3.1.4 *Supervisory packet (SP)*. This field shall be set to 1.

1.5.1.3.1.5 *Supervisory type (ST)*. This field shall be set to 1.

1.5.1.3.1.6 *Temporary channel number (TC)*. The TC value in the originating Mode S CALL REQUEST by GDLP packet shall be returned to the GDLP along with the channel number (CH) assigned by the ADLP.

1.5.1.3.1.7 *Channel number (CH).* The field shall be set equal to the channel number assigned by the ADLP as determined during the CALL REQUEST procedures for the Mode S connection.

1.5.1.3.1.8 *Address, mobile and address, ground.* The AM and AG values in the originating Mode S CALL REQUEST by GDLP packet shall be returned in these fields. When present, DTE addresses in the ISO 8208 CALL ACCEPT packet shall be ignored.

1.5.1.3.2 *Translation into ISO 8208 packets*

1.5.1.3.2.1 *Translation*. Reception by the GDLP reformatting process of a Mode S CALL ACCEPT by ADLP packet (or an S-bit sequence of packets) from the GDCE shall result

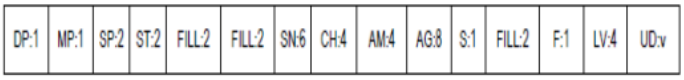
in the generation of a corresponding ISO 8208 CALL ACCEPT packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.3.1 with the exceptions as specified in 2.2.2.3.2.2.

1.5.1.3.2.2 *Called DTE, calling DTE address and length fields*. Where present, the called DTE address shall be composed of the aircraft address and the value contained in the AM field of the Mode S packet, converted to BCD. Where present, the calling DTE address shall be the ground DTE address contained in the AG field of the Mode S packet, converted to BCD. The length field shall be as defined in ISO 8208.

1.5.1.4 *CALL ACCEPT BY GDLP*

1.5.1.4.1 *Translation into Mode S packets*

1.5.1.4.1.1 *Translated packet format*. Reception by the GDLP reformatting process of an ISO 8208 CALL ACCEPT packet from the local DCE shall result in the generation of corresponding Mode S CALL ACCEPT by GDLP packet(s) (as determined by S-bit processing (2.2.1.4.2)) as follows:



Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1.

1.5.1.4.1.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.1.4.1.3 *MSP packet type (MP*). This field shall be set to 1.

1.5.1.4.1.4 *Supervisory packet (SP).* This field shall be set to 1.

1.5.1.4.1.5 *Supervisory type (ST).* This field shall be set to 1.

1.5.1.4.1.6 *Address, mobile and address, ground.* The AM and AG values in the originating Mode S CALL REQUEST by ADLP packet shall be returned in these fields. When present, DTE addresses in the ISO 8208 CALL ACCEPT packet shall be ignored.

1.5.1.4.2 *Translation into ISO 8208 packets*

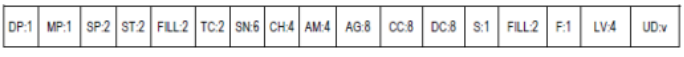
1.5.1.4.2.1 *Translation.* Reception by the ADLP reformatting process of a Mode S CALL ACCEPT by GDLP packet (or an S-bit sequence of packets) from the ADCE shall result in the generation of a corresponding ISO 8208 CALL ACCEPT packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.4.1 with the exceptions as specified in 2.2.4.2.2.

1.5.1.4.2.2 *Called DTE, calling DTE address and length fields.* Where present, the calling DTE address shall be composed of the aircraft address and the value contained in the AM field of the Mode S packet, converted to BCD. Where present, the called DTE address shall be the ground DTE address contained in the AG field of the Mode S packet, converted to BCD. The length field shall be as defined in ISO 8208.

1.5.1.5 *CLEAR REQUEST BY ADLP*

1.5.1.5.1 *Translation into Mode S packets*

1.5.1.5.1.1 *Translated packet format.* Reception by the ADLP reformatting process of an ISO 8208 CLEAR REQUEST packet from the local DCE shall result in the generation of a corresponding Mode S CLEAR REQUEST by ADLP packet(s) (as determined by S--bit processing (2.2.1.4.2)) as follows:



1.5.1.5.1.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.1.5.1.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.1.5.1.4 *Supervisory packet (SP).* This field shall be set to 1.

1.5.1.5.1.5 *Channel number (CH)*: If a channel number has been allocated during the call acceptance phase, then CH shall be set to that value, otherwise it shall be set to zero.

1.5.1.5.1.6 *Temporary channel (TC)*: If a channel number has been allocated during the call acceptance phase, then TC shall be set to zero, otherwise it shall be set to the value used in the CALL REQUEST by GDLP.

1.5.1.5.1.7 *Supervisory type (ST).* This field shall be set to 2.

1.5.1.5.1.8 *Address, ground or address, mobile.* The AG and AM values in the originating Mode S CALL REQUEST by ADLP or CALL REQUEST by GDLP packets shall be returned in these fields. When present, DTE addresses in the ISO 8208 CLEAR REQUEST packet shall be ignored.

1.5.1.5.1.9 *Clearing cause (CC) and diagnostic code (DC) fields*. These fields shall be transferred without modification from the ISO 8208 packet to the Mode S packet when the DTE has initiated the clear procedure. If the XDLP has initiated the clear procedure, the clearing cause field and diagnostic field shall be as defined in the State tables for the DCE and XDCE -The coding and definition of these fields shall be as specified in ISO 8208.

1.5.1.5.2 *Translation into ISO 8208 packets*

1.5.1.5.2.1 *Translation*. Reception by the GDLP reformatting process of a Mode S CLEAR REQUEST by ADLP packet (or an S-bit sequence of packets) from he local GDCE shall result in the generation of a corresponding ISO 8208 CLEAR REQUEST packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.5.1 with the exceptions specified in 2.2.2.5.2.2 and 2.2.2.5.2.3 .

1.5.1.5.2.2 *Called DTE, calling DTE and length fields*. These fields shall be omitted in the ISO 8208 CLEAR REQUEST packet.

1.5.1.5.2.3 *Clearing cause field*. This field shall be set taking account of 2.3.3.3.

1.5.1.6 *CLEAR REQUEST BY GDLP*

1.5.1.6.1 *Translation into Mode S packets*

1.5.1.6.1.1 *Translated packet format*. Reception by the GDLP reformatting process of an ISO 8208 CLEAR REQUEST packet from the local DCE shall result in the generation of corresponding Mode S CLEAR REQUEST by GDLP packet(s) (as determined by S-bit processing (2.2.1.4.2)) as follows:

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1, 2.2.2.2 and 2.2.2.5.

1.5.1.6.1.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.1.6.1.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.1.6.1.4 *Supervisory packet (SP).* This field shall be set to 1.

1.5.1.6.1.5 *Channel number (CH):* If a channel number has been allocated during the call acceptance phase, then CH shall be set to that value, otherwise it shall be set to zero.

1.5.1.6.1.6 *Temporary channel (TC)*: If a channel number has been allocated during the call acceptance phase, then TC shall be set to zero, otherwise it shall be set to the value used in the CALL REQUEST by GDLP.

1.5.1.6.1.7 *Supervisory type (ST). This field shall be set to 2.*

1.5.1.6.2 *Translation into ISO 8208 packets*

1.5.1.6.2.1 Translation. Reception by the ADLP reformatting process of a Mode S CLEAR REQUEST by GDLP packet (or an S-bit sequence of packets) from the local ADCE shall result in the generation of a corresponding ISO 8208 CLEAR REQUEST packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.6.1.

1.5.1.6.2.2 *Called DTE, calling DTE and length fields*. These fields shall be omitted in the ISO 8208 CLEAR REQUEST packet.

1.5.1.7 *DATA*

1.5.1.7.1 *Translation into Mode S packets*

1.5.1.7.1.1 Translated packet format. Reception by the XDLP reformatting process of ISO 8208 DATA packet(s) from the local DCE shall result in the generation of corresponding Mode S DATA packet(s) as determined by M-bit processing (2.2.1.4.1), as follows:

DP:1	**M:1**	**SN:6**	**FILL 1:0 or 6**	**PS:4**	**PR:4**	**CH:4**	**LV:4**	**UD:v**

1.5.1.7.1.2 *Data packet type (DP)*. This field shall be set to 1.

1.5.1.7.1.3 *M field (M).* A value of 1 shall indicate that the packet is part of an M-bit sequence with more packets in the sequence to follow. A value of 0 shall indicate that the sequence ends with this packet. The appropriate value shall be placed in the M-bit field of the Mode S packet.

1.5.1.7.1.4 *Sequence number (SN)*. The sequence number field shall be set as specified in 2.2.2.1.1.7.

1.5.1.7.1.5 *Packet send sequence number (PS)*. The packet send sequence number field shall be set as specified in.2.3.4.4.

1.5.1.7.1.6 *Packet receive sequence number (PR)*. The packet receive sequence number field shall be set as specified in 2.3.4.4.

1.5.1.7.1.7 Channel number (CH). The channel number field shall contain the Mode S channel number that corresponds to the incoming ISO 8208 DATA packet channel number.

1.5.1.7.1.8 User data length (LV). This field shall indicate the number of full bytes used in the last SLM or ELM segment.

1.5.1.7.1.9 Fill (FILL1). This field shall be set as specified in 2.2.2.1.1.11.

1.5.1.7.1.10 User data (UD). The user data shall be transferred from the ISO 8208 packet to the Mode S packet utilizing the M-bit packet assembly processing as required.

1.5.1.7.2 *Translation into ISO 8208 packets.* Reception by the XDLP reformatting process of Mode S DATA packet(s) from the local XDCE shall result in the generation of corresponding ISO 8208 DATA packet(s) to the local DCE. The translation from Mode S packet(s) to the ISO 8208 packet(s) shall be the inverse of the processing defined in 2.2.2.7.1.

1.5.1.8 *INTERRUPT*

1.5.1.8.1 *Translation into Mode S packets*

1.5.1.8.1.1 Translated packet format. Reception by the XDLP reformatting process of an ISO 8208 INTERRUPT packet from the local DCE shall result in the generation of corresponding Mode S INTERRUPT packet(s) (as determined by S-bit processing (2.2.1.4.2)) as follows:

DP:1	**MP:1**	**SP:2**	**ST:2**	**FILL 2:0 or 2**	**S:1**	**F:1**	**SN:6**	**CH:4**	**LV:4**	**UD:v**

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1.

1.5.1.8.1.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.1.8.1.3 *MSP packet type (MP).* This field shall be set to 1.

1.5.1.8.1.4 *Supervisory packet (SP).* This field shall be set to 3.

1.5.1.8.1.5 *Supervisory type (ST)*. This field shall be set to 1.

1.5.1.8.1.6 *User data length (LV).* This field shall be set as specified in 2.1.3.1.

1.5.1.8.1.7 *User data (UD).* The user data shall be transferred from the ISO 8208 packet to the Mode S packet using the S-bit packet reassembly processing as required. The maximum size of the user data field for an INTERRUPT packet shall be 32 bytes.

1.5.1.8.2 *Translation into ISO 8208 packets*. Reception by the XDLP reformatting process of Mode S INTERRUPT packet(s) from the local XDCE shall result in the generation of a corresponding ISO 8208 INTERRUPT packet to the local DCE. The translation from the Mode S packet(s) to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.8.1.

1.5.1.9 *INTERRUPT CONFIRMATION*

1.5.1.9.1 *Translation into Mode S packets*

1.5.1.9.1.1 Translated packet format. Reception by the XDLP reformatting process of an ISO 8208 INTERRUPT CONFIRMATION packet from the local DCE shall result in the generation of a corresponding Mode S INTERRUPT CONFIRMATION packet as follows:

DP:1	MP:1	SP:2	ST:2	SS:2	FILL	SN:6	CH:4	LV:4	UD:v
									2:0 or 2

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1.

1.5.1.9.1.2 *Data packet type (DP).* This field shall be set to 0.

1.5.1.9.1.3 *MSP packet type (MP).* This field shall be set to 1.

1.5.1.9.1.4 *Supervisory packet (SP).* This field shall be set to 3.

1.5.1.9.1.5 *Supervisory type (ST)*. This field shall be set to 3.

1.5.1.9.1.6 *Supervisory subset (SS)*. This field shall be set to 0.

1.5.1.9.2 *Translation into ISO 8208 packets*. Reception by the XDLP reformatting process of a Mode S INTERRUPT CONFIRMATION packet from the local XDCE shall result in the generation of a corresponding ISO 8208 INTERRUPT CONFIRMATION packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.9.1.

1.5.1.10 *RESET REQUEST*

1.5.1.10.1 *Translation into Mode S packets*

1.5.1.10.1.1 *Translated packet format.* Reception by the XDLP reformatting process of an ISO 8208 RESET REQUEST packet from the local DCE shall result in the generation of a corresponding Mode S RESET REQUEST packet as follows:

DP:1	MP:1	SP:2	ST:2	FILL	FILL:2	SN:6	CH:4	FILL:4	RC:8	DC:8
				2:0 or 2						

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1.

1.5.1.10.1.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.1.10.1.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.1.10.1.4 *Supervisory packet (SP)*. This field shall be set to 2.

1.5.1.10.1.5 *Supervisory type (ST).* This field shall be set to 2.

1.5.1.10.1.6 *Reset cause code (RC) and diagnostic code (DC).* The reset cause and diagnostic codes used in the Mode S RESET REQUEST packet shall be as specified in the ISO 8208 packet when the reset procedure is initiated by the DTE. If the reset procedure originates with the DCE, the DCE State tables shall specify the diagnostic fields coding. In this case, bit 8 of the reset cause field shall be set to 0.

1.5.1.10.2 *Translation into ISO 8208 packets.* Reception by the XDLP reformatting process of a Mode S RESET packet from the local XDCE shall result in the generation of a corresponding ISO 8208 RESET packet to the local DCE. The translation from the Mode S packet to the ISO 8208 packet shall be the inverse of the processing defined in 2.2.2.10.1.

1.5.1.11 *ISO 8208 RESTART REQUEST to Mode S CLEAR REQUEST.* The receipt of an ISO 8208 RESTART REQUEST from the local DCE shall result in the reformatting process generating a Mode S CLEAR REQUEST by ADLP or Mode S CLEAR REQUEST by GDLP for all SVCs associated with the requesting DTE. The fields of the Mode S CLEAR REQUEST packets shall be set as specified in 2.2.2.5 and 2.2.2.6.

1.5.2 *PACKETS LOCAL TO THE MODE S SUBNETWORK*

1.5.2.1 *MODE S RECEIVE READY*

1.5.2.1.1 *Packet format.* The Mode S RECEIVE READY packet arriving from an XDLP is not related to the control of the DTE/DCE interface and shall not cause the generation of an ISO 8208 packet. The format of the packet shall be as follows:

DP:1	**MP:1**	**SP:2**	**ST:2**	**FILL2:0**	**FILL:2**	**SN:6**	**CH:4**	**PR::4 or 2**

1.5.2.1.2 *Data packet type (DP).* This field shall be set to 0.

1.5.2.1.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.2.1.4 *Supervisory packet (SP)*. This field shall be set to 2.

1.5.2.1.5 *Supervisory type (ST).*This field shall be set to 0.

1.5.2.1.6 *Packet receive sequence number (PR)*. This field shall be set as specified in 3.3.4.4 .

1.5.2.2 *MODE S RECEIVE NOT READY*

1.5.2.2.1 *Packet format.* The Mode S RECEIVE NOT READY packet arriving from an XDLP is not related to the control of the DTE/DCE interface and shall not cause the generation of an ISO 8208 packet. The format of the packet shall be as follows:

DP:1	**MP:1**	**SP:2**	**ST:2**	**FILL2:0**	**FILL:2**	**SN:6**	**CH:4**	**PR::4 or 2**

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1. The packet shall be processed as specified in 3.3.6.

1.5.2.2.2 *Data packet type (DP).* This field shall be set to 0.

1.5.2.2.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.2.2.4 *Supervisory packet (SP)*. This field shall be set to 2.

1.5.2.2.5 *Supervisory type (ST)*. This field shall be set to 1.

1.5.2.2.6 *Packet receive sequence number (PR)*. This field shall be set as specified in 3.3.4.4.

1.5.2.3 MODE S ROUTE

1.5.2.3.1 Packet format. The format for the packet shall be as follows:

DP:1 MP:1 SP:2 ST:2 OF:1 IN:1 RTL:8 RT:v ODL:O or 8 OD:v

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1. The packet shall only be generated by the GDLP. It shall be processed by the ADLP as specified in 1.8.1.2 and shall have a maximum size as specified in 2.3.4.2.1.

1.5.2.3.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.2.3.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.2.3.4 *Supervisory packet (SP)*. This field shall be set to 3.

1.5.2.3.5 *Supervisory type (ST)*. This field shall be set to 0.

1.5.2.3.6 *Option flag (OF).* This field shall indicate the presence of the optional data length (ODL) and optional data (OD) fields. OF shall be set to 1 if ODL and OD are present. Otherwise it shall be set to 0.

1.5.2.3.7 *Initialization bit (IN).* This field shall indicate the requirement for subnetwork initialization. It shall be set by the GDLP as specified in 1.8.1.2(d).

1.5.2.3.8 Route table length (RTL). This field shall indicate the size of the route table, expressed in bytes.

1.5.2.3.9 Route table (RT)

1.5.2.3.9.1 *Contents*. This table shall consist of a variable number of entries each containing information specifying the addition or deletion of entries in the II code-DTE cross--reference table.

1.5.2.3.9.2 *Entries.* Each entry in the route table shall consist of the II code, a list of up to 8 ground DTE addresses, and a flag indicating whether the resulting II code-DTE pairs shall be added or deleted from the II code-DTE cross-reference table. A route table entry shall be coded as follows:

II:4 AD:1 ND:3 DAL:v

1.5.2.3.9.3 *Interrogator identifier (II).* This field shall contain the 4-bit II code.

1.5.2.3.9.4 Add/delete flag (AD). This field shall indicate whether the II code-DTE pairs shall be added (AD = 1) or deleted (AD = 0) from the II code-DTE cross-reference table.

1.5.2.3.9.5 Number of DTE addresses (ND). This field shall be expressed in binary in the range from 0 to 7 and shall indicate the number of DTE addresses present in DAL minus 1 (in order to allow from 1 to 8 DTE addresses).

1.5.2.3.9.6 DTE address list (DAL). This list shall consist of up to 8 DTE addresses, expressed in 8-bit binary representation.

1.5.2.3.10 Optional data length (ODL). This field shall contain the length in bytes of the following OD field.

1.5.2.3.11 Optional data (OD). This variable length field shall contain optional data.

1.5.2.4 MODE S CLEAR CONFIRMATION BY ADLP

1.5.2.4.1 Packet format. The format for this packet shall be as follows:

DP:1 MP:1 SP:2 ST:2 FILL20 TC:2 SN:6 CH:4 AM:4 AG:8 or 2

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1 and 2.2.2.5. This packet shall be processed as specified in 2.3.3.

1.5.2.4.2 *Data packet type (DP).* This field shall be set to 0.

1.5.2.4.3 *MSP packet type (MP).* This field shall be set to 1.

1.5.2.4.4 *Supervisory packet (SP)*. This field shall be set to 1.

1.5.2.4.5 *Channel number (CH):* If a channel number has been allocated during the call acceptance phase, then CH shall be set to that value, otherwise it shall be set to zero.

1.5.2.4.6 *Temporary channel (TC):* If a channel number has been allocated during the call acceptance phase, then TC shall be set to zero, otherwise it shall be set to the value used in the CALL REQUEST by GDLP.

1.5.2.4.7 *Supervisory type (ST).* This field shall be set to 3.

1.5.2.5 *MODE S CLEAR CONFIRMATION BY GDLP*

1.5.2.5.1 *Packet format*. The format for this packet shall be as follows:

DP:1 MP:1 SP:2 ST:2 FILL2 TC:2 SN:6 CH:4 AM:4 AG:8

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1 and 2.2.2.6. This packet shall be processed as specified in 2.3.3.

1.5.2.5.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.2.5.3 *MSP packet type (MP).* This field shall be set to 1.

1.5.2.5.4 Supervisory packet (SP). This field shall be set to 1.

1.5.2.5.5 Channel number (CH): If a channel number has been allocated during the call acceptance phase, then CH shall be set to that value, otherwise it shall be set to zero.

1.5.2.5.6 Temporary channel (TC): If a channel number has been allocated during the call acceptance phase, then TC shall be set to zero, otherwise it shall be set to the value used in the CALL REQUEST by GDLP.

1.5.2.5.7 Supervisory type (ST). This field shall be set to 3.

1.5.2.6 MODE S RESET CONFIRMATION

1.5.2.6.1 Packet format. The format for this packet shall be as follows:

DP:1 MP:1 SP:2 ST:2 FILL20 or 2 FILL:2 SN:6 CH:4 FILL:4

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1. This packet shall be processed as specified in Table 2.4-14.

1.5.2.6.2 5.2.5.3.6.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.2.6.3 5.2.5.3.6.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.2.6.4 5.2.5.3.6.4 *Supervisory packet (SP).* This field shall be set to 2.

1.5.2.6.5 5.2.5.3.6.5 *Supervisory type (ST).* This field shall be set to 3.

1.5.2.7 *MODE S REJECT*

1.5.2.7.1 *Packet format*. The format for this packet shall be as follows:

DP:1 MP:1 SP:2 ST:2 SS:2 FILL20 or 2 SN:6 CH:4 PR:4

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 2.2.2.1. This packet shall be processed as specified in 2.3.6.8.

1.5.2.7.2 *Data packet type (DP)*. This field shall be set to 0.

1.5.2.7.3 *MSP packet type (MP)*. This field shall be set to 1.

1.5.2.7.4 *Supervisory packet (SP)*. This field shall be set to 3.

1.5.2.7.5 *Supervisory type (ST)*. This field shall be set to 3.

1.5.2.7.6 *Supervisory subset (SS).* This field shall be set to 1.

1.5.2.7.7 *Packet receive sequence number (PR).* This field shall be set as specified in 2.3.4.4 .

1.6 XDCE operation

Note.— The ADCE process within the ADLP acts as a peer process to the GDCE process in the GDLP.

1.6.1 *State transitions.* The XDCE shall operate as a State machine. Upon entering a State, the XDCE shall perform the actions specified in Table 2.4-14. State transition and additional action(s) shall be as specified in Table 2.4-15 through Table 2.4-22.

Note 1.— The next State transition (if any) that occurs when the XDCE receives a packet from the peer XDCE is specified by Table 5-15 through Table 5-19. The same transitions are defined in Table 5-20 through Table 5-22 when the XDCE receives a packet from the DCE (via the reformatting process).

Note 2.— The XDCE State hierarchy is the same as for the DCE as presented in Figure 5-2, except that States r2, r3 and p5 are omitted

1.6.2 DISPOSITION OF PACKETS

1.6.2.1 Upon receipt of a packet from the peer XDCE, the packet shall be forwarded or not forwarded to the DCE (via the reformatting process) according to the parenthetical instructions contained in Tables 2.4-15 to 2.4-19. If no parenthetical instruction is listed or if the parenthetical instruction indicates "do not forward" the packet shall be discarded.

1.6.2.2 Upon receipt of a packet from the DCE (via the reformatting process), the packet shall be forwarded or not forwarded to the peer XDCE according to the parenthetical instructions contained in Tables 2.4-20 to 2.4-22. If no parenthetical instruction is listed or if the parenthetical instruction indicates "do not forward" the packet shall be discarded.

1.6.3 SVC CALL SETUP AND CLEAR PROCEDURE

1.6.3.1 *Setup procedures*. Upon receipt of a CALL REQUEST from the DCE or peer XDCE, the XDLP shall determine if sufficient resources exist to operate the SVC. This shall include: sufficient buffer space (refer to 2.2.1.1 for buffer requirements) and an available p1 State SVC. Upon acceptance of the CALL REQUEST from the DCE (via the reformatting process), the Mode S CALL REQUEST packet shall be forwarded to frame processing. Upon acceptance of a Mode S CALL REQUEST from the peer XDCE (via frame processing), the Mode S CALL REQUEST shall be sent to the reformatting process.

1.6.3.2 *Aborting a call request.* If the DTE and/or the peer XDCE abort a call before they have received a CALL ACCEPT packet, they shall indicate this condition by issuing a CLEAR REQUEST packet. Procedures for handling these cases shall be as specified in Table 2.4-16 and Table 2.4-20.

1.6.3.3 *VIRTUAL CALL CLEARING*

1.6.3.3.1 If the XDCE receives a Mode S CALL REQUEST from the reformatting process that it cannot support, it shall initiate a Mode S CLEAR REQUEST packet that is sent to the DCE (via the reformatting process) for transfer to the DTE (the DCE thus enters the DCE CLEAR REQUEST to DTE State, p7).

1.6.3.3.2 If the XDCE receives a Mode S CALL REQUEST packet from the peer XDCE (via frame processing) which it cannot support, it shall enter the State p7.

1.6.3.3.3 A means shall be provided to advise the DTE whether an SVC has been cleared due to the action of the peer DTE or due to a problem within the subnetwork itself.

1.6.3.3.4 The requirement of 2.3.3.3.3 shall be satisfied by setting bit 8 of the cause field to 1 to indicate that the problem originated in the Mode S sub network and not in the DTE. The diagnostic and cause codes shall be set as follows:

a. no channel number available, DC = 71, CC = 133;

b. buffer space not available, DC = 71, CC = 133;

c. DTE not operational, DC = 162, CC = 141; and

d. link failure, DC = 225, CC = 137.

1.6.3.3.5 If the ADLP receives a Mode S ROUTE packet with the IN bit set to ONE, the ADLP shall perform local initialization by clearing Mode S SVCs associated with the DTE addresses contained in the ROUTE packet. If the GDLP receives a search request (Table 5-23) from an ADLP, the GDLP shall perform local initialization by clearing Mode S SVCs associated with that ADLP. Local initialization shall be accomplished by:

(a) releasing all allocated resources associated with these SVCs (including the resequencing buffers);

(b) returning these SVCs to the ADCE ready State (p1); and

(c) sending Mode S CLEAR REQUEST packets for these SVCs to the DCE (via the reformatting process) for transfer to the DTE.

1.6.3.4 *Clear confirmation*. When the XDCE receives a Mode S CLEAR CONFIRMATION packet, the remaining allocated resources to manage the SVC shall be released (including the resequencing buffers) and the SVC shall be returned to the p1 State. Mode S CLEAR CONFIRMATION packets shall not be transferred to the reformatting process.

1.6.3.5 *Clear collision*. A clear collision occurs at the XDCE when it receives a Mode S CLEAR REQUEST packet from the DCE (via the reformatting process) and then receives a Mode S CLEAR REQUEST packet from the peer XDCE (or vice versa). In this event, the XDCE does not expect to receive a Mode S CLEAR CONFIRMATION packet for this SVC and shall consider the clearing complete.

1.6.3.6 *Packet processing.* The XDCE shall treat an S-bit sequence of Mode S CALL REQUEST, CALL ACCEPT and CLEAR REQUEST packets as a single entity.

1.6.4 DATA TRANSFER AND INTERRUPT PROCEDURES

1.6.4.1 *GENERAL PROVISIONS*

1.6.4.1.1 Data transfer and interrupt procedures shall apply independently to each SVC. The contents of the user data field shall be passed transparently to the DCE or to the peer XDCE. Data shall be transferred in the order dictated by the sequence numbers assigned to the data packets.

1.6.4.1.2 To transfer DATA packets, the SVC shall be in a FLOW CONTROL READY State (d1).

1.6.4.2 *MODE S PACKET SIZE*

1.6.4.2.1 The maximum size of Mode S packets shall be 152 bytes in the uplink direction and 160 bytes in the downlink direction for installations that have full uplink and downlink ELM capability. The maximum downlink packet size for level four transponders with less than 16 segment downlink ELM capability shall be 10 bytes times the maximum number of downlink ELM segments that the transponder specifies in its data link capability report. If there is no ELM capability, the maximum Mode S packet size shall be 28 bytes.

1.6.4.2.2 The Mode S sub network shall allow packets of less than the maximum size to be transferred.

1.6.4.3 *FLOW CONTROL WINDOW SIZE*

1.6.4.3.1 The flow control window size of the Mode S sub network shall be independent of that used on the DTE/DCE interface. The Mode S sub network window size shall be 15 packets in the uplink and downlink directions.

1.6.4.4 SVC FLOW CONTROL

1.6.4.4.1 Flow control shall be managed by means of a sequence number for received packets (PR) and one for packets that have been sent (PS). A sequence number (PS) shall be assigned for each Mode S DATA packet generated by the XDLP for each SVC. The first Mode S DATA packet transferred by the XDCE to frame processing when the SVC has just entered the flow control ready State shall be numbered zero. The first Mode S packet received from the peer XDCE after an SVC has just entered the flow control ready State shall be numbered zero. Subsequent packets shall be numbered consecutively.

1.6.4.4.2 A source of Mode S DATA packets (the ADCE or GDCE) shall not send (without permission from the receiver) more Mode S DATA packets than would fill the flow control window. The receiver shall give explicit permission to send more packets.

1.6.4.4.3 The permission information shall be in the form of the next expected packet sequence number and shall be denoted PR. If a receiver wishes to update the window and it has data to transmit to the sender, a Mode S DATA packet shall be used for information transfer. If the window must be updated and no data are to be sent, a Mode S RECEIVE READY (RR) or Mode S RECEIVE NOT READY (RNR) packet shall be sent. At this point, the "sliding window" shall be moved to begin at the new PR value. The XDCE shall now be authorized to transfer more packets without acknowledgement up to the window limit.

1.6.4.4.4 When the sequence number (PS) of the next Mode S DATA packet to be sent is in the range PR ≤ PS ≤ PR + 14 (modulo 16), the sequence number shall be defined to be "in the window" and the XDCE shall be authorized to transmit the packet. Otherwise, the sequence number (PS) of the packet shall be defined to be "outside the window" and the XDCE shall not transmit the packet to the peer XDCE.

1.6.4.4.5 When the sequence number (PS) of the packet received is next in sequence and within the window, the XDCE shall accept this packet. Receipt of a packet with a PS:

a) outside the window; or

b) out of sequence; or

c) not equal to 0 for the first data packet after entering FLOW CONTROL READY State (d1); shall be considered an error (1.6.8).

1.6.4.4.6 The receipt of a Mode S DATA packet with a valid PS number (i.e. the next PS in sequence) shall cause the lower window PR to be changed to that PS value plus 1. The packet receive sequence number (PR) shall be conveyed to the originating XDLP by a Mode S DATA, RECEIVE READY, RECEIVE NOT READY, or REJECT packet. A valid PR value shall be transmitted by the XDCE to the peer XDCE after the receipt of 8 packets provided that sufficient buffer space exists to store 15 packets. Incrementing the PR and PS fields shall be performed using modulo 16 arithmetic.

1.6.4.4.7 A copy of a packet shall be retained until the user data has been successfully transferred. Following successful transfer, the PS value shall be updated.

1.6.4.4.8 The PR value for user data shall be updated as soon as the required buffer space for the window (as determined by flow control management) is available within the DCE.

1.6.4.4.9 Flow control management shall be provided between the DCE and XDCE.

1.6.4.5 INTERRUPT PROCEDURES FOR SWITCHED VIRTUAL CIRCUITS

1.6.4.5.1 If user data is to be sent via the Mode S subnetwork without following the flow control procedures, the interrupt procedures shall be used. The interrupt procedure shall have no effect on the normal data packet and flow control procedures. An interrupt packet shall be delivered to the DTE (or the transponder or interrogator interface) at or before the point in the stream of data at which the interrupt was generated. The processing of a Mode S INTERRUPT packet shall occur as soon as it is received by the XDCE.

1.6.4.5.2 The XDCE shall treat an S-bit sequence of Mode S INTERRUPT packets as a single entity.

1.6.4.5.3 Interrupt processing shall have precedence over any other processing for the SVC occurring at the time of the interrupt.

1.6.4.5.4 The reception of a Mode S INTERRUPT packet before the previous interrupt of the SVC has been confirmed (by the receipt of a Mode S INTERRUPT CONFIRMATION packet) shall be defined as an error. The error results in a reset (see Table 5-18).

1.6.5 RECEIVE READY PROCEDURE

1.6.5.1 The Mode S RECEIVE READY packet shall be sent if no Mode S DATA packets (that normally contain the updated PR value) are available for transmittal and it is necessary to transfer the latest PR value. It also shall be sent to terminate a receiver not ready condition.

1.6.5.2 Receipt of the Mode S RECEIVE READY packet by the XDCE shall cause the XDCE to update its value of PR for the outgoing SVC. It shall not be taken as a demand for retransmission of packets that have already been transmitted and are still in the window.

1.6.5.3 Upon receipt of the Mode S RECEIVE READY packet, the XDCE shall go into the ADLP(GDLP) RECEIVE READY State (g1).

1.6.6 RECEIVE NOT READY PROCEDURE

1.6.6.1 The Mode S RECEIVE NOT READY packet shall be used to indicate a temporary inability to accept additional DATA packets for the given SVC. The Mode S RNR condition shall be cleared by the receipt of a Mode S RR packet or a Mode S REJECT packet.

1.6.6.2 When the XDCE receives a Mode S RECEIVE NOT READY packet from the peer XDCE, it shall update its value of PR for the SVC and stop transmitting Mode S DATA packets on the SVC to the XDLP. The XDCE shall go into the ADLP(GDLP) RECEIVE NOT READY State (g2).

1.6.6.3 The XDCE shall transmit a Mode S RECEIVE NOT READY packet to the peer XDCE if it is unable to receive from the peer XDCE any more Mode S DATA packets on the indicated SVC. Under these conditions, the XDCE shall go into the ADCE(GDCE) RECEIVE NOT READY State (f2).

1.6.7 RESET PROCEDURE

1.6.7.1 When the XDCE receives a Mode S RESET REQUEST packet from either the peer XDCE or the DCE (via the reformatting process) or due to an error condition performs its own reset, the following actions shall be taken:

(a) those Mode S DATA packets that have been transmitted to the peer XDCE shall be removed from the window;

(b) those Mode S DATA packets that are not transmitted to the peer XDCE but are contained in an M-bit sequence for which some packets have been transmitted shall be deleted from the queue of DATA packets awaiting transmission;

(c) those Mode S DATA packets received from the peer XDCE that are part of an incomplete M-bit sequence shall be discarded;

(d) the lower window edge shall be set to 0 and the next packet sent shall have a sequence number (PS) of 0;

(e) any outstanding Mode S INTERRUPT packets to or from the peer XDCE shall be left unconfirmed;

(f) any Mode S INTERRUPT packet awaiting transfer shall be discarded;

(g) data packets awaiting transfer shall not be discarded (unless they are part of a partially transferred M-bit sequence); and

(h) the transition to d1 shall also include a transition to i1, j1, f 1 and g1.

1.6.7.2 The reset procedure shall apply to the DATA TRANSFER State (p4). The error procedure in Table 5-16 shall be followed. In any other State the reset procedure shall be abandoned.

1.6.8 REJECT PROCEDURE

1.6.8.1 When the XDCE receives a Mode S DATA packet from the peer XDCE with incorrect format or whose packet sequence number (PS) is not within the defined window (Table 5-19) or is out of sequence, it shall discard the received packet and send a Mode S REJECT packet to the peer XDCE via frame processing. The Mode S REJECT packet shall indicate a value of PR for which retransmission of the Mode S DATA packets is to begin. The XDCE shall discard subsequent out-of-sequence Mode S DATA packets whose receipt occurs while the Mode S REJECT packet response is still outstanding.

1.6.8.2 When the XDCE receives a Mode S REJECT packet from the peer XDCE, it shall update its lower window value with the new value of PR and begin to (re) transmit packets with a sequence number of PR.

1.6.8.3 Reject indications shall not be transferred to the DCE. If the ISO 8208 interface supports the reject procedures, the reject indications occurring on the ISO 8208 interface shall not be transferred between the DCE and the XDCE.

1.6.9 PACKET RESEQUENCING AND DUPLICATE SUPPRESSION

1.6.9.1 Resequencing. Resequencing shall be performed independently for the uplink and downlink transfers of each Mode S SVC. The following variables and parameters shall be used: SNR A 6-bit variable indicating the sequence number of a received packet on a specific SVC. It is contained in the SN field of the packet (2.2.2.1.1.7).

NESN The next expected sequence number following a series of consecutive sequence numbers. HSNR The highest value of SNR in the resequencing window.

Tq Resequencing timers (see Tables 5-1 and 5-13) associated with a specific SVC.

All operations involving the sequence number (SN) shall be performed modulo 64.

1.6.9.2 Duplication window. The range of SNR values between NESN – 32 and NESN – 1 inclusive shall be denoted the duplication window.

1.6.9.3 Resequencing window. The range of SNR values between NESN + 1 and NESN + 31 inclusive shall be denoted the resequencing window. Received packets with a sequence number value in this range shall be stored in the resequencing window in sequence number order.

1.6.9.4 TRANSMISSION FUNCTIONS

1.6.9.4.1 For each SVC, the first packet sent to establish a connection (the first Mode S CALL REQUEST or first Mode S CALL ACCEPT packet) shall cause the value of the SN field to be initialized to zero. The value of the SN field shall be incremented after the transmission (or retransmission) of each packet.

1.6.9.4.2 The maximum number of unacknowledged sequence numbers shall be 32 consecutive SN numbers. Should this condition be reached, then it shall be treated as an error and the channel cleared.

1.6.9.5 RECEIVE FUNCTIONS

1.6.9.5.1 Resequencing. The resequencing algorithm shall maintain the variables HSNR and NESN for each SVC. NESN shall be initialized to 0 for all SVCs and shall be reset to 0 when the SVC re-enters the channel number pool.

1.6.9.5.2 Processing of packets within the duplication window. If a packet is received with a sequence number value within the duplication window, the packet shall be discarded.

1.6.9.5.3 Processing of packets within the resequencing window. If a packet is received with a sequence number within the resequencing window, it shall be discarded as a duplicate

if a packet with the same sequence number has already been received and stored in the resequencing window. Otherwise, the packet shall be stored in the resequencing window. Then, if no ***Tq*** timers are running, HSNR shall be set to the value of SNR for this packet and a ***Tq*** timer shall be started with its initial value (Tables 5-1 and 5-13). If at least one Tq timer is running, and SNR is not in the window between NESN and HSNR + 1 inclusive, a new ***Tq*** timer shall be started and the value of HSNR shall be updated. If at least one ***Tq*** timer is running, and SNR for this packet is equal to HSNR + 1, the value of HSNR shall be updated.

1.6.9.5.4 Release of packets to the XDCE. If a packet is received with a sequence number equal to NESN, the following procedure shall be applied:

(a) the packet and any packets already stored in the resequencing window up to the next missing sequence number shall be passed to the XDCE;

(b) NESN shall be set to 1 + the value of the sequence number of the last packet passed to the XDCE; and

(c) the Tq timer associated with any of the released packets shall be stopped.

1.6.9.6 ***Tq*** timer expiration. If a ***Tq*** timer expires, the following procedure shall be applied:

(a) NESN shall be incremented until the next missing sequence number is detected after that of the packet associated with the ***Tq*** timer that has expired

(b) any stored packets with sequence numbers that are no longer in the resequencing window shall be forwarded to the XDCE except that an incomplete S-bit sequence shall be discarded; and

(c) the ***Tq*** timer associated with any released packets shall be stopped.

1.7 Mode S specific services processing Mode S specific services shall be processed by an entity in the XDLP termed the Mode S specific services entity (SSE). Transponder registers shall be used to convey the information specified in Table 5-24. The data structuring of the registers in Table 5-24 shall be implemented in such a way that interoperability is ensured.

Note 1.— The data formats and protocols for messages transferred via Mode S specific services are specified in the Technical Provisions for Mode S Services and Extended Squitter (Doc 9871) (in preparation).

Note 2.— Uniform implementation of the data formats and protocols for messages transferred via Mode S specific services will ensure interoperability.

Note 3.— This section describes the processing of control and message data received from the Mode S specific services interface.

Note 4.— Control data consists of information permitting the determination of, for example, message length, BDS code used to access the data format for a particular register, and aircraft address.

1.7.1 ADLP PROCESSING

1.7.1.1 DOWNLINK PROCESSING

1.7.1.1.1 Specific services capability. The ADLP shall be capable of receiving control and message data from the Mode S specific services interface(s) and sending delivery notices to this interface. The control data shall be processed to determine the protocol type and the length of the message data. When the message or control data provided at this interface are erroneous (i.e. incomplete, invalid or inconsistent), the ADLP shall discard the message and deliver an error report at the interface.

Note. — The diagnostic content and error reporting mechanism are a local issue.

1.7.1.1.2 Broadcast processing. The control and message data shall be used to format the Comm-B broadcast message as specified in 1.7.5 and transferred to the transponder.

1.7.1.1.3 GICB processing. The 8-bit BDS code shall be determined from the control data. The 7-byte register content shall be extracted from the received message data. The register content shall be transferred to the transponder, along with an indication of the specified register number. A request to address one of the air-initiated Comm-B registers or the airborne collision avoidance system (ACAS) active resolution advisories register shall be discarded. The assignment of registers shall be as specified in Table 5-24.

1.7.1.1.4 MSP processing

1.7.1.1.4.1 The MSP message length, channel number (M/CH) (1.7.3.1.3) and optionally the interrogator identifier (II) code shall be determined from the control data. The MSP message content shall be extracted from the received message data. If the message length is 26 bytes or less, the SSE shall format an air-initiated Comm-B message (1.7.1.1.4.2) for transfer to the transponder using the short form MSP packet (1.7.3.1). If the message length is 27 to 159 bytes and the transponder has adequate downlink ELM capability, the SSE shall format an ELM message for transfer using the short form MSP packet. If the message length is 27 to 159 bytes and the transponder has a limited downlink ELM capability, the SSE shall format multiple long form MSP packets (1.7.3.2) using ELM messages, as required utilizing the L-bit and M/SN fields for association of the packets. If the message length is 27 to 159 bytes and the transponder does not have downlink ELM capability, the SSE shall format multiple long form MSP packets (1.7.3.2) using air initiated Comm-B messages, as required utilizing the L-bit and M/SN fields for association of the packets. Different frame types shall never be used in the delivery of an MSP message. Messages longer than 159 bytes shall be discarded. The assignment of downlink MSP channel numbers shall be as specified in Table 5-25.

1.7.1.1.4.2 For an MSP, a request to send a packet shall cause the packet to be multisite--directed to the interrogator which II code is specified in control data. If no II code is specified, the packet shall be downlinked using the air-initiated protocol. A message delivery notice for this packet shall be provided to the Mode S specific interface when the corresponding close- out(s) have been received from the transponder. If a close-out has not been received from the transponder in Tz seconds, as specified in Table 5-1, the MSP packet shall be discarded. This shall include the cancellation in the transponder of any frames associated with this packet. A delivery failure notice for this message shall be provided to the Mode S specific services interface.

1.7.1.2 UPLINK PROCESSING

Note.— This section describes the processing of Mode S specific services messages received from the transponder.

1.7.1.2.1 Specific services capability. The ADLP shall be capable of receiving Mode S specific services messages from the transponder via frame processing.

The ADLP shall be capable of delivering the messages and the associated control data at the specific services interface. When the resources allocated at this interface are insufficient to accommodate the output data, the ADLP shall discard the message and deliver an error report at this interface.

Note.— The diagnostic content and the error reporting mechanism are a local issue.

1.7.1.2.2 Broadcast processing. If the received message is a broadcast Comm-A, as indicated by control data received over the transponder/ADLP interface, the broadcast ID and user data (1.7.5) shall be forwarded to the Mode S specific services interface (1.3.2.1) along with the control data that identifies this as a broadcast message.The assignment of uplink broadcast identifier numbers shall be as specified in Table 5-23.

1.7.1.2.3 MSP processing. If the received message is an MSP, as indicated by the packet format header (1.7.3), the user data field of the received MSP packet shall be forwarded to the Mode S specific services interface (1.3.2.1) together with the MSP channel number (M/CH), the IIS subfield (1.2.1.1.1) together with control data that identifies this as an MSP

message. L-bit processing shall be performed as specified in 1.7.4. The assignment of uplink MSP channel numbers shall be as specified in Table 5-25.

1.7.2 GDLP PROCESSING

1.7.2.1 UPLINK PROCESSING

1.7.2.1.1 Specific services capability. The GDLP shall be capable of receiving control and message data from the Mode S specific services interface(s) (1.3.2.2) and sending delivery notices to the interface(s). The control data shall be processed to determine the protocol type and the length of the message data.

1.7.2.1.2 Broadcast processing. The GDLP shall determine the interrogator(s), broadcast azimuths and scan times from the control data and format the broadcast message for transfer to the interrogator(s) as specified in 1.7.5.

1.7.2.1.3 GICB processing. The GDLP shall determine the register number and the aircraft address from the control data. The aircraft address and BDS code shall be passed to the interrogator as a request for a ground-initiated Comm-B.

1.7.2.1.4 MSP processing. The GDLP shall extract from the control data the message length, the MSP channel number (M/CH) and the aircraft address, and obtain the message content from the message data. If the message length is bytes or less, the SSE shall format a Comm-A message for transfer to the interrogator using the short form MSP packet (1.7.3.1). If the message length is 28 to 151 bytes and the transponder has uplink ELM capability, the SSE shall format an ELM message for transfer to the interrogator using the short form MSP packet. If the message length is 28 to 151 bytes and the transponder does not have uplink ELM capability, the SSE shall format multiple long form MSP packets (1.7.3.2) utilizing the L--bit and the M/SN fields for association of the packets. Messages longer than 151 bytes shall be discarded. The interrogator shall provide a delivery notice to the Mode S specific services interface(s) indicating successful or unsuccessful delivery, for each uplinked packet.

1.7.2.2 DOWNLINK PROCESSING

1.7.2.2.1 Specific services capability. The GDLP shall be capable of receiving Mode S specific services messages from the interrogator via frame processing.

1.7.2.2.2 Broadcast processing. If the received message is a broadcast Comm-B, as indicated by the interrogator/GDLP interface, the GDLP shall:

(a) generate control data indicating the presence of a broadcast message and the 24-bit address of the aircraft from which the message was received;

(b) append the 7-byte MB field of the broadcast Comm-B; and

(c) forward this data to the Mode S specific services interface(s) (1.3.2.2).

1.7.2.2.3 GICB processing. If the received message is a GICB, as indicated by the interrogator/GDLP interface, the GDLP shall:

(a) generate control data indicating the presence of a GICB message, the register number and the 24-bit address of the aircraft from which the message was received;

(b) append the 7-byte MB field of the GICB; and

(c) forward this data to the Mode S specific services interface(s) (1.3.2.2).

1.7.2.2.4 MSP processing. If the received message is an MSP as indicated by the packet format header (1.7.3), the GDLP shall:

(a) generate control data indicating the transfer of an MSP, the length of the message, the MSP channel number (M/CH) and the 24-bit address of the aircraft from which the message was received;

(b) append the user data field of the received MSP packet; and

(c) forward this data to the Mode S specific services interface(s) (1.3.2.2).

L-bit processing shall be performed as specified in 1.7.4.

1.7.3 MSP PACKET FORMATS

1.7.3.1 Short form MSP packet. The format for this packet shall be as follows:

DP:1	MP:1	MCH:6	FILL1:0 or 6	UD:v

1.7.3.1.1 Data packet type (DP). This field shall be set to 0.

1.7.3.1.2 MSP packet type (MP). This field shall be set to 0.

1.7.3.1.3 MSP channel number (M/CH). The field shall be set to the channel number derived from the SSE control data.

1.7.3.1.4 Fill field (FILL1:0 or 6). The fill length shall be 6 bits for a downlink SLM frame. Otherwise the fill length shall be 0.

1.7.3.1.5 User data (UD). The user data field shall contain message data received from the Mode S specific services interface (1.3.2.2).

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1.7.3.2 Long form MSP packet. The format for this packet shall be as follows:

DP:1	MP:1	SP:2	L:1	M/SN:3	FILL2:0 or 2	M/CH:6	UD:v

Fields shown in the packet format and not specified in the following paragraphs shall be set as specified in 1.5.2.1 and 1.7.3.1

1.7.3.3 Data packet type (DP). This field shall be set to 0.

1.7.3.3.1 MSP packet type (MP). This field shall be set to 1.

1.7.3.3.2 Supervisory packet (SP). This field shall be set to 0.

1.7.3.3.3 L field (L). A value of 1 shall indicate that the packet is part of an L-bit sequence with more packets in the sequence to follow. A value of 0 shall indicate that the sequence ends with this packet.

1.7.3.3.4 MSP sequence number field (M/SN). This field shall be used to detect duplication in the delivery of L-bit sequences. The first packet in an L-bit sequence shall be assigned a sequence number of 0. Subsequent packets shall be numbered sequentially. A packet received with the same sequence number as the previously received packet shall be discarded.

1.7.4 L-bit processing. L-bit processing shall be performed only on the long form MSP packet and shall be performed as specified for M-bit processing (1.5.1.4.1) except as specified in the following paragraphs.

1.7.4.1 Upon receipt of a long form MSP packet, the XDLP shall construct the user data field by:

(a) verifying that the packet order is correct using the M/SN field (1.7.3.2);

(b) assuming that the user data field in the MSP packet is the largest number of integral bytes that is contained within the frame;

(c) associating each user data field in an MSP packet received with a previous user data field in an MSP packet that has an L-bit value of 1; and

Note.— Truncation of the user data field is not permitted as this is treated as an error condition.

(d) if an error is detected in the processing of an MSP packet, the packet shall be discarded.

1.7.4.2 In the processing of an L-bit sequence, the XDLP shall discard any MSP packets that have duplicate M/SN values. The XDLP shall discard the entire L-bit sequence if a long form MSP packet is determined to be missing by use of the M/SN field.

1.7.4.3 The packets associated with any L-bit sequence whose reassembly is not completed in Tm seconds (Tables 5-1 and 5-13) shall be discarded.

1.7.5 BROADCAST FORMAT

1.7.5.1 Uplink broadcast. The format of the broadcast Comm-A shall be as follows:

The 83-bit uplink broadcast shall be inserted in an uplink Comm-A frame. The MA field of the Comm-A frame shall contain the broadcast identifier specified in Table 5-23 in the first 8 bits, followed by the first 48 user data bits of the broadcast message. The last 27 user data bits of the broadcast message shall be placed in the 27 bits immediately following the UF field of the Comm-A frame.

1.7.5.2 Downlink broadcast. The format of broadcast Comm-B shall be as follows: The 56-bit downlink broadcast message shall be inserted in the MB field of the broadcast Comm--B. The MB field shall contain the broadcast identifier specified in Table 5-23 in the first 8 bits, followed by the 48 user data bits.

1.8 Mode S sub-network management

1.8.1 INTERROGATOR LINK DETERMINATION FUNCTION

Note.— The ADLP interrogator link determination function selects the II code of the Mode S interrogator through which a Mode S sub-network packet may be routed to the desired destination ground DTE.

1.8.1.1 II code-DTE address correlation. The ADLP shall construct and manage a Mode S interrogator-data terminal equipment (DTE) cross-reference table whose entries are Mode S interrogator identifier (II) codes and ground DTE addresses associated with the ground ATN routers or other ground DTEs. Each entry of the II code-DTE cross-reference table shall consist of the 4-bit Mode S II code and the 8-bit binary representation of the ground DTE.

Note 1.— Due to the requirement for non-ambiguous addresses, a DTE address also uniquely identifies a GDLP.

Note 2.— An ATN router may have more than one ground DTE address.

1.8.1.2 Protocol. The following procedures shall be used:

(a) when the GDLP initially detects the presence of an aircraft, or detects contact with a currently acquired aircraft through an interrogator with a new II code, the appropriate fields of the DATA LINK CAPABILITY report shall be examined to determine if, and to what level, the aircraft has the capability to participate in a data exchange. After positive determination of data link capability, the GDLP shall uplink one or more Mode S ROUTE packets as specified in 1.5.3.3. This information shall relate the Mode S II code with the ground DTE addresses accessible through that interrogator. The ADLP shall update the II code-DTE cross-reference table and then discard the Mode S ROUTE packet(s);

(b) a II code-DTE cross-reference table entry shall be deleted when commanded by a Mode S ROUTE packet or when the ADLP recognizes that the transponder has not been selectively interrogated by a Mode S interrogator with a given II code for Ts seconds by monitoring the IIS subfield in Mode S surveillance or Comm-A interrogations (Table 5-1);

(c) when the GDLP determines that modification is required to the Mode S interrogator assignment, it shall transfer one or more Mode S ROUTE packets to the ADLP. The update information contained in the Mode S ROUTE packet shall be used by the ADLP to modify its cross-reference table. Additions shall be processed before deletions;

(d) when the GDLP sends the initial ROUTE packet after acquisition of a Mode S data link-equipped aircraft, the IN bit shall be set to ONE. This value

shall cause the ADLP to perform the procedures as specified in 1.6.3.3.3. Otherwise, the IN bit shall be set to ZERO;

(e) when the ADLP is initialized (e.g. after a power-up procedure), the ADLP shall issue a search request by sending a broadcast Comm-B message with broadcast identifier equal to 255 (FF16, as specified in Table 5-23) and the remaining 6 bytes unused. On receipt of a search request, a GDLP shall respond with one or more Mode S ROUTE packets, clear all SVCs associated with the ADLP, as specified in 1.6.3.3, and discard the search request. This shall cause the ADLP to initialize the II code-DTE cross-reference table; and

(f) on receipt of an update request (Table 5-23), a GDLP shall respond with one or more Mode S ROUTE packets and discard the update request. This shall cause the ADLP to update the II code-DTE cross-reference table.

Note.— The update request may be used by the ADLP under exceptional circumstances (e.g. changeover to standby unit) to verify the contents of its II code DTE cross reference table.

1.8.1.3 PROCEDURES FOR DOWNLINKING MODE S PACKETS

1.8.1.3.1 When the ADLP has a packet to downlink, the following procedures shall apply:

(a) CALL REQUEST packet. If the packet to be transferred is a Mode S CALL REQUEST, the ground DTE address field shall be examined and shall be associated with a connected Mode S interrogator using the II code-DTE cross reference table. The packet shall be downlinked using the multisite-directed protocol. A request to transfer a packet to a DTE address not in the cross--reference table shall result in the action specified in 1.6.3.3.1.

(b) Other SVC packets. For an SVC, a request to send a packet to a ground DTE shall cause the packet to be multisite directed to the last Mode S interrogator used to successfully transfer (uplink or downlink) a packet to that DTE, provided that this Mode S interrogator is currently in the II code- DTE cross--reference table. Otherwise, an SVC packet shall be downlinked using the multisite-directed protocol to any other Mode S interrogator associated with the specified ground DTE address. Level 5 transponders shall be permitted to use additional interrogators for downlink transfer as indicated in the II code--DTE cross-reference table.

1.8.1.3.2 A downlink frame transfer shall be defined to be successful if its Comm-B or ELM close-out is received from the transponder within Tz seconds as specified in Table 5-1. If the attempt is not successful and an SVC packet is to be sent, the II code-DTE cross-reference table shall be examined for another entry with the same called ground DTE address and a different Mode S II code. The procedure shall be retried using the multisite--directed protocol with the new Mode S interrogator. If there are no entries for the required called DTE, or all entries result in a failed attempt, a link failure shall be declared (1.8.3.1).

1.8.2 SUPPORT FOR THE DTE(S)

1.8.2.1 GDLP connectivity reporting. The GDLP shall notify the ground DTE(s) of the availability of a Mode S data link-equipped aircraft ("join event"). The GDLP shall also inform the ground DTEs when such an aircraft is no longer in contact via that GDLP ("leave event"). The GDLP shall provide for notification (on request) of all Mode S data link equipped aircraft currently in contact with that GDLP. The notifications shall provide the ground ATN router with the sub-network point of attachment (SNPA) address of the mobile ATN router, with the position of the aircraft and quality of service as optional parameters. The SNPA of the mobile ATN router shall be the DTE address formed by the aircraft address and a sub--address of 0 (1.3.1.3.2).

1.8.2.2 ADLP connectivity reporting. The ADLP shall notify all aircraft DTEs whenever the last remaining entry for a ground DTE is deleted from the II code-DTE cross-reference table (1.8.1.1). This notification shall include the address of this DTE.

1.8.2.3 Communications requirements. The mechanism for communication of changes in subnetwork connectivity shall be a confirmed service, such as the join/leave events that allow notification of the connectivity status.

1.8.3 ERROR PROCEDURES

1.8.3.1 Link failure. The failure to deliver a packet to the referenced XDLP after an attempt has been made to deliver this packet via all available interrogators shall be declared to be a link level failure. For an SVC, the XDCE shall enter the State p1 and release all resources associated with that channel. This shall include the cancellation in the transponder of any frames associated with this SVC. A Mode S CLEAR REQUEST packet shall be sent to the DCE via the reformatting process and shall be forwarded by the DCE as an ISO 8208 packet to the local DTE as described in 1.6.3.3. On the aircraft side, the channel shall not be returned to the ADCE channel pool, i.e. does not return to the State p1, until Tr seconds after the link failure has been declared (Table 5-).

1.8.3.2 ACTIVE CHANNEL DETERMINATION

1.8.3.2.1 Procedure for d1 State. The XDLP shall monitor the activity of all SVCs, not in a READY State (p1). If an SVC is in the (XDCE) FLOW CONTROL READY State (d1) for more than Tx seconds (the active channel timer, Tables -1 and 5-13) without sending a Mode S RR, RNR, DATA, or REJECT packet, then:

(a) if the last packet sent was a Mode S REJECT packet to which a response has not been received, then the XDLP shall resend that packet;

(b) otherwise, the XDLP shall send a Mode S RR or RNR packet as appropriate to the peer XDLP.

1.8.3.2.2 Procedure for other States. If an XDCE SVC is in the p2, p3, p6, p7, d2 or d3 State for more than Tx seconds, the link failure procedure of 5.2.8.3.1 shall be performed.

1.8.3.2.3 Link failure shall be declared if either a failure to deliver, or a failure to receive, keep-alive packets has occurred. In which case the channel shall be cleared.

1.9 The data link capability report

The data link capability report shall be as specified in the Civil Aviation (surveillance and collision avoidance system) Regulations.

1.10 System timers

1.10.1 The values for timers shall conform to the values given in Tables 5-1 and 5-13.

1.10.2 Tolerance for all timers shall be plus or minus one per cent.

1.10.3 Resolution for all timers shall be one second.

1.11 System requirements

1.11.1 Data integrity. The maximum bit error rates for data presented at the ADLP/ transponder interface or the GDLP/interrogator interface measured at the local DTE/XDLP interface (and vice versa) shall not exceed 10-9 for undetected errors and 10-7 for detected errors.

Note.— The maximum error rate includes all errors resulting from data transfers across the interfaces and from XDLP internal operation.

1.11.2 TIMING

1.11.2.1 ADLP timing. ADLP operations shall not take longer than 0.25 seconds for regular traffic and 0.125 seconds for interrupt traffic. This interval shall be defined as follows:

(a) Transponders with downlink ELM capability. The time that the final bit of a 128-byte data packet is presented to the DCE for downlink transfer to the time that the final bit of the first encapsulating frame is available for delivery to the transponder.

(b) Transponders with Comm-B capability. The time that the final bit of a user data field of 24 bytes is presented to the DCE for downlink transfer to the time that the final bit of the last of the four Comm-B segments that forms the frame encapsulating the user data is available for delivery to the transponder.

(c) Transponders with uplink ELM capability. The time that the final bit of the last segment of an ELM of 14 Comm-C segments that contains a user data field of 128 bytes is received by the ADLP to the time that the final bit of the corresponding packet is available for delivery to the DTE.

(d) Transponders with Comm-A capability. The time that the final bit of the last segment of four linked Comm-A segments that contains a user data field of 25 bytes is received by the ADLP to the time that the final bit of the corresponding packet is available for delivery to the DTE.

1.11.2.2 GDLP TIMING

The total time delay across the GDLP, exclusive of transmission delay, shall not be greater than 0.125 seconds.

1.11.2.3 Interface rate. The physical interface between the ADLP and the transponder shall have a minimum bit rate of 100 kilobits per second.

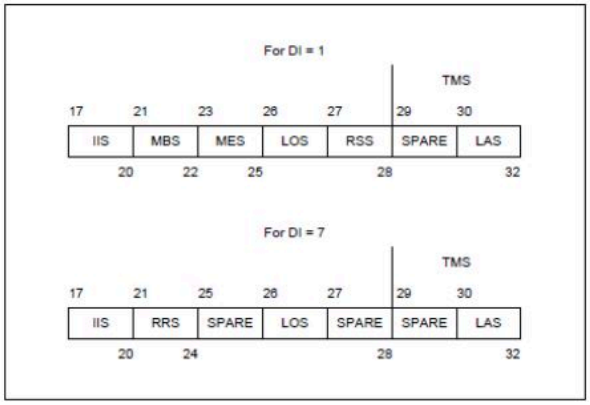


Figure 5-1. The SD field structure

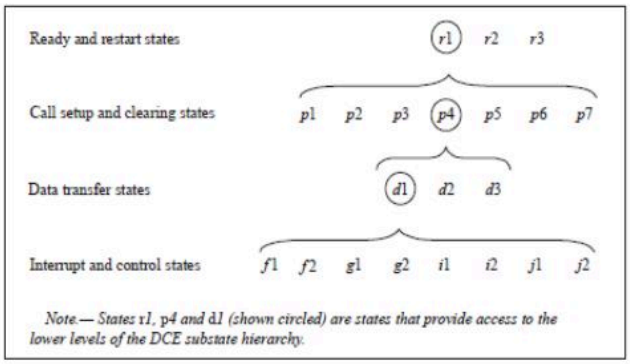


Figure 5-2. DCE substate hierarchy

TABLES

Timer name	*Timer label*	*Nominal value*
Channel retirement	*Tr*	600 s
Active channel-ADLP	*Tx*	420 s
Interrogator interrogation	*Ts*	60 s
Interrogator link	*Tz*	30 s
Link frame cancellation	*Tc*	60 s
L-bit delivery-ADLP	*Tm*	120 s
Packet resequencing and S-bit delivery	*Tq*	60 s

Table 5-1. ADLP Mode S subnetwork timers

DCE state	*State definition*	*Action that shall be taken when entering the state*
r1	PACKET LEVEL READY	Return all SVCs to the *p1* state (see *p1* state explanation).
r2	DTE RESTART REQUEST	Return each SVC to the *p1* state (see *p1* state explanation). Issue a RESTART CONFIRMATION to the DTE.
r3	DCE RESTART REQUEST	Issue a RESTART REQUEST to the DTE. Unless entered via the *r2* state, send a RESTART REQUEST to the reformatting process.
p1	READY	Release all resources assigned to SVC. Break the correspondence between the DTE/DCE SVC and the ADCE/GDCE SVC (the ADCE/GDCE SVC may not yet be in the *p1* state).
p2	DTE CALL REQUEST	Determine if sufficient resources exist to support request; if so, allocate resources and forward CALL REQUEST packet to reformatting process; if not, enter DCE CLEAR REQUEST to DTE state (*p7*). Determination of resources and allocation is as defined in ISO 8208.
p3	DCE CALL REQUEST	Determine if sufficient resources exist to support request; if so allocate resources and forward CALL REQUEST packet to DTE; if not, send a CLEAR REQUEST packet to the reformatting process. Determination of resources and allocation is as defined in ISO 8208.
p4	DATA TRANSFER	No action.
p5	CALL COLLISION	Reassign outgoing call to another SVC (the DTE in its call collision state ignores the incoming call) and enter the DCE CALL REQUEST state (*p3*) for that new SVC. Enter the *p2* state to process the CALL REQUEST from the DTE.
p6	DTE CLEAR REQUEST	Release all resources assigned to SVC, send a CLEAR CONFIRMATION packet to the DTE and enter *p1* state.
p7	DCE CLEAR REQUEST to DTE	Forward CLEAR REQUEST packet to DTE.
d1	FLOW CONTROL READY	No action.
d2	DTE RESET REQUEST	Remove DATA packets transmitted to DTE from window; discard any DATA packets that represent partially transmitted M-bit sequences and discard any INTERRUPT packet awaiting transfer to the DTE; reset all window counters to 0; set any timers and retransmission parameters relating to DATA and INTERRUPT transfer to their initial value. Send RESET CONFIRMATION packet to DTE. Return SVC to *d1* state.
d3	DCE RESET REQUEST to DTE	Remove DATA packets transmitted to DTE from window; discard any DATA packets that represent partially transmitted M-bit sequences and discard any INTERRUPT packet awaiting transfer to the DTE; reset all window counters to 0; set any timers and retransmission parameters relating to DATA and INTERRUPT transfer to their initial value. Forward RESET REQUEST packet to DTE.

DCE state	*State definition*	*Action that shall be taken when entering the state*
i1	DTE INTERRUPT READY	No action.
i2	DTE INTERRUPT SENT	Forward INTERRUPT packet received from DTE to reformatting process.
j1	DCE INTERRUPT READY	No action.
j2	DCE INTERRUPT SENT	Forward INTERRUPT packet received from reformatting process to DTE.
f1	DCE RECEIVE READY	No action.
f2	DCE RECEIVE NOT READY	No action.
g1	DTE RECEIVE READY	No action.
g2	DTE RECEIVE NOT READY	No action.

Table 5-2. DCE actions at state transition

THIRD SCHEDULE (Regulation 49(b)).

1. DCE AND XDCE STATE TABLES Regulation 49(b)

1.4 *Kenya Civil Aviation Authority (KCAA) table requirements.* The DCE and XDCE shall function as specified in Tables 5-3 to 5-22. CAA-U Tables 5-15 through 5-22 shall be applied to:

(a) ADLP CAA-U transitions when the XDCE or XDLP terms in parenthesis are omitted; and

(b) GDLP State transitions when the terms in parenthesis are used and the XDCE or XDLP preceding them are omitted.

1.5 *Diagnostic and cause codes*. The table entries for certain conditions indicate a diagnostic code that shall be included in the packet generated when entering the State indicated. The term, "D =," shall define the diagnostic code. When "A = DIAG ", the action taken shall be to generate an ISO 8208 DIAGNOSTIC packet and transfer it to the DTE; the diagnostic code indicated shall define the entry in the diagnostic field of the packet. The cause field shall be set as specified in

1.6.3.3 . The reset cause field shall be set as specified in ISO 8208.

Note 1.— The tables provided below specify State requirements in the following order:

5-3 DCE special cases

5-4 DTE effect on DCE restart States

5-5 DTE effect on DCE call setup and clearing States

5-6 DTE effect on DCE reset States

5-7 DTE effect on DCE interrupt transfer States

5-8 DTE effect on DCE flow control transfer States

5-9 XDCE effect on DCE restart States

5-10 XDCE effect on DCE call setup and clearing States

5-11 XDCE effect on DCE reset States

5-12 XDCE effect on DCE interrupt transfer States

5-15 GDLP (ADLP) effect on ADCE (GDCE) packet layer ready States

5-16 GDLP (ADLP) effect on ADCE (GDCE) call setup and clearing States

5-17 GDLP (ADLP) effect on ADCE (GDCE) reset States

5-18 GDLP (ADLP) effect on ADCE (GDCE) interrupt transfer States

5-19 GDLP (ADLP) effect on ADCE (GDCE) flow control transfer States

5-20 DCE effect on ADCE (GDCE) call setup and clearing States

5-21 DCE effect on ADCE (GDCE) reset States

5-22 DCE effect on ADCE (GDCE) interrupt transfer States

Note 2.— All tables specify both ADLP and GDLP actions.

Note 3. — Within the Mode S subnetwork, States p6 and d2 are transient States.

Note 4. — References to "notes" in the State tables refer to table-specific notes that follow each State table.

Note 5. — All diagnostic and cause codes are interpreted as decimal numbers.

Note 6. —An SVC between an ADCE and a GDCE may be identified by a temporary and/or permanent channel number, as defined in 1.5.1.2.

Table 5-3. DCE special cases

Received from DTE	*DCE special cases* *Any state*
Any packet less than 2 bytes in length (including a valid data link level frame containing no packet)	A=DIAG *D*=38
Any packet with an invalid general format identifier	A=DIAG *D*=40
Any packet with a valid general format identifier and an assigned logical channel identifier (includes a logical channel identifier of 0)	See Table 5-4

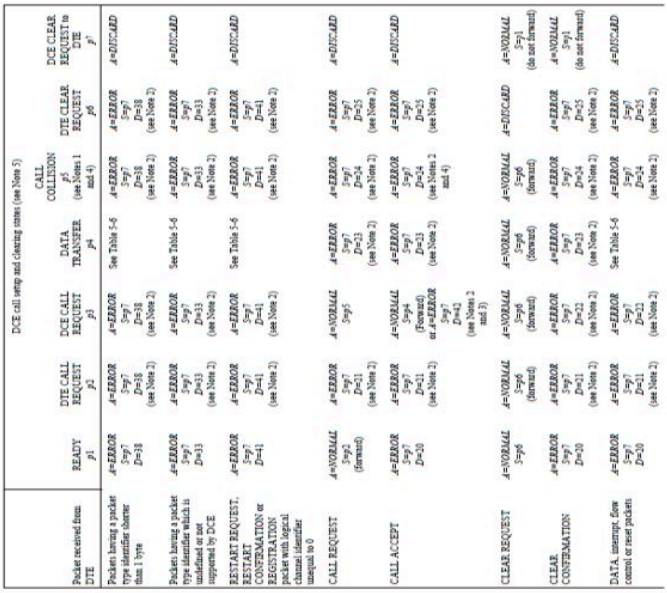
Table 5-4. DTE effect on DCE restart states

Packet received from DTE	DCE restart states (see Note 5) PACKET LEVEL READY (see Note 1) *r1*	DTE RESTART REQUEST *r2*	DCE RESTART REQUEST *r3*
Packets having a packet type identifier shorter than 1 byte and logical channel identifier not equal to 0	See Table 5-5	*A*=*ERROR* *S*=r3 *D*=38 (see Note 4)	*A*=*DISCARD*
Any packet, except RESTART, REGISTRATION (if supported) with a logical channel identifier of 0	*A*=*DIAG* *D*=36	*A*=*DIAG* *D*=36	*A*=*DIAG* *D*=36
Packet with a packet type identifier which is undefined or not supported by DCE	See Table 5-5	*A*=*ERROR* *S*=r3 *D*=33 (see Note 4)	*A*=*DISCARD*
RESTART REQUEST, RESTART CONFIRMATION, or REGISTRATION (if supported) packet with a logical channel identifier unequal to 0	See Table 5-5	*A*=*ERROR* *S*=r3 *D*=41 (see Note 4)	*A*=*DISCARD*
RESTART REQUEST	*A*=*NORMAL* (forward) *S*=r2	*A*=*DISCARD*	*A*=*NORMAL* *S*=p1 or *d*1 (see Note 2)
RESTART CONFIRMATION	*A*=*ERROR* *S*=r3 *D*=17 (see Note 6)	*A*=*ERROR* *S*=r3 *D*=18 (see Note 4)	*A*=*NORMAL* *S*=p1 or *d*1 (see Note 2)
RESTART REQUEST OR RESTART CONFIRMATION packet with a format error	*A*=*DIAG* *D*=38, 39, 81 or 82	*A*=*DISCARD*	*A*=*ERROR* *D*=38, 39, 81 or 82
REGISTRATION REQUEST or REGISTRATION CONFIRMATION packets (see Note 3)	*A*=*NORMAL*	*A*=*NORMAL*	*A*=*NORMAL*
REGISTRATION REQUEST or REGISTRATION CONFIRMATION packet with a format error (see Note 3)	*A*=*DIAG* *D*=38, 39, 81 or 82	*A*=*ERROR* *S*=r3 *D*=38, 39, 81 or 82 (see Note 4)	*A*=*ERROR* *D*=38, 39, 81 or 82
Call setup, call clearing, DATA, interrupt, flow control, or reset packet	See Table 5-5	*A*=*ERROR* *S*=r3 *D*=18	*A*=*DISCARD*

NOTES:

1. *The Mode S subnetwork has no restart states. Receipt of a RESTART REQUEST causes the DCE to respond with a RESTART CONFIRMATION. The RESTART REQUEST packet is forwarded to the reformatting process, which issues clear requests for all SVCs associated with the DTE. The DCE enters the r3 state only as a result of an error detected on the DTE/DCE interface.*
2. *The SVC channels are returned to state p1, the permanent virtual circuits (PVC) channels are returned to state d1.*
3. *The use of the registration facility is optional on the DTE/DCE interface.*
4. *No action is taken within the Mode S subnetwork.*
5. *Table entries are defined as follows:* A = *action to be taken,* S = *the state to be entered,* D = *the diagnostic code to be used in packets generated as a result of this action,* DISCARD *indicates that the received packet is to be cleared for the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
6. *The error procedure consists of entering the r3 state, and sending a RESTART REQUEST to the reformatting process.*

Table 5-4. DTE effect on DCE restart states

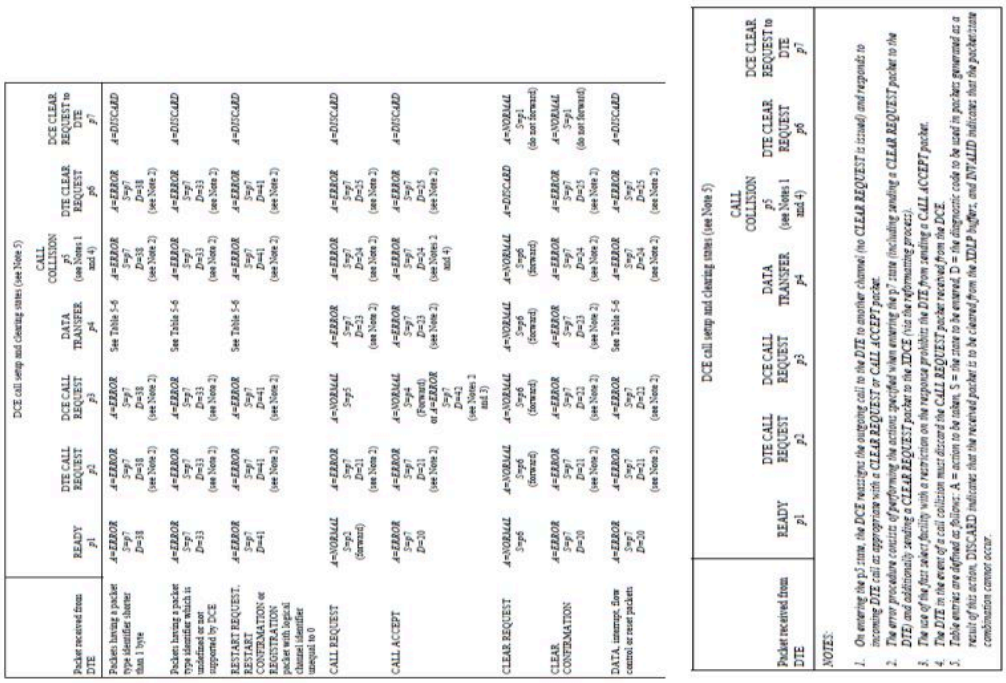


Packet received from DTE	DCE call setup and clearing states (see Note 5)						
	READY *p1*	DTE CALL REQUEST *p2*	DCE CALL REQUEST *p3*	DATA TRANSFER *p4*	CALL COLLISION *p5* (see Notes 1 and 4)	DTE CLEAR REQUEST *p6*	DCE CLEAR REQUEST to DTE *p7*
Packets having a packet type identifier shorter than 1 byte	A=ERROR S=*p7* D=18	A=ERROR S=*p7* D=18 (see Note 2)	A=ERROR S=*p7* D=18 (see Note 2)	See Table 5-5	A=ERROR S=*p7* D=18 (see Note 2)	A=ERROR S=*p7* D=18 (see Note 2)	A=DISCARD
Packets having a packet type identifier which is undefined or not supported by DCE	A=ERROR S=*p7* D=33	A=ERROR S=*p7* D=33 (see Note 2)	A=ERROR S=*p7* D=33 (see Note 2)	See Table 5-5	A=ERROR S=*p7* D=33 (see Note 2)	A=ERROR S=*p7* D=33 (see Note 2)	A=DISCARD
RESTART REQUEST, RESTART CONFIRMATION or REGISTRATION packet with logical channel identifier unequal to 0	A=ERROR S=*p7* D=1	A=ERROR S=*p7* D=1 (see Note 2)	A=ERROR S=*p7* D=1 (see Note 2)	See Table 5-6	A=ERROR S=*p7* D=1 (see Note 2)	A=ERROR S=*p7* D=1 (see Note 2)	A=DISCARD
CALL REQUEST	A=NORMAL S=*p5* (forward)	A=ERROR S=*p7* D=21 (see Note 2)	A=NORMAL S=*p5*	A=ERROR S=*p7* D=21 (see Note 2)	A=ERROR S=*p7* D=21 (see Note 2)	A=ERROR S=*p7* D=21 (see Note 2)	A=DISCARD
CALL ACCEPT	A=ERROR S=*p7* D=20	A=ERROR S=*p7* D=21 (see Note 2)	A=NORMAL S=*p4* (forward) or A=ERROR S=*p7* D=1 (see Note 2 and 3)	A=ERROR S=*p7* D=23 (see Note 2)	A=ERROR S=*p7* D=24 (see Note 2 and 4)	A=ERROR S=*p7* D=25 (see Note 2)	A=DISCARD
CLEAR REQUEST	A=NORMAL S=*p6*	A=NORMAL S=*p6* (forward)	A=NORMAL S=*p6* (forward)	A=NORMAL S=*p6* (forward)	A=NORMAL S=*p6* (forward)	A=DISCARD	A=NORMAL S=*p1* (do not forward)
CLEAR CONFIRMATION	A=ERROR S=*p7* D=20	A=ERROR S=*p7* D=21 (see Note 2)	A=ERROR S=*p7* D=22 (see Note 2)	A=ERROR S=*p7* D=23 (see Note 2)	A=ERROR S=*p7* D=24 (see Note 2)	A=ERROR S=*p7* D=25 (see Note 2)	A=NORMAL S=*p1* (do not forward)
DATA, interrupt, flow control or reset packets	A=ERROR S=*p7* D=20	A=ERROR S=*p7* D=21 (see Note 2)	A=ERROR S=*p7* D=21 (see Note 2)	See Table 5-5	A=ERROR S=*p7* D=24 (see Note 2)	A=ERROR S=*p7* D=25 (see Note 2)	A=DISCARD

NOTES:

1. *On entering the p5 state, the DCE reassigns the outgoing call to the DTE to another channel (no CLEAR REQUEST is issued) and responds to incoming DTE call as appropriate with a CLEAR REQUEST or CALL ACCEPT packet.*
2. *The error procedure consists of performing the actions specified when entering the p7 state (including sending a CLEAR REQUEST packet to the DTE) and additionally sending a CLEAR REQUEST packet to the XDCE (via the reformatting process).*
3. *The use of the fast select facility with a restriction on the response prohibits the DTE from sending a CALL ACCEPT packet.*
4. *The DTE in the event of a call collision must discard the CALL REQUEST packet received from the DCE.*
5. *Table entries are defined as follows:* A = *action to be taken,* S = *the state to be entered,* D = *the diagnostic code to be used in packets generated as a result of this action,* DISCARD *indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*

Table 5-5. DTE effect on DCE call setup and clearing states



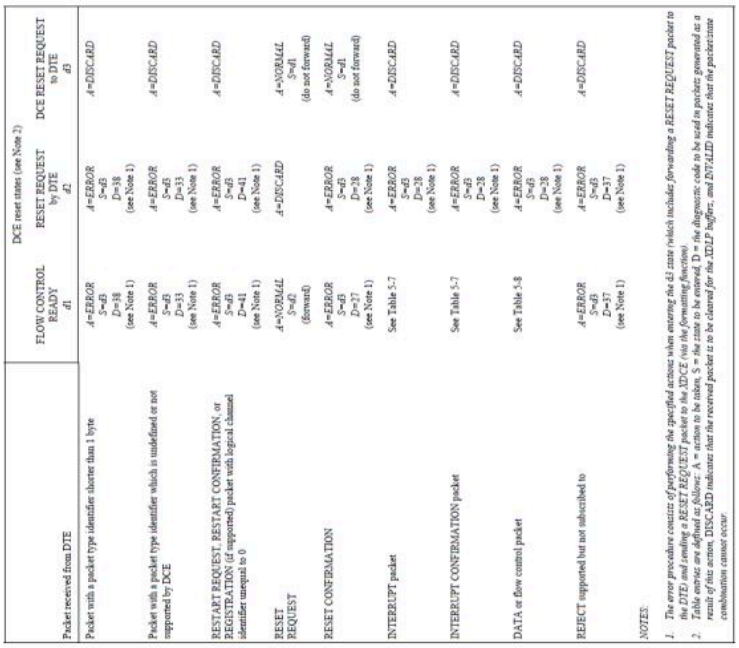
	DCE call setup and clearing states (see Note 5)							
Packet received from DTE	READY p1	DTE CALL REQUEST p2	DCE CALL REQUEST p3	DATA TRANSFER p4	CALL COLLISION p5 (see Notes 1 and 4)	DTE CLEAR REQUEST p6	DCE CLEAR REQUEST to DTE p7
Packet having a packet type identifier shorter than 1 byte	d=ERROR S=p7 D=58	d=ERROR S=p7 D=58 (see Note 2)	d=ERROR S=p7 D=58 (see Note 2)	See Table 5-5	d=ERROR S=p7 D=58 (see Note 2)	d=ERROR S=p7 D=58 (see Note 2)	d=DISCARD
Packet having a packet type identifier which is undefined or not supported by DCE	d=ERROR S=p7 D=33 (see Note 2)	d=ERROR S=p7 D=33 (see Note 2)	d=ERROR S=p7 D=33 (see Note 2)	See Table 5-5	d=ERROR S=p7 D=33 (see Note 2)	d=ERROR S=p7 D=33 (see Note 2)	d=DISCARD
RESTART REQUEST, RESTART CONFIRMATION, or REGISTRATION (if supported) packet with logical channel identifier unequal to 0	d=ERROR S=p7 D=41 (see Note 2)	d=ERROR S=p7 D=41 (see Note 2)	d=ERROR S=p7 D=41 (see Note 2)	See Table 5-5	d=ERROR S=p7 D=41 (see Note 2)	d=ERROR S=p7 D=41 (see Note 2)	d=DISCARD
RESET REQUEST	d=NORMAL S=p2 (forward)	d=ERROR S=p7 D=21 (see Note 2)	d=NORMAL S=p5	d=ERROR S=p7 D=53 (see Note 2)	d=ERROR S=p7 D=54 (see Note 2)	d=ERROR S=p7 D=25 (see Note 2)	d=DISCARD
CALL ACCEPT	d=ERROR S=p7 D=20	d=ERROR S=p7 D=21 (see Note 2)	d=NORMAL S=p4 (Forward) or d=ERROR S=p7 D=42 (see Notes 2 and 3)	d=ERROR S=p7 D=53 (see Note 2)	d=ERROR S=p7 D=54 (see Note 2)	d=ERROR S=p7 D=25 (see Note 2)	d=DISCARD
CLEAR REQUEST	d=NORMAL S=p6 (forward)	d=NORMAL S=p6 (forward)	d=NORMAL S=p6 (forward)	d=NORMAL S=p6 (forward)	d=NORMAL S=p6 (forward)	d=DISCARD	d=NORMAL S=p1 (do not forward)
CLEAR CONFIRMATION	d=ERROR S=p7 D=20	d=ERROR S=p7 D=21 (see Note 2)	d=ERROR S=p7 D=21 (see Note 2)	d=ERROR S=p7 D=53 (see Note 2)	d=ERROR S=p7 D=54 (see Note 2)	d=ERROR S=p7 D=25 (see Note 2)	d=NORMAL S=p1 (do not forward)
DATA, interrupt, flow control or reset packets	d=ERROR S=p7 D=20	d=ERROR S=p7 D=21 (see Note 2)	d=ERROR S=p7 D=21 (see Note 2)	See Table 5-5	d=ERROR S=p7 D=54 (see Note 2)	d=ERROR S=p7 D=25 (see Note 2)	d=DISCARD

	DCE call setup and clearing states (see Note 5)						
Packet received from DTE	READY p1	DTE CALL REQUEST p2	DCE CALL REQUEST p3	DATA TRANSFER p4	CALL COLLISION p5 (see Notes 1 and 4)	DTE CLEAR REQUEST p6	DCE CLEAR REQUEST to DTE p7

NOTES:

1. *On entering the p5 state, the DCE recognizes the outgoing call to the DTE to another channel (no CLEAR REQUEST to oneself) and responds to incoming DTE calls as appropriate with a CLEAR REQUEST or CALL ACCEPT packet.*
2. *The error procedure consists of performing the actions specified when entering the p7 state (including sending a CLEAR REQUEST packet to the DTE) and additionally sending a CLEAR REQUEST packet to the IDCE (via the reformatting process).*
3. *The use of the fast select facility with a restriction on the response prohibits the DTE from sending a CALL ACCEPT packet.*
4. *The DTE in the event of a call collision must discard the CALL REQUEST packet received from the DCE.*
5. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared for the IDLE buffers, and INVALID indicates that the packet/state combination cannot occur.*

Table 5-6 DTE effect on DCE reset states



	DCE reset states (see Note 2)		
Packet received from DTE	FLOW CONTROL READY d1	RESET REQUEST by DTE d2	DCE RESET REQUEST to DTE d3
Packet with a packet type identifier shorter than 1 byte	d=ERROR S=d3 D=38 (see Note 1)	d=ERROR S=d3 D=38 (see Note 1)	d=DISCARD
Packet with a packet type identifier which is undefined or not supported by DCE	d=ERROR S=d3 D=33 (see Note 1)	d=ERROR S=d3 D=33 (see Note 1)	d=DISCARD
RESTART REQUEST, RESTART CONFIRMATION, or REGISTRATION (if supported) packet with logical channel identifier unequal to 0	d=ERROR S=d3 D=41 (see Note 1)	d=ERROR S=d3 D=41 (see Note 1)	d=DISCARD
RESET REQUEST	d=NORMAL S=d2 (forward)	d=DISCARD	d=NORMAL S=d1 (do not forward)
RESET CONFIRMATION	d=ERROR S=d3 D=37 (see Note 1)	d=ERROR S=d3 D=28 (see Note 1)	d=NORMAL S=d1 (do not forward)
INTERRUPT packet	See Table 5-7	d=ERROR S=d3 D=28 (see Note 1)	d=DISCARD
INTERRUPT CONFIRMATION packet	See Table 5-7	d=ERROR S=d3 D=28 (see Note 1)	d=DISCARD
DATA or flow control packet	See Table 5-8	d=ERROR S=d3 D=28 (see Note 1)	d=DISCARD
REJECT supported but not subscribed to	d=ERROR S=d3 D=37 (see Note 1)	d=ERROR S=d3 D=37 (see Note 1)	d=DISCARD

NOTES:

1. *The error procedure consists of performing the specified actions when entering the d3 state (which includes forwarding a RESET REQUEST packet to the DTE) and sending a RESET REQUEST packet to the IDCE (via the reformatting function).*
2. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared for the IDLE buffers, and INVALID indicates that the packet/state combination cannot occur.*

Table 5-7. DTE effect on DCE interrupt transfer states

Packet received from DTE	DTE/DCE interrupt transfer states (see Note 2) DTE INTERRUPT READY *i1*	 DTE INTERRUPT SENT *i2*
INTERRUPT (see Note 1)	*A=NORMAL* *S=i2* (forward)	*A=ERROR* *S=d3* *D=44* (see Note 3)
Packet received from DTE	**DTE/DCE interrupt transfer states (see Note 2)** **DCE INTERRUPT READY** ***j1***	 **DCE INTERRUPT SENT** ***j2***
INTERRUPT CONFIRMATION (see Note 1)	*A=ERROR* *S=d3* *D=43* (see Note 3)	*A=NORMAL* *S=j1* (forward)

NOTES:

1. *If the packet has a format error, then the error procedure applies (see Note 3). Interrupt packets with user data greater than 32 bytes should be treated as a format error.*
2. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
3. *The error procedure consists of performing the specified actions when entering the d3 state (which includes forwarding a RESET REQUEST packet to the DTE) and sending a RESET REQUEST packet to the XDCE (via the reformatting process).*

Table 5-8. DTE effect on DCE flow control transfer states

Packet received from DTE	DCE flow control transfer states (see Notes 2 and 3) DCE RECEIVE READY *f1*	 DCE RECEIVE NOT READY *f2*
DATA packet with less than 4 bytes when using modulo 128 numbering	*A=ERROR* *S=d3* *D=38* (see Note 4)	*A=DISCARD*
DATA packet with invalid PR	*A=ERROR* *S=d3* *D=2* (see Note 4)	*A=ERROR* *S=d3* *D=2* (see Note 4)
DATA packet with valid PR but invalid PS or user data field with improper format	*A=ERROR* *S=d3* *D=1* (invalid PS) *D=39* (UD > maxs negotiated length) *D=80* (UD unaligned) (see Note 4)	*A=DISCARD* (process PR data)
DATA packet with valid PR with M-bit set to 1 when the user data field is partially full	*A=ERROR* *S=d3* *D=165* (see Note 4)	*A=DISCARD* (process PR data)
DATA packet with valid PR, PS and user data field format	*A=NORMAL* (forward)	*A=DISCARD* (process PR data)
Packet received from DTE	**DCE flow control transfer states (see Notes 2 and 3)** **DTE RECEIVE READY** ***g1***	 **DTE RECEIVE NOT READY** ***g2***
RR, RNR, or REJECT packet with less than 3 bytes when using modulo 128 numbering (see Note 1)	*A=DISCARD*	*A=DISCARD*
RR, RNR, or REJECT packet with an invalid PR	*A=ERROR* *S=d3* *D=1* (see Note 4)	*A=ERROR* *S=d3* *D=2* (see Note 4)
RR packet with a valid PR	*A=NORMAL*	*A=NORMAL* *S=g1*
RNR packet with a valid PR	*A=NORMAL* *S=g2*	*A=NORMAL*
REJECT packet with a valid PR	*A=NORMAL*	*A=NORMAL* *S=g1*

NOTES:

1. *The reject procedures are not required.*
2. *The RR, RNR and REJECT procedures are a local DTE/DCE matter and the corresponding packets are not forwarded to the XDCE.*
3. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
4. *The error procedure consists of performing the specified actions when entering the d3 state (which includes forwarding a RESET REQUEST packet to the DTE) and sending a RESET REQUEST packet to the XDCE (via the reformatting process).*

Table 5-9. XDCE effect on DCE restart states

Packet received from XDCE	DCE restart states (see Note)		
	PACKET LEVEL READY *r1*	DTE RESTART REQUEST *r2*	DCE RESTART REQUEST *r3*
CALL REQUEST	See Table 5-10	Send CLEAR REQUEST to reformatting process with *D*=244	Send CLEAR REQUEST to reformatting process with *D*=244
CALL ACCEPT, CLEAR REQUEST, DATA, INTERRUPT, INTERRUPT CONFIRMATION, RESET REQUEST	See Table 5-10	*A=DISCARD*	*A=DISCARD*

Note.— Table entries are defined as follows: A = *action to be taken,* S = *the state to be entered,* D = *the diagnostic code to be used in packets generated as a result of this action,* DISCARD *indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*

Table 5-10. XDCE effect on DCE call setup and clearing states

Packet received from XDCE	DCE call setup and clearing states (see Note)						
	READY *p1*	DTE CALL REQUEST *p2*	DCE CALL REQUEST *p3*	DATA TRANSFER *p4*	CALL COLLISION *p5*	DTE CLEAR REQUEST *p6*	DCE CLEAR REQUEST to DTE *p7*
CALL REQUEST	*A=NORMAL* *S=p3* (forward)	INVALID	INVALID	INVALID	INVALID	INVALID	INVALID
CALL ACCEPT	*A=DISCARD*	*A=NORMAL* *S=p4* (forward)	INVALID	INVALID	INVALID	*A=DISCARD*	*A=DISCARD*
CLEAR REQUEST	*A=DISCARD*	*A=NORMAL* *S=p7* (forward)	*A=NORMAL* *S=p7* (forward)	*A=NORMAL* *S=p7* (forward)	INVALID	*A=DISCARD*	*A=DISCARD*
DATA, INTERRUPT, INTERRUPT CONFIRMATION, or RESET REQUEST	*A=DISCARD*	INVALID	INVALID	See Table 5-11	INVALID	*A=DISCARD*	*A=DISCARD*

Note.— Table entries are defined as follows: A = *action to be taken,* S = *the state to be entered,* D = *the diagnostic code to be used in packets generated as a result of this action,* DISCARD *indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*

Table 5-11. XDCE effect on DCE reset states

Packet received from XDCE	DCE reset states (see Note) FLOW CONTROL READY *d1*	 DTE RESET REQUEST *d2*	 DCE RESET REQUEST to DTE *d3*
RESET REQUEST	*A=NORMAL* *S=d3* (forward)	*A=NORMAL* *S=d1* (forward)	*A=DISCARD*
INTERRUPT	See Table 5-12	*A=DISCARD*	*A=DISCARD*
INTERRUPT CONFIRMATION	See Table 5-12	*A=DISCARD*	INVALID
DATA	*A=NORMAL* (forward)	*A=DISCARD*	*A=DISCARD*

Note.— Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.

Table 5-12. XDCE effect on DCE interrupt transfer states

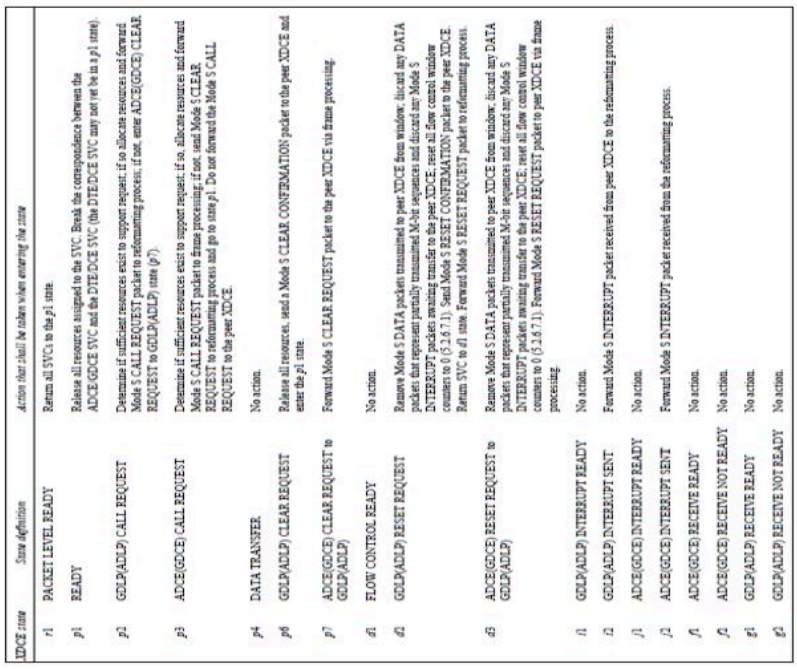
Packet received from XDCE	DCE interrupt transfer states (see Note) DTE INTERRUPT READY *i1*	 DTE INTERRUPT SENT *i2*
INTERRUPT CONFIRMATION	INVALID	*A=NORMAL* *S=i1* (forward)
Packet received from XDCE	DCE interrupt transfer states (see Note) DCE INTERRUPT READY *j1*	 DCE INTERRUPT SENT *j2*
INTERRUPT	*A=NORMAL* *S=j2* (forward)	INVALID

Note.— Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.

Table 5-13. GDLP Mode S subnetwork timers

Timer name	*Timer label*	*Nominal value*
Active channel-GDLP	*Tx*	300 s
L-bit delivery-GDLP	*Tm*	120 s
Packet resequencing and S-bit delivery	*Tq*	60 s

Table 5-14. XDCE actions at state transition



XDCE state	State definition	Action that shall be taken when entering the state
r1	PACKET LEVEL READY	Return all SVCs to the p1 state.
p1	READY	Release all resources assigned to the SVC. Break the correspondence between the ADCE/GDCE SVC and the DTE/DCE SVC (the DTE/DCE SVC may not yet be in a p1 state).
p2	GDLP(ADLP) CALL REQUEST	Determine if sufficient resources exist to support request: if so allocate resources and forward Mode S CALL REQUEST packet to reformatting process; if not, enter ADCE(GDCE) CLEAR REQUEST to GDLP(ADLP) state (p7).
p3	ADCE(GDCE) CALL REQUEST	Determine if sufficient resources exist to support request: if so, allocate resources and forward Mode S CALL REQUEST packet to frame processing; if not, send Mode S CLEAR REQUEST to reformatting process and go to state p1. Do not forward the Mode S CALL REQUEST to the peer XDCE.
p4	DATA TRANSFER	No action.
p6	GDLP(ADLP) CLEAR REQUEST	Release all resources, send a Mode S CLEAR CONFIRMATION packet to the peer XDCE and enter the p1 state.
p7	ADCE(GDCE) CLEAR REQUEST to GDLP(ADLP)	Forward Mode S CLEAR REQUEST packet to the peer XDCE via frame processing.
d1	FLOW CONTROL READY	No action.
d2	GDLP(ADLP) RESET REQUEST	Remove Mode S DATA packets transmitted to peer XDCE from window; discard any DATA packets that represent partially transmitted M-bit sequences and discard any Mode S INTERRUPT packets awaiting transfer to the peer XDCE; reset all flow control window counters to 0 (3.2.6.7.1). Send Mode S RESET CONFIRMATION packet to the peer XDCE. Return SVC to d1 state. Forward Mode S RESET REQUEST packet to reformatting process.
d3	ADCE(GDCE) RESET REQUEST to GDLP(ADLP)	Remove Mode S DATA packets transmitted to peer XDCE from window; discard any DATA packets that represent partially transmitted M-bit sequences and discard any Mode S INTERRUPT packets awaiting transfer to the peer XDCE; reset all flow control window counters to 0 (3.2.6.7.1). Forward Mode S RESET REQUEST packet to peer XDCE via frame processing.
i1	GDLP(ADLP) INTERRUPT READY	No action.
i2	GDLP(ADLP) INTERRUPT SENT	Forward Mode S INTERRUPT packet received from peer XDCE to the reformatting process.
j1	ADCE(GDCE) INTERRUPT READY	No action.
j3	ADCE(GDCE) INTERRUPT SENT	Forward Mode S INTERRUPT packet received from the reformatting process.
f1	ADCE(GDCE) RECEIVE READY	No action.
f2	ADCE(GDCE) RECEIVE NOT READY	No action.
g1	GDLP(ADLP) RECEIVE READY	No action.
g2	GDLP(ADLP) RECEIVE NOT READY	No action.

Table 5-15. GDLP (ADLP) effect on ADCE (GDCE) packet layer ready states

Packet received from GDLP (ADLP) (see Note 2)	ADCE (GDCE) states (see Notes 1 and 3) PACKET LEVEL READY r1
CH=0 with no TC present (see Note 4) or CH=0 in a CALL ACCEPT by ADLP packet	*A=DISCARD*
Unassigned packet header	*A=DISCARD*
Call setup, call clearing, DATA, interrupt, flow control, or reset	See Table 5-16

NOTES:

1. *The XDCE state is not necessarily the same state as the DTE/DCE interface.*
2. *All packets from the peer XDLP have been checked for duplication before evaluation as represented by this table.*
3. *Table entries are defined as follows:* A = *action to be taken,* S = *the state to be entered,* D = *the diagnostic code to be used in packets generated as a result of this action,* DISCARD *indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
4. *Where CH=0 and a valid TC is present in a CLEAR REQUEST by ADLP or GDLP packet or a CLEAR CONFIRMATION by ADLP or GDLP packet, it is handled as described in 5.2.5.1.2.3 and Table 5-16.*

Table 5-16. GDLP (ADLP) effect on ADCE (GDCE) call setup and clearing states

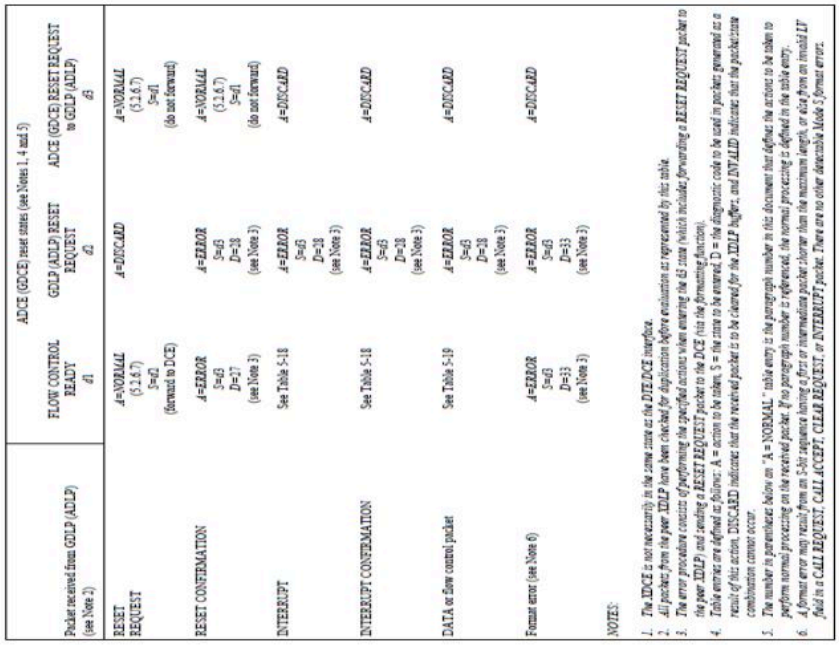
Packet received from GDLP (ADLP) (see Note 2)	ADCE (GDCE) call setup and clearing States (See Notes 1, 7 and 8)					
	READY *p1*	GDLP (ADLP) CALL REQUEST *p2*	ADCE (GDCE) CALL REQUEST *p3*	DATA TRANSFER *p4*	GDLP (ADLP) CLEAR REQUEST *p6*	ADCE (GDCE) CLEAR REQUEST to GDLP (ADLP) *p7*
Format error (see Note 3)	*A=ERROR* (see Note 10) *S=p7* *D*=33 (see Note 9)	*A=ERROR* *S=p7* *D*=33 (see Note 6)	*A=ERROR* *S=p7* *D*=33 (see Notes 6 and 9)	See Table 5-17	*A=ERROR* *S=p7* *D*=25 (see Note 6)	*A=DISCARD*
CALL REQUEST	*A=NORMAL* (5.2.6.3.1) *S=p2* (forward request to DCE)	*A=ERROR* *S=p7* *D*=21 (see Note 6)	Not applicable (see Note 4)	Not applicable (see Note 4)	*A=ERROR* *S=p7* *D*=25 (see Note 6)	*A=DISCARD*
CALL ACCEPT	*A=ERROR* *S=p7* *D*=20 (see Note 10)	*A=ERROR* *S=p7* *D*=21 (see Note 6)	*A=NORMAL* (5.2.6.3.1) *S=p4* (forward to DCE), or *A=ERROR* *S=p7* *D*=42 (see Note 6)	*A=ERROR* *S=p7* *D*=23 (see Note 6)	*A=ERROR* *S=p7* *D*=25 (see Note 6)	*A=DISCARD*

Packet received from GDLP (ADLP) (see Note 2)	ADCE (GDCE) call setup and clearing States (See Notes 1, 7 and 8)					
	READY *p1*	GDLP (ADLP) CALL REQUEST *p2*	ADCE (GDCE) CALL REQUEST *p3*	DATA TRANSFER *p4*	GDLP (ADLP) CLEAR REQUEST *p6*	ADCE (GDCE) CLEAR REQUEST to GDLP (ADLP) *p7*
CLEAR REQUEST	*A=NORMAL* (5.2.6.3.3) *S=p6* (do not forward)	*A=NORMAL* (5.2.6.3.3) *S=p6* (forward to DCE)	*A=NORMAL* (5.2.6.3.3) *S=p6* (forward to DCE)	*A=NORMAL* (5.2.6.3.3) *S=p6* (forward to DCE)	*A=DISCARD*	*A=NORMAL* (5.2.6.3.3) *S=p1* (do not forward)
CLEAR CONFIRMATION	*A=ERROR* *S=p7* *D*=20 (see Note 10)	*A=ERROR* *S=p7* *D*=21 (see Note 6)	*A=ERROR* *S=p7* *D*=22 (see Note 6)	*A=ERROR* *S=p7* *D*=23 (see Note 6)	*A=ERROR* *S=p7* *D*=25 (see Note 6)	*A=NORMAL* (5.2.6.3.3) *S=p1* (do not forward)
DATA, interrupt, flow control or reset packets	*A=ERROR* *S=p7* *D*=20 (see Note 10)	*A=ERROR* *S=p7* *D*=21 (see Notes 6 and 9)	*A=ERROR* *S=p7* *D*=21 (see Notes 5 and 6)	See Table 5-17	*A=ERROR* *S=p7* *D*=25 (see Note 6)	*A=DISCARD*

NOTES:

1. *The XDCE is not necessarily in the same state as the DTE/DCE interface.*
2. *All packets from the peer XDLP have been checked for duplication before emulation as represented by this table.*
3. *A format error may result from an S-bit sequence having a first or intermediate packet shorter than the maximum length, or else from an invalid LT field in a CALL REQUEST, CALL ACCEPT, CLEAR REQUEST or INTERRUPT packet. There are no other detectable Mode 3 format errors.*
4. *The ADCE assigns all channel numbers used between the ADLP and GDLP. hence call collisions are not possible. When a CALL REQUEST by GDLP packet is received bearing a temporary channel number associated with an STC in the p4 state, the association of the temporary to permanent channel number is broken (5.2.5.1.1.2.3).*
5. *Not applicable to the GDLP.*
6. *The error procedure consists of performing the actions specified when entering the p7 state (including sending a CLEAR REQUEST packet to the peer XDLP) and additionally sending a CLEAR REQUEST packet to the DCE (via the reformatting process).*
7. *Table entries are defined as follows: A = action to be entered, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action. DISCARD indicates that the received packet is to be cleared from the XDLP buffers; and INVALID indicates that the packet/state combination cannot occur.*
8. *The number in parentheses below an "A = NORMAL" table entry is the paragraph number in this document that defines the actions to be taken to perform normal processing on the received packet. If no paragraph number is referenced, the normal processing is defined in the table entry.*
9. *An error condition is declared and transfer to the p7 state is possible only if the ground DTE address is known unambiguously. Otherwise the action is to discard the packet.*
10. *The error procedure consists of performing the action when entering the p7 state (including sending a CLEAR REQUEST packet to the XDLP) but without sending a CLEAR REQUEST packet to the local DCE.*

Table 5-17. GDLP (ADLP) effect on ADCE (GDCE) reset states

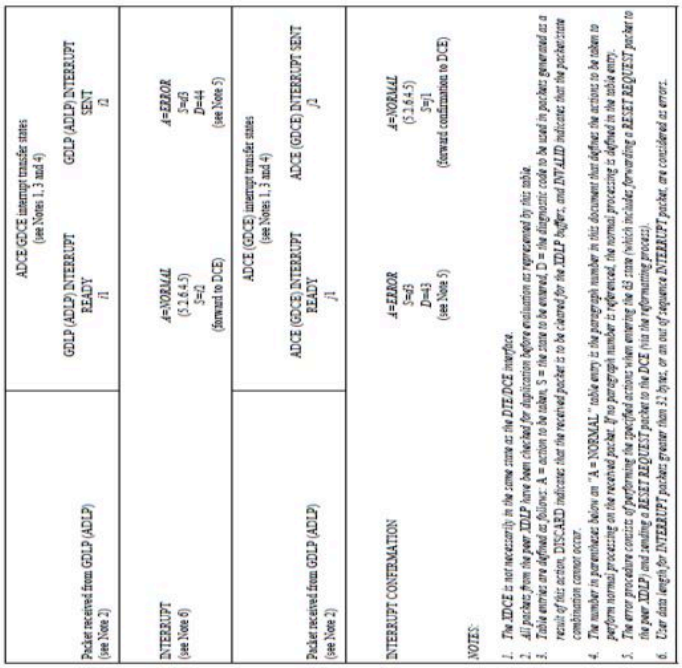


Packet received from GDLP (ADLP) (see Note 2)	ADCE (GDCE) reset states (see Notes 1, 4 and 5)		
	FLOW CONTROL READY *s1*	GDLP (ADLP) RESET REQUEST *s2*	ADCE (GDCE) RESET REQUEST to GDLP (ADLP) *s3*
RESET REQUEST	A=NORMAL (5.2.6.7) S=0 (forward to DCE)	A=DISCARD	A=NORMAL (5.2.6.7) S=1 (do not forward)
RESET CONFIRMATION	A=ERROR S=0 D=17 (see Note 3)	A=ERROR S=0 D=18 (see Note 3)	A=NORMAL (5.2.6.7) S=1 (do not forward)
INTERRUPT	See Table 5-18	A=ERROR S=0 D=18 (see Note 3)	A=DISCARD
INTERRUPT CONFIRMATION	See Table 5-18	A=ERROR S=0 D=18 (see Note 3)	A=DISCARD
DATA or flow control packet	See Table 5-19	A=ERROR S=0 D=18 (see Note 3)	A=DISCARD
Format error (see Note 6)	A=ERROR S=0 D=33 (see Note 3)	A=ERROR S=0 D=33 (see Note 3)	A=DISCARD

NOTES:

1. *The XDCE is not necessarily in the same state as the DTE/DCE interface.*
2. *All packets from the peer XDLP have been checked for duplication before evaluation as represented by this table.*
3. *The error procedure consists of performing the specified actions when entering the s3 state (which includes forwarding a RESET REQUEST packet to the peer XDLP) and sending a RESET REQUEST packet to the DCE (via the reforwarding function).*
4. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action. DISCARD indicates that the received packet is to be cleared for the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
5. *The number in parentheses below an "A = NORMAL" table entry is the paragraph number in this document that defines the actions to be taken to perform normal processing on the received packet. If no paragraph number is referenced, the normal processing is defined in the table entry.*
6. *A format error may result from an 8-bit sequence having a first or intermediate octet other than the maximum length, or else from an invalid LT field in a CALL REQUEST, CALL ACCEPT, CLEAR REQUEST, or INTERRUPT packet. There are no other detectable Mode 3 format errors.*

Table 5-18. GDLP (ADLP) effect on ADCE (GDCE) interrupt transfer states

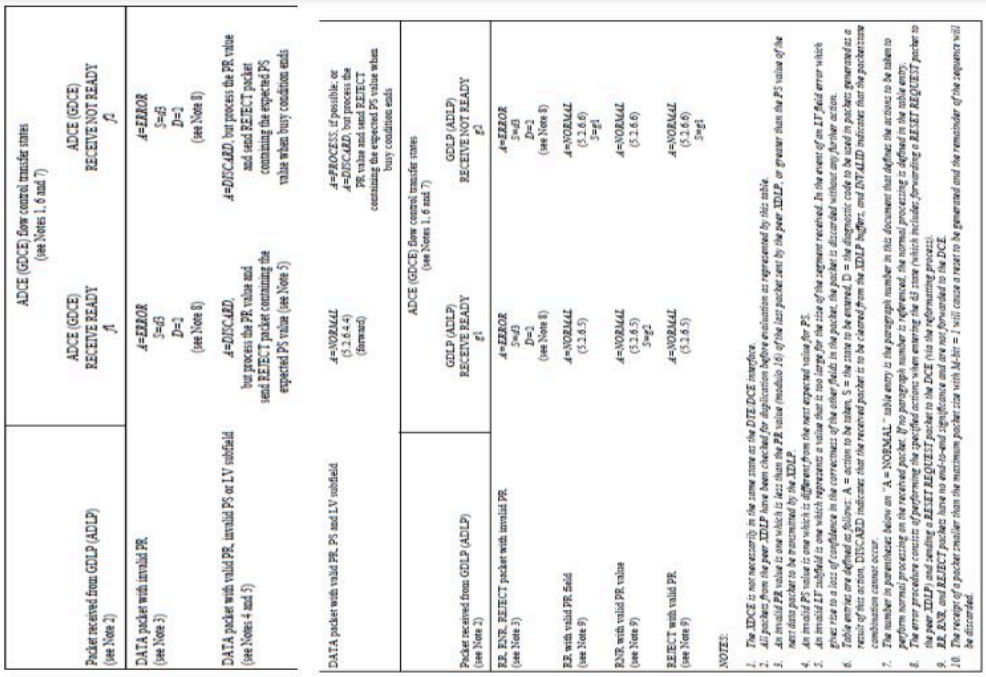


Packet received from GDLP (ADLP) (see Note 2)	ADCE/GDCE interrupt transfer states (see Notes 1, 3 and 4)	
	GDLP (ADLP) INTERRUPT READY *i1*	GDLP (ADLP) INTERRUPT SENT *i2*
INTERRUPT (see Note 6)	A=NORMAL (5.2.6.4.5) S=0 (forward to DCE)	A=ERROR S=0 D=44 (see Note 5)
Packet received from GDLP (ADLP) (see Note 2)	ADCE (GDCE) interrupt transfer states (see Notes 1, 3 and 4)	
	ADCE (GDCE) INTERRUPT READY *j1*	ADCE (GDCE) INTERRUPT SENT *j2*
INTERRUPT CONFIRMATION	A=ERROR S=0 D=43 (see Note 5)	A=NORMAL (5.2.6.4.5) S=1 (forward confirmation to DCE)

NOTES:

1. *The XDCE is not necessarily in the same state as the DTE/DCE interface.*
2. *All packets from the peer XDLP have been checked for duplication before evaluation as represented by this table.*
3. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action. DISCARD indicates that the received packet is to be cleared for the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
4. *The number in parentheses below an "A = NORMAL" table entry is the paragraph number in this document that defines the actions to be taken to perform normal processing on the received packet. If no paragraph number is referenced, the normal processing is defined in the table entry.*
5. *The error procedure consists of performing the specified actions when entering the s3 state (which includes forwarding a RESET REQUEST packet to the peer XDLP) and sending a RESET REQUEST packet to the DCE (via the reforwarding process).*
6. *User data length for INTERRUPT packets greater than 32 bytes, or an out of sequence INTERRUPT packet, are considered as errors.*

Table 5-19. GDLP (ADLP) effect on ADCE (GDCE) flow control transfer states



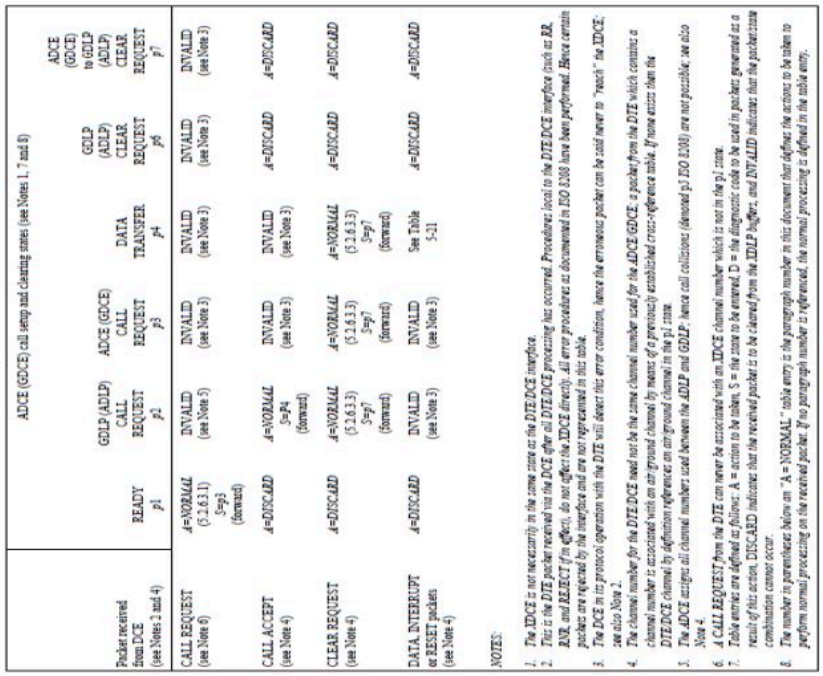
Packet received from GDLP (ADLP) (see Note 2)	ADCE (GDCE) flow control transfer states (see Notes 1, 6 and 7)	
	ADCE (GDCE) RECEIVE READY *p1*	ADCE (GDCE) RECEIVE NOT READY *p2*
DATA packet with invalid PR (see Note 3)	*A*=ERROR *S*=*d3* *D*=1 (see Note 8)	*A*=ERROR *S*=*d3* *D*=1 (see Note 8)
DATA packet with valid PR, invalid PS or LV subfield (see Notes 4 and 5)	*A*=DISCARD, but process the PR value and send REJECT packet containing the expected PS value (see Note 5)	*A*=DISCARD, but process the PR value and send REJECT packet containing the expected PS value when busy condition ends
DATA packet with valid PR, PS and LV subfield	*A*=NORMAL (5.1.6.4-5) (forward)	*A*=PROCESS, if possible, or *A*=DISCARD, but process the PR value and send REJECT containing the expected PS value when busy condition ends

Packet received from GDLP (ADLP) (see Note 2)	ADCE (GDCE) flow control transfer states (see Notes 1, 6 and 7)	
	GDLP (ADLP) RECEIVE READY *p1*	GDLP (ADLP) RECEIVE NOT READY *p2*
RR, RNR, REJECT packet with invalid PR (see Note 3)	*A*=ERROR *S*=*d3* *D*=1 (see Note 8)	*A*=ERROR *S*=*d3* *D*=1 (see Note 8)
RR with valid PR field (see Note 9)	*A*=NORMAL (5.3.6.5)	*A*=NORMAL (5.3.6.6) *S*=*p1*
RNR with valid PR value (see Note 9)	*A*=NORMAL (5.3.6.5) *S*=*p2*	*A*=NORMAL (5.3.6.6)
REJECT with valid PR (see Note 9)	*A*=NORMAL (5.3.6.5)	*A*=NORMAL (5.3.6.6) *S*=*p1*

NOTES:

1. *The XDCE is not necessarily in the same state as the DTE/DCE interface.*
2. *All packets from the peer XDLP have been checked for duplication before evaluation as represented by this table.*
3. *An invalid PR value is one which is less than the PR value (modulo 16) of the last packet sent by the peer XDLP, or greater than the PS value of the next data packet to be transmitted by the XDLP.*
4. *An invalid PS value is one which is different from the next expected value for PS.*
5. *An invalid LV subfield is one which represents a value that is too large for the size of the segment received. In the event of an LV field error which gives rise to a loss of confidence in the correctness of the other fields in the packet, the packet is discarded without any further action.*
6. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action. DISCARD indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
7. *The number in parentheses below an "A = NORMAL" table entry is the paragraph number in this document that defines the actions to be taken to perform normal processing on the received packet. If no paragraph number is referenced, the normal processing is defined in the table entry.*
8. *The error procedure consists of performing the specified actions when entering the d3 state (which includes forwarding a RESET REQUEST packet to the peer XDLP) and sending a RESET REQUEST packet to the DCE (via the reformatting process).*
9. *RR, RNR, and REJECT packets have no end-to-end significance and are not forwarded to the DCE.*
10. *The receipt of a packet smaller than the maximum packet size with M-bit = 1 will cause a reset to be generated and the remainder of the sequence will be discarded.*

Table 5-20. DCE effect on ADCE (GDCE) call setup and clearing states

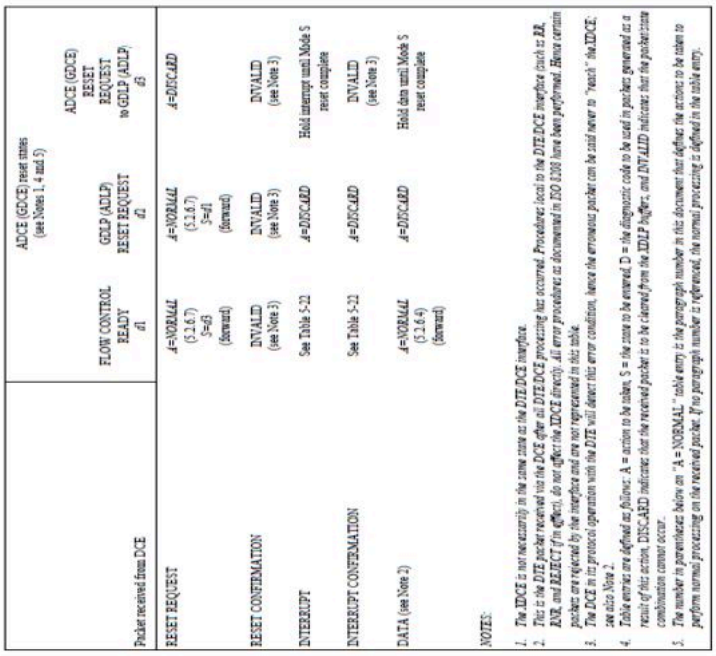


Packet received from DCE (see Notes 3 and 4)	ADCE (GDCE) call setup and clearing states (see Notes 1, 7 and 8)						ADCE (GDCE) to GDLP (ADLP) CLEAR REQUEST *p7*
	READY *p1*	GDLP (ADLP) CALL REQUEST *p2*	ADCE (GDCE) CALL REQUEST *p3*	DATA TRANSFER *p4*	GDLP (ADLP) CLEAR REQUEST *p6*		
CALL REQUEST (see Note 6)	*A*=NORMAL (5.2.6.3.1) *S*=*p3* (forward)	INVALID (see Note 5)	INVALID (see Note 3)	INVALID (see Note 3)	INVALID (see Note 3)		INVALID (see Note 3)
CALL ACCEPT (see Note 4)	*A*=DISCARD	*A*=NORMAL *S*=*P4* (forward)	INVALID (see Note 3)	INVALID (see Note 3)	*A*=DISCARD		*A*=DISCARD
CLEAR REQUEST (see Note 4)	*A*=DISCARD	*A*=NORMAL (5.2.6.3.3) *S*=*p7* (forward)	*A*=NORMAL (5.2.6.3.3) *S*=*p7* (forward)	*A*=NORMAL (5.2.6.3.3) *S*=*p7* (forward)	*A*=DISCARD		*A*=DISCARD
DATA, INTERRUPT or RESET packets (see Note 4)	*A*=DISCARD	INVALID (see Note 3)	INVALID (see Note 3)	See Table 5-21	*A*=DISCARD		*A*=DISCARD

NOTES:

1. *The XDCE is not necessarily in the same state as the DTE/DCE interface.*
2. *This is the DTE packet received via the DCE after all DTE/DCE processing has occurred. Procedures local to the DTE/DCE interface (such as RR, RNR, and REJECT) in effect, do not affect the XDCE directly; all error procedures as documented in ISO 8208 have been performed. Hence certain packets are rejected by the interface and are not represented in this table.*
3. *The DCE in its protocol operation with the DTE will detect this error condition, hence this erroneous packet can be said never to "reach" the XDCE; see also Note 2.*
4. *The channel number for the DTE/DCE need not be the same channel number used for the ADCE/GDCE - a packet from the DTE which contains a channel number is associated with an air/ground channel by means of a previously established cross-reference table. If none exists then the DTE/DCE channel by definition references an air/ground channel in the p1 state.*
5. *The ADCE assigns all channel numbers used between the ADLP and GDLP; hence call collisions (denoted p3 ISO 8208) are not possible; see also Note 4.*
6. *A CALL REQUEST from the DTE can never be associated with an XDCE channel number which is not in the p1 state.*
7. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action. DISCARD indicates that the received packet is to be cleared from the XDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
8. *The number in parentheses below an "A = NORMAL" table entry is the paragraph number in this document that defines the actions to be taken to perform normal processing on the received packet. If no paragraph number is referenced, the normal processing is defined in the table entry.*

Table 5-21. DCE effect on ADCE (GDCE) reset states

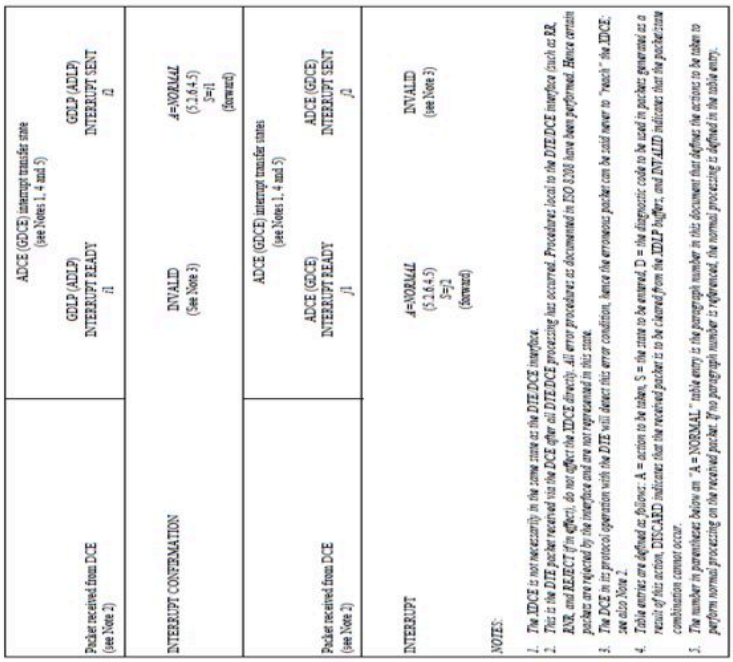


Packet received from DCE	ADCE (GDCE) reset states (see Notes 1, 4 and 5)		
	FLOW CONTROL READY *t1*	GDLP (ADLP) RESET REQUEST *t2*	ADCE (GDCE) RESET REQUEST to GDLP (ADLP) *t3*
RESET REQUEST	*A*=NORMAL (5.2.6.7) *S*=t3 (downward)	*A*=NORMAL (5.2.6.7) *S*=t1 (downward)	*A*=DISCARD
RESET CONFIRMATION	INVALID (see Note 3)	INVALID (see Note 3)	INVALID (see Note 3)
INTERRUPT	See Table 5-22	*A*=DISCARD	Hold interrupt until Mode S reset complete
INTERRUPT CONFIRMATION	See Table 5-22	*A*=DISCARD	INVALID (see Note 3)
DATA (see Note 2)	*A*=NORMAL (5.2.6.4) (downward)	*A*=DISCARD	Hold data until Mode S reset complete

NOTES:

1. *The ADCE is not necessarily in the same state as the DTE/DCE interface.*
2. *This is the DTE packet received via the DCE after all DTE/DCE processing has occurred. Procedures local to the DTE/DCE interface (such as RR, RNR, and REJECT (frmr sent)), do not affect the ADCE directly. All error procedures as documented in ISO 8208 have been performed. Hence certain packets are rejected by the interface and are not represented in this table.*
3. *The DCE in its protocol operation with the DTE will detect this error condition, hence the erroneous packet can be said never to "reach" the ADCE; see also Note 2.*
4. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared from the IDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
5. *The number in parentheses below an "A = NORMAL" table entry is the paragraph number in this document that defines the actions to be taken to perform normal processing on the received packet. If no paragraph number is referenced, the normal processing is defined in the table entry.*

Table 5-22. DCE effect on ADCE (GDCE) interrupt transfer states



Packet received from DCE (see Note 2)	ADCE (GDLP) interrupt transfer state (see Notes 1, 4 and 5)	
	GDLP (ADLP) INTERRUPT READY *t1*	GDLP (ADLP) INTERRUPT SENT *t2*
INTERRUPT CONFIRMATION	INVALID (See Note 3)	*A*=NORMAL (5.2.6.4-5) *S*=t1 (downward)
Packet received from DCE (see Note 2)	**ADCE (GDCE) interrupt transfer states (see Notes 1, 4 and 5)**	
	ADCE (GDCE) INTERRUPT READY *t1*	**ADCE (GDCE) INTERRUPT SENT *t2***
INTERRUPT	*A*=NORMAL (5.2.6.4-5) *S*=t2 (downward)	INVALID (see Note 3)

NOTES:

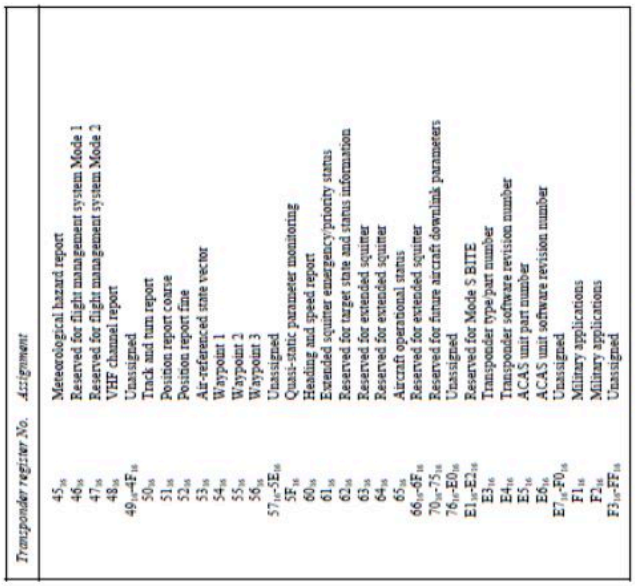
1. *The ADCE is not necessarily in the same state as the DTE/DCE interface.*
2. *This is the DTE packet received via the DCE after all DTE/DCE processing has occurred. Procedures local to the DTE/DCE interface (such as RR, RNR, and REJECT (frmr sent)), do not affect the ADCE directly. All error procedures as documented in ISO 8208 have been performed. Hence certain packets are rejected by the interface and are not represented in this state.*
3. *The DCE in its protocol operation with the DTE will detect this error condition, hence the erroneous packet can be said never to "reach" the ADCE; see also Note 2.*
4. *Table entries are defined as follows: A = action to be taken, S = the state to be entered, D = the diagnostic code to be used in packets generated as a result of this action, DISCARD indicates that the received packet is to be cleared from the IDLP buffers, and INVALID indicates that the packet/state combination cannot occur.*
5. *The number in parentheses below an "A = NORMAL" table entry is the paragraph number in this document that defines the actions to be taken to perform normal processing on the received packet. If no paragraph number is referenced, the normal processing is defined in the table entry.*

Table 5-23. Broadcast identifier number assignments

Uplink broadcast identifier	*Assignment*
00_{16}	Not valid
01_{16}	Reserved (differential GNSS correction)
30_{16}	Not valid
31_{16}	Reserved for ACAS (RA broadcast)
32_{16}	Reserved for ACAS (ACAS broadcast)
Others	Unassigned
Downlink broadcast identifier	*Assignment*
00_{16}	Not valid
02_{16}	Reserved (traffic information service)
10_{16}	Data link capability report
20_{16}	Aircraft identification
FE_{16}	Update request
FF_{16}	Search request
Others	Unassigned

Table 5-24. Register number assignments

Transponder register No.	*Assignment*
00_{16}	Not valid
01_{16}	Unassigned
02_{16}	Linked Comm-B, segment 2
03_{16}	Linked Comm-B, segment 3
04_{16}	Linked Comm-B, segment 4
05_{16}	Extended squitter airborne position
06_{16}	Extended squitter surface position
07_{16}	Extended squitter status
08_{16}	Extended squitter identification and type
09_{16}	Extended squitter airborne velocity
$0A_{16}$	Extended squitter event-driven information
$0B_{16}$	Air/air information 1 (aircraft state)
$0C_{16}$	Air/air information 2 (aircraft intent)
$0D_{16}$-$0E_{16}$	Reserved for air/air state information
$0F_{16}$	Reserved for ACAS
10_{16}	Data link capability report
11_{16}-16_{16}	Reserved for extension to data link capability reports
17_{16}	Common usage GICB capability report
18_{16}-$1F_{16}$	Mode S specific services capability reports
20_{16}	Aircraft identification
21_{16}	Aircraft and airline registration markings
22_{16}	Antenna positions
23_{16}	Reserved for antenna position
24_{16}	Reserved for aircraft parameters
25_{16}	Aircraft type
26_{16}-$2F_{16}$	Unassigned
30_{16}	ACAS active resolution advisory
31_{16}-$3F_{16}$	Unassigned
40_{16}	Selected vertical intention
41_{16}	Next waypoint identifier
42_{16}	Next waypoint position
43_{16}	Next waypoint information
44_{16}	Meteorological routine air report



Transponder register No.	*Assignment*
45_{16}	Meteorological hazard report
46_{16}	Reserved for flight management system Mode 1
47_{16}	Reserved for flight management system Mode 2
48_{16}	VHF channel report
49_{16}–$4F_{16}$	Unassigned
50_{16}	Track and turn report
51_{16}	Position report course
52_{16}	Position report fine
53_{16}	Air-referenced state vector
54_{16}	Waypoint 1
55_{16}	Waypoint 2
56_{16}	Waypoint 3
57_{16}–$5E_{16}$	Unassigned
$5F_{16}$	Quasi-static parameter monitoring
60_{16}	Heading and speed report
61_{16}	Extended squitter emergency/priority status
62_{16}	Reserved for target state and status information
63_{16}	Reserved for extended squitter
64_{16}	Reserved for extended squitter
65_{16}	Aircraft operational status
66_{16}–$6F_{16}$	Reserved for extended squitter
70_{16}–75_{16}	Reserved for future aircraft downlink parameters
76_{16}–$E0_{16}$	Unassigned
$E1_{16}$–$E2_{16}$	Reserved for Mode S BITE
$E3_{16}$	Transponder type part number
$E4_{16}$	Transponder software revision number
$E5_{16}$	ACAS unit part number
$E6_{16}$	ACAS unit software revision number
$E7_{16}$–$F0_{16}$	Unassigned
$F1_{16}$	Military applications
$F2_{16}$	Military applications
$F3_{16}$–FF_{16}	Unassigned

Note.— In the context of Table 5-24, the term "aircraft" can be understood as "transponder carrying aircraft","pseudo-aircraft (e.g. an obstacle)" or "vehicle".

Table 5-25. MSP channel number assignments

Uplink channel number	*Assignment*
0	Not valid
1	Reserved (specific services management)
2	Reserved (traffic information service)
3	Reserved (ground-to-air alert)
4	Reserved (ground derived position)
5	ACAS sensitivity level control
6	Reserved (ground-to-air service request)
7	Reserved (air-to-ground service response)
8–63	Unassigned
Downlink channel number	*Assignment*
0	Not valid
1	Reserved (specific services management)
2	Unassigned
3	Reserved (data flash)
4	Reserved (position request)
5	Unassigned
6	Reserved (ground-to-air service response)
7	Reserved (air-to-ground service request)
8–63	Unassigned

FOURTH SCHEDULE (-Regulation 49(c))

1. MODE S PACKET FORMATS)

1.1 Formats. The Mode S packet formats shall be as specified in Figures 5-3 to 5-22 as contained in the this schedule.

1.2 Significance of control fields. The structure of the format control fields used in Mode S packets shall be as specified in Figure 5-23. The significance of all control fields used in these packet formats shall be as follows:

Field symbol	***Definition***
GM	Address, Ground; the 8-bit binary representation of the ground DTE address
AM	Address, Mobile; the 4-bit binary representation of the last two BCD digits of the mobile DTE address
CC	Clearing cause as defined in ISO 8208
CH	Channel number (1 to 15)
DC	Diagnostic code as defined in ISO 8208
DP	Data packet type (Figure 5-23)
F	S-bit sequence, first packet flag
FILL	Fill field
FILL1	Has a length of 6 bits for a non-multiplexed packet in a downlink SLM frame; otherwise it is 0 bit
FILL1	Has a length of 0 bit for a non-multiplexed packet in a downlink SLM frame and for a multiplexing header; otherwise it is 2 bits
FIRST PACKET	The contents of the first of the multiplexed packets
FS	Fast select present
IN	Initialization bit
L	“More bit” for long-form MSP packets
LAST PACKET	The contents of the last of the multiplexed packets
LENGTH	The length of a multiplexed packet in bytes expressed as an unsigned binary number
LV	User data field length; number of user bytes M “More bit” for SVC DATA packets
M/CH	MSP channel number
MP	MSP packet type (Figure 5-23)
M/SN	Sequence number; the sequence number for the long form MSP packet
OD	Optional data
ODL	Optional data length
OF	Option flag
P	Priority field
PR	Packet receive sequence number
PS	Packet send sequence number
RC	Resetting cause code as defined in ISO 8208
RT	Route table
RTL	Route table length expressed in bytes
S	“More bit” for CALL REQUEST, CALL ACCEPT, CLEAR REQUEST and INTERRUPT packets
SN	Sequence number; the sequence number for this packet type
SP	Supervisory packet (Figure 5-23)
SS	Supervisory subset number (Figure 5-23)

ST	Supervisory type (Figure 5-23)
TC	Temporary channel number (1 to 3)
UD	User data field

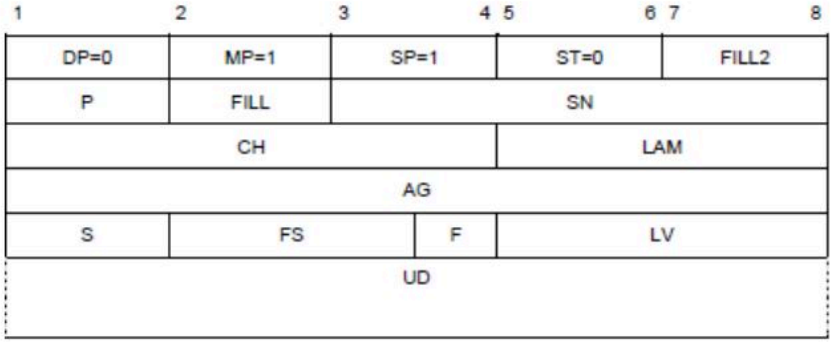


Figure 5-3. CALL REQUEST by ADLP packet

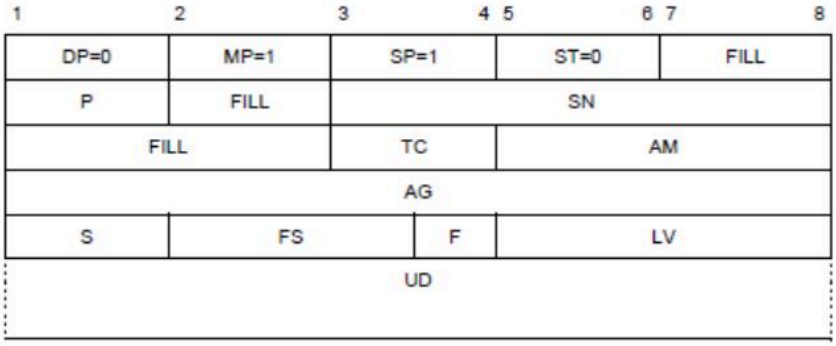


Figure 5-4. CALL REQUEST by GDLP packet

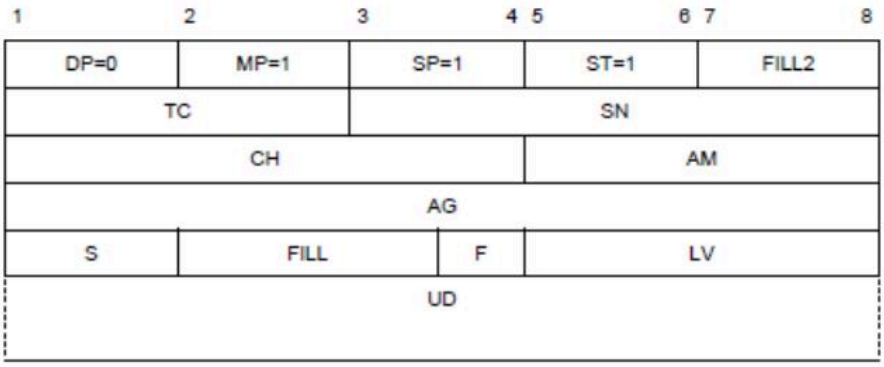


Figure 5-5. CALL ACCEPT by ADLP packet

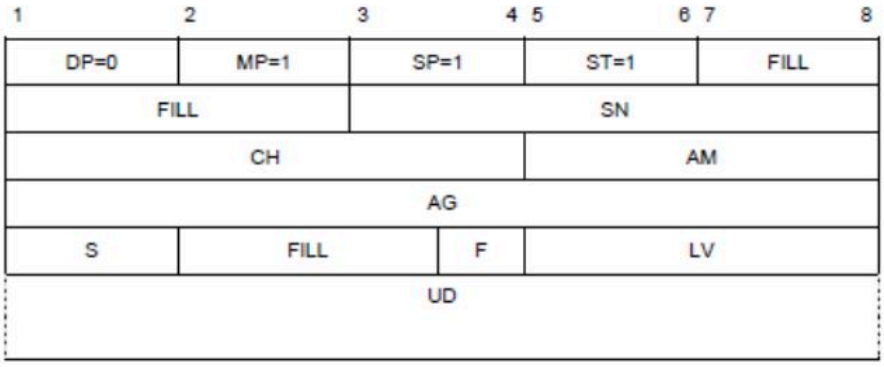


Figure 5-6. CALL ACCEPT by GDLP packet

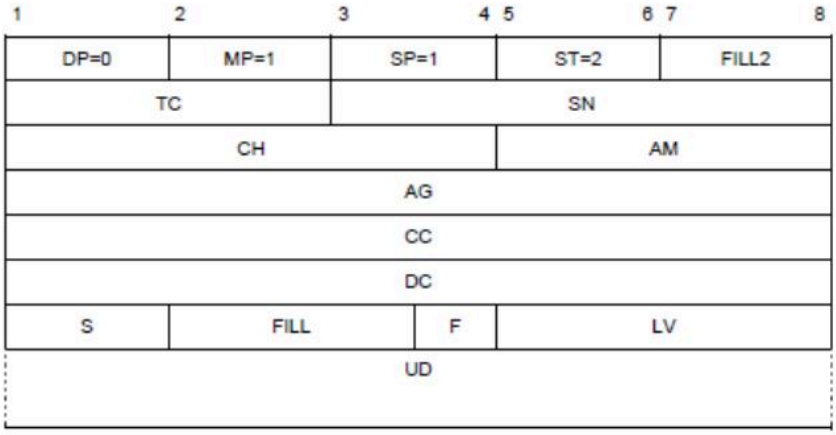


Figure 5-7. CLEAR REQUEST by ADLP packet

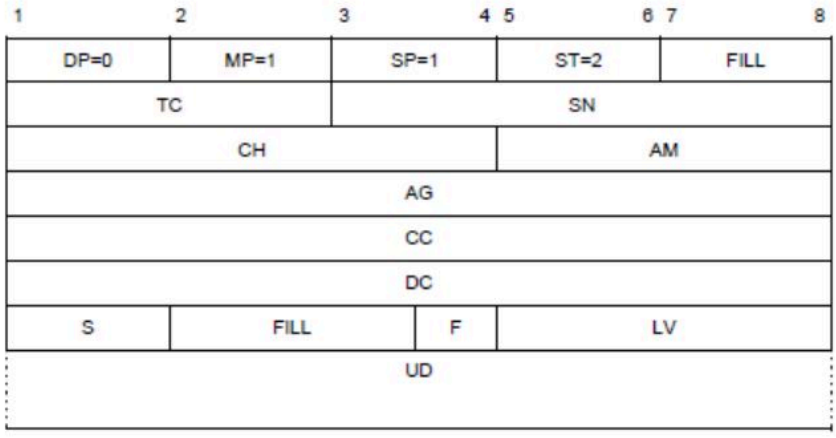


Figure 5-8. CLEAR REQUEST by GDLP packet

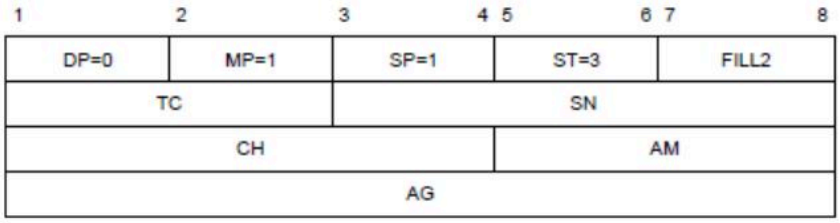


Figure 5-9. CLEAR CONFIRMATION by ADLP packet

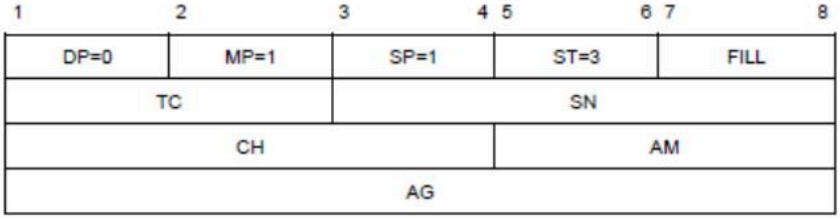


Figure 5-10. CLEAR CONFIRMATION by GDLP packet

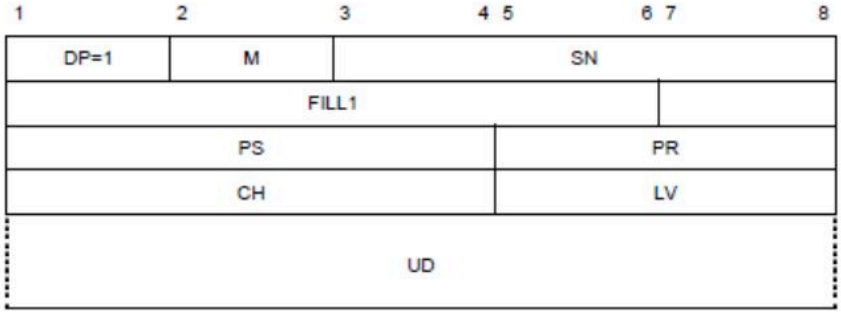


Figure 5-11. DATA packet

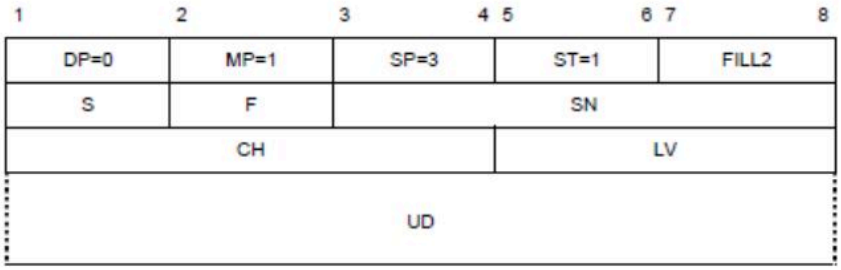


Figure 5-12. INTERRUPT packet

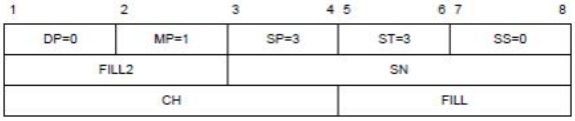


Figure 5-13. INTERRUPT CONFIRMATION packet

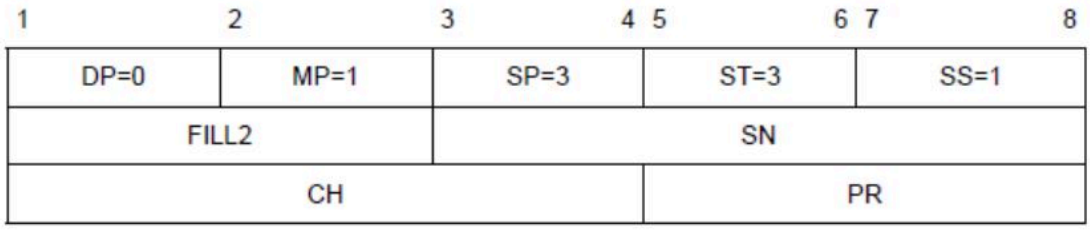


Figure 5-13. INTERRUPT CONFIRMATION packet

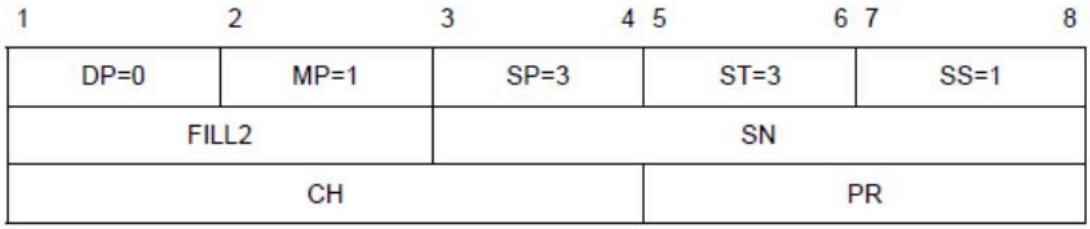


Figure 5-14. REJECT packet

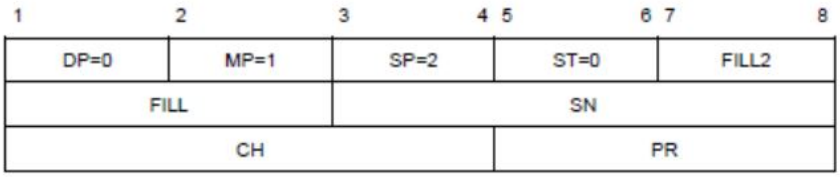


Figure 5-15. RECEIVE READY packet

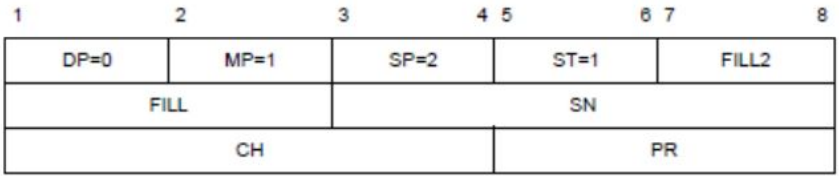


Figure 5-16. RECEIVE NOT READY packet

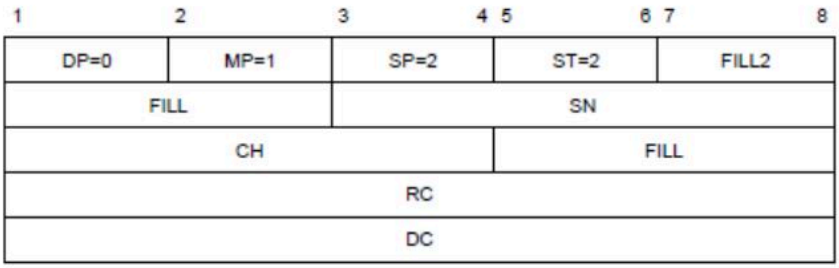


Figure 5-17. RESET REQUEST packet

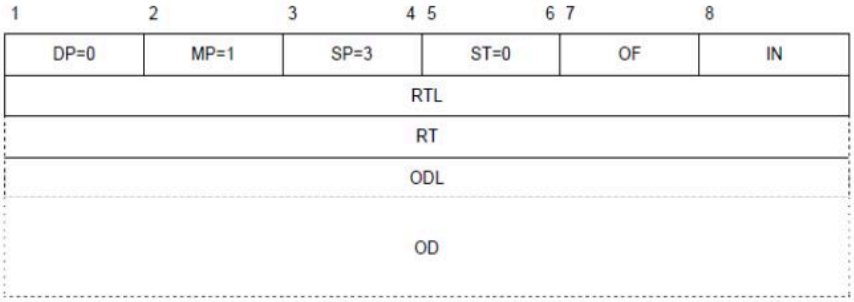


Figure 5-18. RESET CONFIRMATION packet

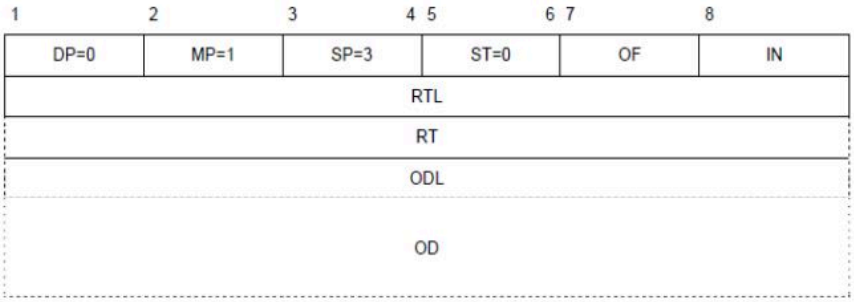


Figure 5-19. ROUTE packet

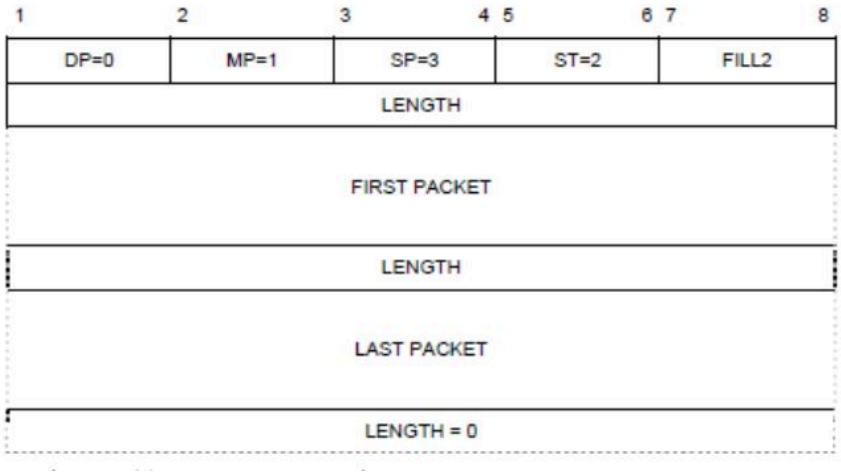


Figure 5-20. MULTIPLEX packet

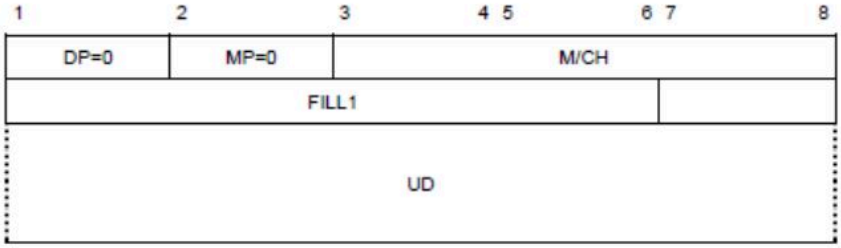


Figure 5-21. SHORT FORM MSP packet

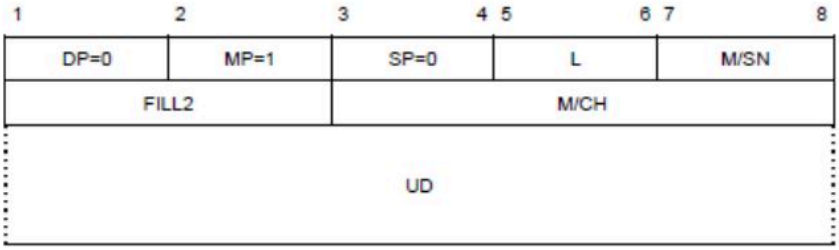


Figure 5-22. LONG FORM MSP packet

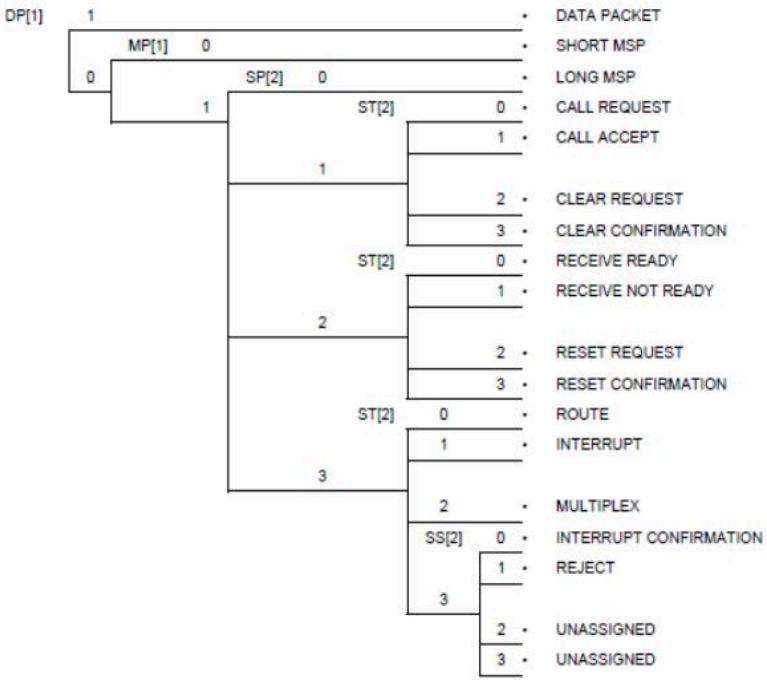


Figure 5-23. Control fields used in MODE S packets

FIFTH SCHEDULE (Regulation 53)

VHF AIR GROUND DIGITAL LINK

1. SYSTEM CHARACTERISTICS OF THE GROUND INSTALLATION FOR VHF AIR-GROUND DIGITAL LINK

1.1 Ground station transmitting function

1.1.1 Frequency stability. The radio frequency of VDL ground station equipment operation shall not vary more than plus or minus 0.0002 per cent (2 parts per million) from the assigned frequency.

Note.— The frequency stability for VDL ground stations using DSB-AM modulation is specified in Part II, Chapter 2 for 25 kiloHertz channel spacing.

1.2 Power

The effective radiated power shall be such as to provide a field strength of at least 75. microvolts per metre (minus 109 dBW/m2) within the defined operational coverage of the facility, on the basis of free-space propagation.

1.3 Spurious emissions

1.3.1 Spurious emissions shall be kept at the lowest value which the State of the technique and the nature of the service permit.

Note.— Appendix S3 to the Radio Regulations specifies the levels of spurious emissions to which transmitters must conform.

1.4 Adjacent channel emissions

1.4.1 The amount of power from a VDL ground transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the first adjacent channel shall not exceed 0 dBm.

1.4.1.1 After 1 January 2002, the amount of power from all new installations of a VDL ground transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the first adjacent channel shall not exceed 2 dBm.

1.4.2 The amount of power from a VDL ground transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the second adjacent channel shall be less than minus 25 dBm and from thereon it shall monotonically decrease at the minimum rate of 5 dB per octave to a maximum value of minus 52 dBm.

1.4.2.1 After 1 January 2002, the amount of power from all new installations of a VDL ground transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the second adjacent channel shall be less than minus 28 dBm.

1.4.2.2 After 1 January 2002, the amount of power from all new installations of a VDL ground transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the fourth adjacent channel shall be less than minus 38 dBm, and from thereon it shall monotonically decrease at the minimum rate of 5 dB per octave to a maximum value of minus 53 dBm.

1.4.3 The amount of power from a VDL ground transmitter under all operating conditions when measured over a 16 kiloHertz channel bandwidth centred on the first adjacent channel shall not exceed minus 20 dBm.

1.4.3.1 After 1 January 2002, the amount of power from all new installations of a VDL ground transmitter under all operating conditions when measured over a 16 kiloHertz channel bandwidth centred on the first adjacent channel shall not exceed minus 18 dBm.

1.4.4 After 1 January 2005, all VDL ground transmitters shall meet the provisions of

1.4.1.1 , 1.4.2.1, 1.4.2.2 and 1.4.3.1, subject to the conditions of 1.4.5.

1.4.5 Requirements of mandatory compliance of the provisions of 1.4.4 shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales. The agreements shall provide at least two years' notice of mandatory compliance of ground systems.

SIXTH SCHEDULE (Regulation 54)

VHF AIR GROUND DIGITAL LINK (VDL)

1. SYSTEM CHARACTERISTICS OF THE AIRCRAFT INSTALLATION FOR VHF AIR-GROUND DIGITAL LINK

1.1 Frequency stability. The radio frequency of VDL aircraft equipment shall not vary more than plus or minus 0.0005 per cent (5 parts per million) from the assigned frequency.

1.2 Power. The effective radiated power shall be such as to provide a field strength of at least 20 microvolts per metre (minus 120 dBW/m2) on the basis of free- space propagation, at ranges and altitudes appropriate to the operational conditions pertaining to the areas over which the aircraft is operated.

1.3 Spurious emissions

1.3.1 Spurious emissions shall be kept at the lowest value which the State of the technique and the nature of the service permit.

Note.— Appendix S3 to the Radio Regulations specifies the levels of spurious emissions to which transmitters must conform.

1.4 Adjacent channel emissions

1.4.1 The amount of power from a VDL aircraft transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the first adjacent channel shall not exceed 0 dBm.

1.4.1.1 After 1 January 2002, the amount of power from all new installations of a VDL aircraft transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the first adjacent channel shall not exceed 2 dBm.

1.4.2 The amount of power from a VDL aircraft transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the second adjacent channel shall be less than minus 25 dBm and from thereon it shall monotonically decrease at the minimum rate of 5 dB per octave to a maximum value of minus 52 dBm.

1.4.2.1 After 1 January 2002, the amount of power from all new installations of a VDL aircraft transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the second adjacent channel shall be less than minus 28 dBm.

1.4.2.2 After 1 January 2002, the amount of power from all new installations of a VDL aircraft transmitter under all operating conditions when measured over the 25 kiloHertz channel bandwidth of the fourth adjacent channel shall be less than minus 38 dBm, and from thereon it shall monotonically decrease at the minimum rate of 5 dB per octave to a maximum value of minus 53 dBm.

1.4.3 The amount of power from a VDL aircraft transmitter under all operating conditions when measured over a 16 kiloHertz channel bandwidth centred on the first adjacent channel shall not exceed minus 20 dBm.

1.4.3.1 After 1 January 2002, the amount of power from all new installations of a VDL aircraft transmitter under all operating conditions when measured over a 16 kiloHertz channel bandwidth centred on the first adjacent channel shall not exceed minus 18 dBm.

1.4.4 After 1 January 2005, all VDL aircraft transmitters shall meet the provisions of 1.4.1.1 , 1.4.2.1, 1.4.2.2 and 1.4.3.1, subject to the conditions of 1.4.5.

1.4.5 Requirements of mandatory compliance of the provisions of 1.4.4 shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales. The agreements shall provide at least two years' notice of mandatory compliance of aircraft systems.

1.5 Receiving function

1.5.1 Specified error rate. The specified error rate for Mode 2 operation shall be the maximum corrected Bit Error Rate (BER) of 1 in 104. The specified error rate for Mode 3 operation shall be the maximum uncorrected BER of 1 in 103. The specified error rate for Mode 4 operation shall be the maximum uncorrected BER of 1 in 104.

Note. — The above physical layer BER requirements are derived from the BER requirement imposed by ATN at the sub-network interface.

1.5.2 Sensitivity. The receiving function shall satisfy the specified error rate with a desired signal strength of not more than 20 microvolts per metre (minus 120 dBW/m2).

Note.— The required signal strength at the edge of the service volume takes into account the requirements of the system and signal losses within the system, and considers environmental noise sources.

1.5.3 Out-of-band immunity performance. The receiving function shall satisfy the specified error rate with a desired signal field strength of not more than 40 microvolts per metre (minus 114 dBW/m2) and with an undesired DSB-AM D8PSK or GFSK signal on the adjacent or any other assignable channel being at least 40 dB higher than the desired signal.

1.5.3.1 After 1 January 2002, the receiving function of all new installations of VDL shall satisfy the specified error rate with a desired signal field strength of not more than 40 microvolts per metre (minus 114 dBW/m2) and with an undesired VHF DSB-AM, D8PSK or GFSK signal at least 60 dB higher than the desired signal on any assignable channel 100 kiloHertz or more away from the assigned channel of the desired signal.

Note.— This level of interference immunity performance provides a receiver performance consistent with the influence of the VDL RF spectrum mask as specified in 1.4 with an effective isolation transmitter/receiver isolation of 69 dB. Better transmitter and receiver performance could result in less isolation required. Guidance material on the measurement technique is included in the ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including statement of Approved ICAO Policies (Doc 9718).

1.5.3.2 After 1 January 2005, the receiving function of all installations of VDL shall meet the provisions of 1.5.3.1, subject to the conditions of 1.5.3.3.

1.5.3.3 Requirements of mandatory compliance of the provisions of 1.5.3.2 shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales. The agreement shall provide for at least two years' notice of mandatory compliance of aircraft systems.

1.5.4 INTERFERENCE IMMUNITY PERFORMANCE

1.5.4.1 The receiving function shall satisfy the specified error rate with a desired field strength of not more than 40 microvolts per metre, and with one or more out-of- band signals, except for VHF FM broadcast signals, having a total level at the receiver input of minus 33 dBm.

Note.— In areas where adjacent higher band signal interference exceeds this specification, a higher immunity requirement will apply.

1.5.4.2 The receiving function shall satisfy the specified error rate with a desired field strength of not more than 40 microvolts per metre, and with one or more VHF FM broadcast signals having a total level at the receiver input of minus 5 dBm.

SEVENTH SCHEDULE (Regulation 55(a))

PHYSICAL LAYER PROTOCOLS AND SERVICES

The aircraft and ground stations shall access the physical medium operating in simplex mode.

1.1 Functions

1.1.1 The physical layer shall provide the following functions:

(a) transmitter and receiver frequency control;

(b) digital reception by the receiver;

(c) digital transmission by the transmitter; and

(d) notification services.

1.1.1.1 Transmitter/receiver frequency control. The VDL physical layer shall set the transmitter or receiver frequency as commanded by the link management entity (LME) .

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Note.— The LME is a link layer entity as contained in the Manuals on VDL Mode 2 and VDL Mode 3 Technical Specifications.

1.1.1.2 Digital reception by the receiver. The receiver shall decode input signals and forward them to the higher layers for processing.

1.1.1.3 Digital transmission. The VDL physical layer shall appropriately encode and transmit information received from higher layers over the RF channel.

1.2 Modes 2 and 3 common physical layer

1.2.1 Modulation scheme. Modes 2 and 3 shall use differentially encoded 8 phase shift keying (D8PSK), using a raised cosine filter with $\alpha = 0.6$ (nominal value). The information to be transmitted shall be differentially encoded with 3 bits per symbol (baud) transmitted as changes in phase rather than absolute phase. The data stream to be transmitted shall be divided into groups of 3 consecutive data bits, least significant bit first. Zeros shall be padded to the end of the transmissions if needed for the final channel symbol.

1.2.1.1 Data encoding. A binary data stream entering a differential data encoder shall be converted into three separate binary streams X, Y, and Z so that bits 3n form X, bits 3n + 1 form Y, and bits 3n + 2 form Z. The triplet at time k (X_k, Y_k, Z_k) shall be converted to a change in phase as shown in Table 6-1*, and the absolute phase ϕ_k is the accumulated series of $\Delta\phi_k$, that is:

$$\varphi_k = \varphi_{k-1} + \Delta\varphi_k$$

Table 6-1 Modes 2 and 3 data encoding

X_k	Y_k	Z_k	$\Delta\phi_k$
0	0	0	$0\pi/4$
0	0	1	$1\pi/4$
0	1	1	$2\pi/4$
0	1	0	$3\pi/4$
1	1	0	$4\pi/4$
1	1	1	$5\pi/4$
1	0	1	$6\pi/4$
1	0	0	$7\pi/4$

1.2.1.2 Transmitted signal form. The phase-modulated baseband signal as defined in 1.2.1.1 shall excite the pulse shape filter.

$$s(t) = \sum_{k=-\infty}^{+\infty} h(\phi_k, t - kT_s)$$

where:

h is the complex impulse response of the pulse shape filter;

k is defined in 1.2.1.1;

φ is defined by the equation in 1.2.1.1;

t is time;

Ts is time duration of each symbol.

The output (function of time) of the pulse shape filter (s(t)) shall modulate the carrier frequency. The pulse shape filter shall have a nominal complex frequency response of a raised-cosine filter with α =0.6.

1.2.2 Modulation rate. The symbol rate shall be 10 500 symbols/second, resulting in a nominal bit rate of 31 500 bits/s. The modulation stability requirements for Modes 2 and 3 are provided in Table 6-2.

Table 6-2 Mode 2 and 3 modulation stability

VDL Mode	Aircraft Modulation stability	Ground Modulation Stability
Mode 2	± 0.0050 per cent	± 0.0050 per cent
Mode 3	± 0.0005 per cent	± 0.0002 per cent

1.3 Mode 2 specific physical layer

Note.— The Mode 2 specific physical layer specification includes a description of the Mode 2 training sequence, forward error correction (FEC), interleaving, bit scrambling, channel sensing, and physical layer system parameters.

1.3.1 To transmit a sequence of frames, a station shall insert the bit numbers and flags (per the data link service description for Mode 2 as contained in the Manual on VDL Mode 2 Technical Specifications), compute the FEC (per 1.3.1.2), interleave (per 1.3.1.3), prepend the training sequence (per 1.3.1.1), carry out bit scrambling (per 1.3.1.4) and finally encode and modulate the RF signal (per 1.2.1).

1.3.1.1 Training sequence. Data transmission shall begin with a demodulator training sequence consisting of five segments:

(a) transmitter ramp-up and power stabilization;

(b) synchronization and ambiguity resolution;

(c) reserved symbol;

(d) transmission length; and

(e) header FEC.

Note.— Immediately after these segments follows an AVLC frame with the format as contained in the data link service description in the Manual on VDL Mode 2 Technical Specifications.

1.3.1.1.1 Transmitter ramp-up and power stabilization. The purpose of the first segment of the training sequence, called the ramp-up, is to provide for transmitter power stabilization and receiver AGC settling, and it shall immediately precede the first symbol of the unique word. The duration of the ramp-up shall be five symbol periods. The time reference point (t), for the following specification is the centre of the first unique word symbol, a point that occurs half a symbol period after the end of the ramp-up. Conversely Stated, the beginning of the ramp-up starts at t = –5.5 symbol periods. The transmitted power shall be less than –40 dBc prior to time t = –5.5 symbol periods. The ramp-up shall provide that at time t = –3.0 symbol periods the transmitted power is 90 per cent of the manufacturer's Stated output

power or greater (see Figure 6-1). Regardless of the method used to implement (or truncate) the raised cosine filter, the output of the transmitter between times t = –3.0 and t = –0.5 will appear as if '000' symbols were transmitted during the ramp-up period.

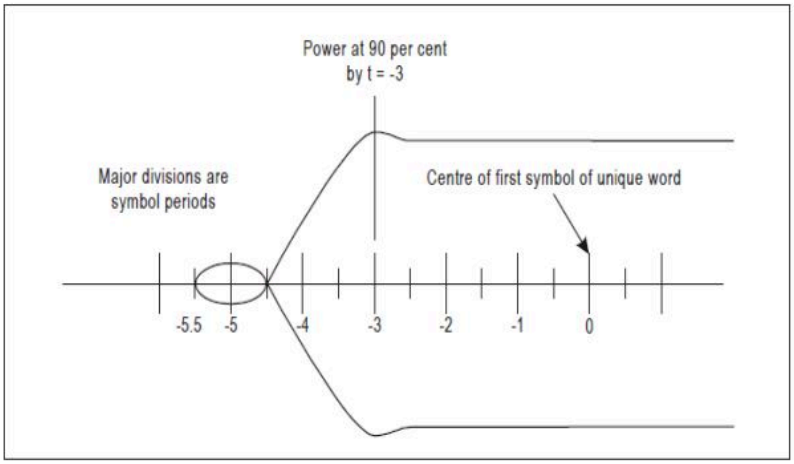


Figure 6-1 Transmitter power stabilization

Note. 1.— For Mode 3, the timing reference point is the same as the "power reference point".

Note 2.— It is desirable to maximize the time allowed for the AGC settling time.Efforts shall be made to have power above 90 per cent of nominal output power at t – 3.5 symbol periods.

1.3.1.1.2 Synchronization and ambiguity resolution. The second segment of the training sequence shall consist of the unique word:

000 010 011 110 000 001 101 110 001 100 011 111 101 111 100 010

and shall be transmitted from left to right.

1.3.1.1.3 Reserved symbol. The third segment of the training sequence shall consist of the single symbol representing 000.

Note.— This field is reserved for future definition.//

1.3.1.1.4 Transmission length. To allow the receiver to determine the length of the final Reed-Solomon block, the transmitter shall send a 17-bit word, from least significant bit (lsb) to most significant bit (msb), indicating the total number of data bits that follow the header FEC

Note.— The length does not include those bits transmitted for: the Reed Solomon FEC, extra bits padded to ensure that the interleaver generates an integral number of 8-bit words, or the extra bits padded to ensure that the data encoder generates an integral number of 3-bit symbols.

1.3.1.1.5 Header FEC. To correct bit errors in the header, a (25, 20) block code shall be computed over the reserved symbol and the transmission length segments.

The block code shall be transmitted as the fifth segment. The encoder shall accept the header in the bit sequence that is being transmitted. The five parity bits to be transmitted shall be generated using the following equation:

$[P_1,....P_5]=[R_1,.....R_3,TL_1, ..., TL_{17}]H^T$

where:

P is the parity symbol (P1 shall be transmitted first);

R is the reserved symbol;

TL is the transmission Length symbol;

T is the matrix transpose function; and

H is the parity matrix defined below:

$$H = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & 1 & 0 & 1 & 1 & 0 & 1 & 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 & 1 & 1 & 1 & 1 & 0 & 0 & 1 & 0 & 1 & 0 & 1 & 0 \end{bmatrix}$$

1.3.1.1.6 Bit transmission order. The five parity bits of the resultant vector product shall be transmitted from the left bit first.

1.3.1.2 Forward error correction. In order to improve the effective channel throughput by reducing the number of required retransmissions, FEC shall be applied after the training sequence, regardless of frame boundaries.

1.3.1.2.1 FEC calculation. The FEC coding shall be accomplished by means of a systematic fixed-length Reed- Solomon (RS)(255,249)2^8-ary code.

Note 1.— This code is capable of correcting up to three octets for data blocks of 249 octets (1992 bits). Longer transmissions must be divided up into 1992 bit transmissions and shorter transmissions must be extended by virtual fill with trailing zeros. Six RS-check octets are appended for a total block of 255 octets.

The field defining the primitive polynomial of the code shall be as follows:

$P(X)= (X^8 + X^7 + X^2 + X + 1)$

The generator polynomial shall be as follows:

$$\prod_{i=120}^{125}(x-\alpha^i)$$

where:

α is a primitive element of GF(256);

GF(256) is a Galois field (GF) of size 256.

Note 2.— The Reed-Solomon codes are described in the recommendation for Space Data System Standards Telemetry Channel Coding, by the Consultative Committee for Space Data Systems.

]1.3.1.2.2 Block lengths. The six RS-check octets shall be calculated on blocks of 249 octets. Longer transmissions shall be split into blocks of 249 octets, per

1.3.1.3 . Blocks of shorter length shall be extended to 249 octets by a virtual fill of trailing zeros. The virtual fill shall not be transmitted. Blocks shall be coded according to 1.3.1.2.3 through 1.3.1.2.3.3.

1.3.1.2.3 No error correction. For blocks with 2 or fewer non-fill octets, no error correction shall be used.

1.3.1.2.3.1 Single-byte error correction. For blocks with 3 to 30 non-fill octets, all six RS--check octets shall be generated, but only the first two shall be transmitted. The last four RS--check octets shall be treated as erasures at the decoder.

1.3.1.2.3.2 Two-byte error correction. For blocks with 31 to 67 non-fill octets, all six RS--check octets shall be generated, but only the first four shall be transmitted. The last two RS--check octets shall be treated as erasures at the decoder.

1.3.1.2.3.3 Three-byte error correction. For blocks with 68 or more non-fill octets, all six RS-check octets shall be generated and transmitted.

1.3.1.3 Interleaving. To improve the performance of the FEC, an octet-based table-driven interleaver shall be used. The interleaver shall create a table having 255 octets per row and c rows, where

$$c = \frac{transmission\ length\ (bits)}{1992\ (bits)}$$

where:

(a) the transmission length is as defined in 1.3.1.1.5;and

(b) c = the smallest integer greater than or equal to the value of the fraction.

After extending the data to an even multiple of 1992 bits, the interleaver shall write the transmission stream into the first 249 octets of each row by taking each consecutive group of eight bits and storing them from the first column to the 249th The first bit in each group of eight bits shall be stored in the eighth bit position; the first group of 1992 bits shall be stored in the first row, the second group of 1992 bits in the second row, etc. After the FEC is computed on each row, the FEC data (or erasures) shall be stored in columns 250 through 255. The interleaver shall then pass the data to the scrambler by reading out column by column, skipping any octet which contains erasures or all fill bits. All of the bits in an octet shall be transmitted from bit 8 to bit 1.

On reception, the de-interleaver shall calculate the number of rows and size of the last (potentially partial) row from the length field in the header. It shall only pass valid data bytes to the higher layer.

1.3.1.4 Bit scrambling. To aid clock recovery and to stabilize the shape of the transmitted spectrum, bit scrambling shall be applied. The pseudo noise (PN) sequence shall be a 15--stage generator (see Figure 6-2) with the characteristic polynomial:

$X^{15} + X + 1$

The PN-sequence shall start after the frame synchronization pattern with the initial value 1101 0010 1011 001 with the leftmost bit in the first stage of the register as per Figure 6--2. After processing each bit, the register shall be shifted one bit to the right. For possible encryption in the future this initial value shall be programmed. The sequence shall be added (modulo 2) to the data at the transmit side (scrambling) and to the scrambled data at the receive side (descrambling) per Table 6-3.

Table 6-3 Scrambler function

Function	Data in	Data out
scrambling	clean data	scrambling data
descrambling	scrambling data	clean data

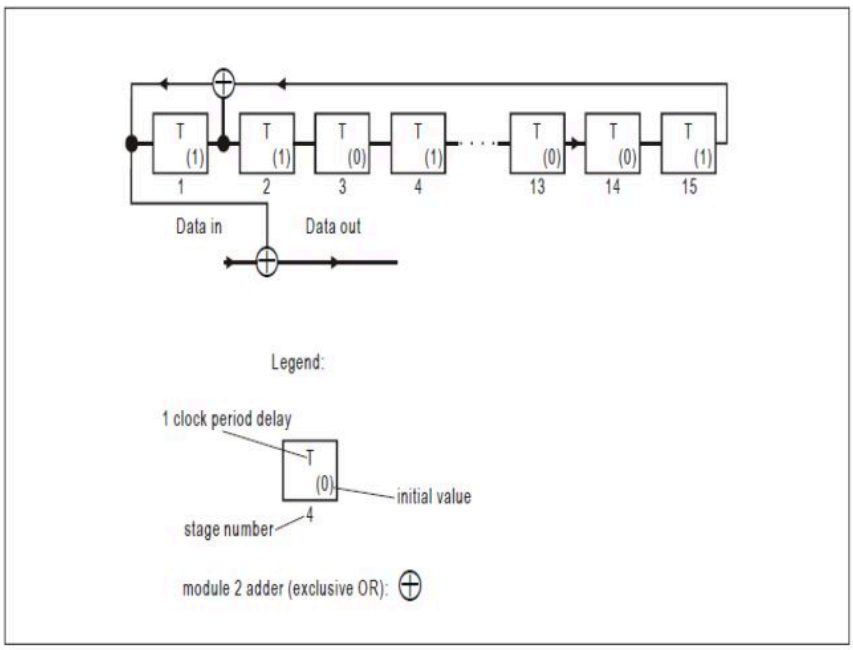


Figure 6-2 PN generator for bit scrambling

Note.— The concept of a PN scrambler is explained in ITU-R S.446-4, Annex I, Section 4.3.1, Method 1).

1.3.2 MODE 2 CHANNEL SENSING

1.3.2.1 Channel busy to idle detection. When a station receives on-channel power of at least –87 dBm for at least 5 milliseconds, then:

(a) with a likelihood of 0.9, it shall continue to consider the channel occupied if the signal level is attenuated to below -92 dBm for less than 1 millisecond; and

(b) with a likelihood of 0.9, it shall consider the channel unoccupied if the signal level is attenuated to below –92 dBm for at least 1.5 milliseconds.

Note.— The maximum link throughput available to all users is highly sensitive to the RF channel sense delay (from the time when the channel actually changes State until a station detects and acts on that change) and RF channel seizure delay (from the time when a station decides to transmit until the transmitter is sufficiently ramped up to lock out other stations). Accordingly, it is imperative that all efforts are made to reduce those times as the State-of-the-art advances.

1.3.2.2 Channel idle to busy detection. With a likelihood of at least 0.9, a station shall consider the channel occupied within 1 millisecond after on-channel power rises to at least –90 dBm.

1.3.2.3 The detection of an occupied channel shall occur within 0.5 milliseconds Note. — A higher probability of false alarm is acceptable on the idle to busy detection than the busy to idle detection because of the effects of the two different errors.

1.3.3 MODE 2 RECEIVER/TRANSMITTER INTERACTION

1.3.3.1 Receiver to transmitter turnaround time. A station shall transmit the training sequence such that the centre of the first symbol of the unique word will be transmitted within 1.25 milliseconds after the result of an access attempt is successful (see Figure 6-3).

The total frequency change during the transmission of the unique word shall be less than 10 Hertz. After transmission of the unique word, the phase acceleration shall be less than 500 Hertz per second.

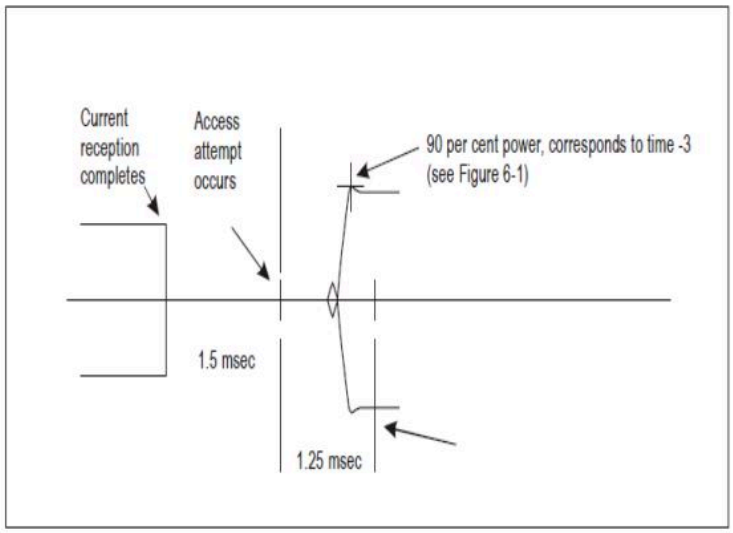


Figure 6-3 Receive to transmit turnaround time

Table 6-4 Physical services system parameters

symbol	Parameter name	Mode 2 value
P1	Minimum transmission length	131071 bits

1.3.4.1.1 Parameter P1 (minimum transmission length). Parameter P1 defines the minimum transmission length that a receiver shall be capable of demodulating without degradation of BER.

1.4 Mode 3 specific physical layer

Note.— The Mode 3 specific physical layer specification includes a descriptionnof Mode 3 management (M) burst and handoff check message (H) burst uplink,nM burst downlink, voice/data (V/D) burst, and bit scrambling.

1.4.1 Management (M) burst and handoff check message (H) burst uplink. The M uplink burst (as contained in the Manual on VDL Mode 3 Technical Specifications) shall consist of three segments, the training sequence followed by the system data and the transmitter ramp down. The H uplink burst (as contained in the Manual on VDL Mode 3 Technical Specifications) shall consist of three segments, the training sequence followed by the handoff check message and the transmitter ramp down.

1.4.1.1 Training sequence. Uplink M burst and H burst training sequences shall consist of two components as follows:

(a) transmitter ramp up and power stabilization; and

(b) synchronization and ambiguity resolution.

1.4.1.1.1 Transmitter ramp-up and power stabilization. This shall be as defined in section 1.3.1.1.1.

1.4.1.1.2 Synchronization and ambiguity resolution. The second component of the training sequence shall consist of the synchronization sequence, known as S2*, as follows:

000. 001 101 100 110 010 111 100 010 011 101 000 111 000 011 001

and shall be transmitted from left to right.

Note.— The sequence S2 is very closely related to the sequence S2 (Section 1.4.3.1.2) . The 15 phase changes between the 16 symbols of S2* are each exactly 180o out of phase from the 15 phase changes associated with S2.*

This relationship can be used to simplify the process of simultaneously searching for both sequences.

1.4.1.2 System data and handoff check message. The non-3T configuration (as contained in the Manual on VDL Mode 3 Technical Specifications) system data shall consist of 32 transmitted symbols. The 96 transmitted bits shall include 48 bits of information and 48 parity bits, generated as 4 Golay (24 12) code words. The 3T configuration as contained in the Manual on VDL Mode 3 Technical Specifications shall consist of 128 transmitted symbols.

The 384 transmitted bits shall include 192 bits of information and 192 parity bits, generated as 16 Golay (24, 12) code words. The 3T configuration handoff check message shall consist of 40 transmitted symbols. The 120 transmitted bits shall include 60 bits of information and 60 parity bits, generated as 5 Golay (24,12) code words. The specific definition of the Golay encoder shall be as follows: If the 12 bit input bit sequence is written as a row vector x, then the 24 bit output sequence can be written as the row vector y, where y = x G, and the matrix G shall be given by

$$G = \begin{bmatrix}
1&1&0&1&0&1&1&1&0&0&0&1&1&0&0&0&0&0&0&0&0&0&0&0\\
0&1&1&1&1&1&1&0&0&1&0&0&1&0&1&0&0&0&0&0&0&0&0&0\\
1&1&1&0&1&0&0&1&0&1&0&1&0&0&1&0&0&0&0&0&0&0&0&0\\
0&1&1&0&0&0&1&1&1&0&1&1&0&0&0&1&0&0&0&0&0&0&0&0\\
1&1&1&0&0&1&1&0&1&1&0&0&0&0&0&0&1&0&0&0&0&0&0&0\\
1&0&1&1&0&0&1&1&0&1&1&0&0&0&0&0&0&1&0&0&0&0&0&0\\
1&0&0&1&1&0&0&1&1&0&1&1&0&0&0&0&0&0&1&0&0&0&0&0\\
0&1&0&1&1&0&1&1&1&1&0&0&0&0&0&0&0&0&0&1&0&0&0&0\\
0&0&1&0&1&1&0&1&1&1&1&0&0&0&0&0&0&0&0&0&1&0&0&0\\
0&0&0&1&0&1&1&0&1&1&1&1&0&0&0&0&0&0&0&0&0&1&0&0\\
1&1&0&1&1&1&0&0&0&1&1&0&0&0&0&0&0&0&0&0&0&0&1&0\\
1&0&1&0&1&1&1&0&0&0&1&1&0&0&0&0&0&0&0&0&0&0&0&1
\end{bmatrix}$$

Note.— The extended Golay code allows for the correction of any error pattern with 3 or fewer bit errors and the detection of any 4-bit error pattern.

1.4.1.3 Transmitter ramp-down. The transmitter power shall be –20 dBc within 2.5 symbol periods of the middle of the final symbol of the burst. The transmitter power leakage when the transmitter is in the “off” State shall be less than -83 dBm.

Note. — Reference RTCA/DO-160D section 21, category H for antenna radiated signals.

1.4.2 Management (M) burst downlink. The M downlink burst (as contained in the Manual on VDL Mode 3 Technical Specifications) shall consist of three segments, the training sequence followed by the system data and the transmitter ramp down.

1.4.2.1 Training sequence. The M downlink burst training sequence shall consist of two components as follows:

(a) transmitter ramp up and power stabilization; and

(b) synchronization and ambiguity resolution.

1.4.2.1.1 Transmitter ramp-up and power stabilization. This shall be as defined in 1.4.1.1.1.

1.4.2.1.2 Synchronization and ambiguity resolution. Three separate synchronization sequences shall be used for this burst type. The standard sequence, known as S1, shall be as follows:

000. 111 001 001 010 110 000 011 100 110 011 111 010 101 100 101

and shall be transmitted from left to right. The special sequence used to identify poll responses shall be as defined in 6.4.4.1.1.2.

The special sequence used to identify net entry requests (S1*) shall use the following sequence:

000. 001 111 111 100 000 110 101 010 000 101 001 100 011 010 011

and shall be transmitted from left to right.

Note.— The sequence S1 is very closely related to the sequence S1. The 15 phase changes between the 16 symbols of S1* are each exactly 180o out of phase from the 15 phase changes associated with S1 . This relationship can be used to simplify the process of simultaneously searching for both sequences.*

1.4.2.2 System data. The system data segment shall consist of 16 transmitted symbols.

The 48 transmitted bits shall be encoded as 24 bits of system data and 24 bits of parity bits generated as two consecutive (24, 12) Golay code words. The encoding of the (24, 12) Golay code words shouldl be as defined in 1.4.1.2

1.4.2.3 Transmitter ramp-down. This shall be as defined in 1.4.1.3.

1.4.3 Voice or data (V/D) burst. The V/D burst (as contained in the Manual on VDL Mode 3 Technical Specifications) shall consist of four segments: the training sequence followed by the header, the user information segment and the transmitter ramp down. The same V/D burst format shall be used for both uplink and downlink.

1.4.3.1 Training sequence. V/D burst training sequence shall consist of two components as follows:

(a) transmitter ramp-up and power stabilization; and

(b) synchronization and ambiguity resolution.

1.4.3.1.1 Transmitter ramp-up and power stabilization. This shall be as specified in 1.4.1.1.1 .

1.4.3.1.2 Synchronization and ambiguity resolution. The second component of the training sequence shall consist of the synchronization sequence, known as S2, as follows:

000. 111 011 010 000 100 001 010 100 101 011 110 001 110 101 111

and shall be transmitted from left to right.

1.4.3.2 Header. The header segment shall consist of 8 transmitted symbols. The 24 transmitted bits shall be encoded as 12 bits of header information and 12 parity bits, generated as a single (24, 12) Golay code word. The encoding of the (24, 12) Golay code word shall be as defined in 1.4.1.2.

1.4.3.3 User information. The user information segment shall consist of 192 3-bit symbols. When transmitting voice, FEC shall be applied to the analysis output of the vocoder specified in 6.8. The vocoder shall provide satisfactory performance in a BER environment of 10–3 (with a design goal of 10–2). The overall bit rate of the vocoder including FEC is 4 800 bits/s (except when in the truncated mode in which the bit rate is 4 000 bits/s).

1.4.3.3.1 When transmitting user data, the 576 bits shall be encoded as a single Reed-Solomon (72, 62) 28–ary code word. For user data input to the Reed-Solomon encoder of length less than 496 bits, input data shall be padded with zeroes at the end to a full length of 496 bits. The field defining the primitive polynomial of the code shall be as described in 1.3.1.2.1.

The generator polynomial shall be as follows:

$$\prod_{i=120}^{129}(x-\alpha^{i})$$

Note.— The Reed-Solomon (72, 62) code is capable of correcting up to five 28-ary (code word) symbol errors in the received word.

1.4.3.4 Transmitter ramp-down. This shall be as defined in 1.4.1.3.

1.4.4 Interleaving. There shall be no interleaving in Mode 3 operation.

1.4.5 Bit scrambling. Under Mode 3 operation, bit scrambling, as specified in 1.3.1.4 shall be performed on each burst, starting after the training sequence. The scrambling sequence shall be reinitialized on each burst effectively providing a constant overlay for each of the Mode 3 fixed length bursts.

1.4.6 Receiver/transmitter interaction. The switching times in this subsection will be defined as the time between the middle of the last information symbol of one burst and the middle of the first symbol of the synchronization sequence of the subsequent burst.

Note.— This nominal time will be shortened by considerations such as the finite width of each symbol due to Nyquist filtering and the ramp up and power stabilization sequence. Such alternative definitions could yield switching times up to 8 symbol periods shorter.

1.4.6.1 Receiver to transmitter switching time. An aircraft radio shall be capable of switching from reception to transmission within 17 symbol periods. This time can be relaxed to 33 symbol periods for aircraft radios which do not functions requiring discrete addressing.

Note 1.— The shortest R/T switching time for an aircraft radio occurs when the reception of an uplink M channel beacon is followed by a V/D transmission in the same slot. In certain instances where aircraft radios do not functions requiring discrete addressing, the R/T switching time can be increased since the last two Golay words of the uplink M channel beacon need not be read.

Note 2.— The minimum turnaround time assumes that in configurations 3V1D, 2V1D, and 3T (as contained in Section 5.5.2.4 of the Manual on VDL Mode 3 Technical Specifications), the aircraft radios will be provided with software that will prevent them from transmitting a downlink M channel message in a slot following the reception of a voice message from another aircraft with a long time delay.

1.4.6.2 Transmitter to receiver switching time. An aircraft radio shall be capable of switching from transmission to reception within 32 symbol periods.

Note.— The worst case T/R switching time for an aircraft radio occurs when it transmits a downlink M channel message and receives a V/D message in the same slot.

1.4.7 Fringe coverage indication

1.4.7.1 Indication of near edge-of-coverage shall be provided to the VDL Mode 3 aircraft.

1.3.3.2 Transmitter to receiver turnaround time. The transmitter power shall be –20 dBc within 2.5 symbol periods of the middle of the final symbol of the burst. The transmitter power leakage when the transmitter is in the “off” State shall be less than –83 dBm. A station shall be capable of receiving and demodulating with nominal performance, an incoming signal within 1.5 milliseconds after transmission of the final information symbol.

Note.— Reference DO-160D section 21, category H for antenna radiated signals.

1.3.4 MODE 2 PHYSICAL LAYER SYSTEM PARAMETERS

1.3.4.1 The physical layer shall implement the system parameters as defined in Table 6-4.

EIGHTH SCHEDULE (Regulation 56)

VHF AIR GROUND DIGITAL LINK SYSTEMS

1. LINK LAYER PROTOCOLS AND SERVICES

1.1 General information

1.1.1 Functionality. The VDL link layer shall provide the following sub layer functions:

(a) media access control (MAC) sub layer, which requires the use of the carrier sense multiple access (CSMA) algorithm for Mode 2 or TDMA for Mode 3;

(b) a data link service (DLS) sub layer:

1) for Mode 2, the DLS sub layer provides connection-oriented point-to-point links using data link entities (DLE) and connectionless broadcast link over the MAC sub layer; and

2) for Mode 3, the DLS sub layer provides acknowledged connectionless point- to-point and point-to-multipoint links over a MAC sub layer that guarantees sequencing; and

(c) a Very High Frequency Digital Link management entity , which establishes and maintains DLEs between the aircraft and the ground-based systems using link management entities (LME).

1.1.2 SERVICE

1.1.2.1 Connection-oriented. The VDL Mode 2 link layer shall provide a reliable point-to-point service using a connection-oriented DLS sub layer.

1.1.2.2 Connectionless. The VDL Mode 2 and 3 link layers shall provide an unacknowledged broadcast service using a connectionless DLS sub layer.

1.1.2.3 Acknowledged connectionless. The VDL Mode 3 link layer shall provide an acknowledged point-to-point service using a connectionless DLS sub layer that relies upon the MAC sub layer to guarantee sequencing.

1.2 6.5.2 MAC sub layer

1.2.1 The MAC sub layer shall provide for the transparent acquisition of the shared communications path. It makes invisible to the DLS sub layer the way in which supporting communications resources are utilized to achieve this.

Note.— Specific MAC services and procedures for VDL Modes 2 and 3 are contained in the Manuals on VDL Mode 2 and VDL Mode 3 Technical Specifications.

1.3 Data link service sublayer

1.3.1 For Mode 2, the DLS shall support bit-oriented simplex air-ground communications using the aviation VHF link control (AVLC) protocol.

Note.— Specific data link services, parameters and protocol definitions for VDL Mode 2 are contained in the Manual on VDL Mode 2 Technical Specifications.

1.3.2 For Mode 3, the DLS shall support bit-oriented, priority based, simplex air- ground communications using the acknowledged connectionless data link (A- CLDL) protocol.

Note.— Specific data link services, parameters and protocol definitions for VDL Mode 3 are contained in the Manual on VDL Mode 3 Technical Specifications.

1.4 6.5.4 Very High Frequency Digital Link management entity

1.4.1 Services. The Very High Frequency Digital Link management entity shall provide link establishment, maintenance and disconnection services as well as support parameter modification. Specific Very High Frequency Digital Link management entity services, parameter formats and procedures for Modes 2 and 3. are contained in the Manuals on Very High Frequency Digital Link Mode 2 and Mode 3 Technical Specifications.

NINTH SCHEDULE (Regulation 57)

VHF AIR GROUND DIGITAL LINK SYSTEMS

1. SUBNETWORK LAYER PROTOCOLS AND SERVICES

1.1 Architecture for Mode 2

1.1.1 The sub network layer protocol used across the VHF air-ground sub network for VDL Mode 2 is referred to formally as a sub network access protocol (SNAcP) and shall conform to ISO 8208, except as contained in the Manual on VDL Mode 2 Technical Specifications. The SNAcP is contained within the Manual on VDL Mode 2 Technical Specifications as the sub network protocol. If there are any differences between the Manual on VDL Mode 2 Technical Specifications and the cited specifications, the Manual on VDL Mode 2 Technical Specifications shall have precedence. On the air-ground interface, the aircraft sub network entity shall act as a DTE and the ground sub network entity shall act as a DCE.

Note.— Specific sub network layer protocol access points, services, packet formats, parameters and procedures for VDL Mode 2 are contained in the Manual on VDL Mode 2 Technical Specifications.

1.2 Architecture for Mode 3

1.2.1 The sub network layer used across the VHF air-ground sub network for VDL Mode 3 provides the flexibility to simultaneously support multiple sub network protocols. The currently defined options are to support ISO 8473 connectionless network protocol and to support ISO 8208, both as contained in the Manual on VDL Mode 3 Technical Specifications. The Manual on VDL Mode 3 Technical Specifications shall have precedence with respect to any differences with the cited specifications. For the ISO 8208 interface, both the air and ground subnetwork entities shall act as DCEs.

Note.— Specific sub network layer protocol access points, services, packet formats, parameters and procedures for VDL Mode 3 are contained in the Manual on VDL Mode 3 Technical Specifications.

TENTH SCHEDULE (Regulation 55(b))

VDL MODE 4

1. Physical layer protocols and services

Note.— Unless otherwise Stated, the requirements defined in this section apply to both mobile and ground stations.

1.1 FUNCTIONS

1.1.1 *TRANSMITTED POWER*

1.1.1.1 *Airborne installation.* The effective radiated power shall be such as to provide a field strength of at least 35 microvolts per metre (minus 114.5 dBW/m2) on the basis of free space propagation, at ranges and altitudes appropriate to the conditions pertaining to the areas over which the aircraft is operated.

1.1.1.2 *Ground installation.*

The effective radiated power shall be such as to provide a field strength of at least 75 microvolts per metre (minus 109 dBW/m2) within the defined operational coverage of the facility, on the basis of free-space propagation.

1.1.2 TRANSMITTER AND RECEIVER FREQUENCY CONTROL

1.1.2.1 The VDL Mode 4 physical layer shall set the transmitter or receiver frequency as commanded by the link management entity (LME). Channel selection time shall be less than 13 ms after the receipt of a command from a VSS user.

1.1.3 DATA RECEPTION BY RECEIVER

1.1.3.1 The receiver shall decode input signals and forward them to the higher layers for processing.

1.1.4 DATA TRANSMISSION BY TRANSMITTER

1.1.4.1 Data encoding and transmission. The physical layer shall encode the data received from the data link layer and transmit it over the RF channel. RF transmission shall take place only when permitted by the MAC.

1.1.4.2 Order of transmission. The transmission shall consist of the following stages in the following order:

(a) transmitter power stabilization;

(b) bit synchronization;

(c) ambiguity resolution and data transmission; and

(d) transmitter decay.

Note.— The definitions of the stages are given in Sections 1.2.3.1 to 1.2.3.4.

1.1.4.3 Automatic transmitter shutdown. A VDL Mode 4 station shall automatically shut-down power to any final stage amplifier in the event that output power from that amplifier exceeds –30 dBm for more than 1 second. Reset to an operational mode for the affected amplifier shall require a manual operation.

Note.— This is intended to protect the shared channel resource against so- called "stuck transmitters".

1.1.5 NOTIFICATION SERVICES

1.1.5.1 Signal quality. The operational parameters of the equipment shall be monitored at the physical layer. Signal quality analysis shall be performed in the demodulator process and in the receive process.

Note.— Processes that may be evaluated in the demodulator include bit error rate (BER), signal to noise ratio (SNR), and timing jitter. Processes that may be evaluated in the receiver include received signal level and group delay.

1.1.5.2 Arrival time. The arrival time of each received transmission shall be measured with a two-sigma error of 5 microseconds.

1.1.5.3 The receiver shall be capable of measuring the arrival time within a two-sigma error of 1 microsecond.

1.2 PROTOCOL DEFINITION FOR GFSK

1.2.1 Modulation scheme. The modulation scheme shall be GFSK. The first bit transmitted (in the training sequence) shall be a high tone and the transmitted tone shall be toggled before transmitting a 0 (i.e. non-return to zero inverted encoding).

1.2.2 Modulation rate. Binary ones and binary zeros shall be generated with a modulation index of 0.25 ± 0.03 and a BT product of 0.28 ± 0.03, producing data transmission at a bit rate of 19 200 bits/s ± 50 ppm.

1.2.3 STAGES OF TRANSMISSION

1.2.3.1 Transmitter power stabilization. The first segment of the training sequence is the transmitter power stabilization, which shall have a duration of 16 symbol periods. The transmitter power level shall be no less than 90 per cent of the steady State power level at the end of the transmitter power stabilization segment.

1.2.3.2 Bit synchronization. The second segment of the training sequence shall be the 24-bit binary sequence 0101 0101 0101 0101 0101 0101, transmitted from left to right immediately before the start of the data segment.

1.2.3.3 Ambiguity resolution and data transmission. The transmission of the first bit of data shall start 40 bit intervals (approximately 2 083.3 microseconds) ± 1 microsecond after the nominal start of transmission.

Note 1.— This is referenced to emissions at the output of the antenna.

Note 2.— Ambiguity resolution is performed by the link layer.

1.2.3.4 Transmitter decay. The transmitted power level shall decay at least by 20 dB within 300 microseconds after completing a transmission. The transmitter power level shall be less than -90 dBm within 832 microseconds after completing a transmission.

1.3 CHANNEL SENSING

1.3.1 Estimation of noise floor. A VDL Mode 4 station shall estimate the noise floor based on power measurements of the channel whenever a valid training sequence has not been detected.

1.3.2 The algorithm used to estimate the noise floor shall be such that the estimated noise floor shall be lower than the maximum power value measured on the channel over the last minute when the channel is regarded as idle.

Note.— The VDL Mode 4 receiver uses an energy sensing algorithm as one of the means to determine the State of the channel (idle or busy). One algorithm that can be used to estimate the noise floor is described in the Manual on VDL Mode 4 Technical Specifications.

1.3.3 Channel idle to busy detection. A VDL Mode 4 station shall employ the following means to determine the channel idle to busy transition at the physical layer.

1.3.3.1 Detection of a training sequence. The channel shall be declared busy if a VDL Mode 4 station detects a valid training sequence followed by a frame flag.

1.3.3.2 Measurement of channel power. Regardless of the ability of the demodulator to detect a valid training sequence, a VDL Mode 4 station shall consider the channel busy with at least a 95 per cent probability within 1 ms after on channel power rises to the equivalent of at least four times the estimated noise floor for at least 0.5 milliseconds.

1.3.4 CHANNEL BUSY TO IDLE DETECTION

1.3.4.1 A VDL Mode 4 station shall employ the following means to determine the channel busy to idle transition.

1.3.4.2 Measurement of transmission length. When the training sequence has been detected, the channel busy State shall be held for a period of time at least equal to 5 milliseconds, and subsequently allowed to transition to the idle State based on measurement of channel power.

1.3.4.3 Measurement of channel power. When not otherwise held in the channel busy State, a VDL Mode 4 station shall consider the channel idle with at least a 95 per cent probability if on-channel power falls below the equivalent of twice the estimated noise floor for at least 0.9 milliseconds.

1.4 RECEIVER/TRANSMITTER INTERACTION

1.4.1 Receiver to transmitter turnaround time. A VDL Mode 4 station shall be capable of beginning the transmission of the transmitter power stabilization sequence within 16 microseconds after terminating the receiver function.

1.4.2 Frequency change during transmission. The phase acceleration of the carrier from the start of the synchronization sequence to the data end flag shall be less than 300 Hertz per second.

1.4.3 Transmitter to receiver turnaround time. A VDL Mode 4 station shall be capable of receiving and demodulating with nominal performance an incoming signal within 1 ms after completing a transmission.

Note.— Nominal performance is defined as a bit error rate (BER) of 10–4

1.5 PHYSICAL LAYER SYSTEM PARAMETERS

1.5.1 PARAMETER P1 (MINIMUM TRANSMISSION LENGTH)

1.5.1.1 A receiver shall be capable of demodulating a transmission of minimum length P1 without degradation of BER.

1.5.1.2 The value of P1 shall be 19 200 bits.

1.5.2 PARAMETER P2 (NOMINAL CO-CHANNEL INTERFERENCE PERFORMANCE)

1.5.2.1 The parameter P2 shall be the nominal co-channel interference at which a receiver shall be capable of demodulating without degradation in BER.

1.5.2.2 The value of P2 shall be 12 dB.

1.6 FM BROADCAST INTERFERENCE IMMUNITY PERFORMANCE FOR VDL MODE 4 RECEIVING SYSTEMS

1.6.1 A VDL Mode 4 station shall conform to the requirements defined in section

1.5.4 when operating in the band 117.975–137 Megahertz.

1.6.2 A VDL Mode 4 station shall conform to the requirements defined below when operating in the band 108-117.975 Megahertz.

1.6.2.1 The VDL Mode 4 receiving system shall meet the requirements specified in

1.5.1 in the presence of two signal, third-order intermodulation products caused by VHF FM broadcast signals having levels in accordance with the following:

$$\mathbf{2N_1 + N_2 + 72 \leq 0}$$

for VHF FM sound broadcasting signals in the range 107.7–108.0 Megahertz

and

$$2N_1 + N_2 + 3\left\{24 - 20\log\frac{\Delta f}{0.4}\right\} \leq 0$$

for VHF FM sound broadcasting signals below 107.7 Megahertz, where the frequencies of the two VHF FM sound broadcasting signals produce, within the receiver, a two-signal, third-order intermodulation product on the desired VDL Mode 4 frequency.

N1 and N2 are the levels (dBm) of the two VHF FM sound broadcasting signals at the VDL Mode 4 receiver input. Neither level shall exceed the desensitization criteria set forth in 1.6.2.2.

Δf = 108.1 – f1, where f1 is the frequency of N1, the VHF FM sound broadcasting signal closer to 108.1 Megahertz.

Note.— The FM intermodulation immunity requirements are not applied to a VDL Mode 4 channel operating below 108.1 Megahertz, and hence frequencies below 108.1 Megahertz are not intended for general assignments.

1.6.2.2 The VDL Mode 4 receiving system shall not be desensitized in the presence of VHF FM broadcast signals having levels in accordance with Table 6-5

Table 6-5 VDL Mode 4 operating on frequencies between 112.0-117.975 Megahertz

Frequency (MHZ	**Maximum level of unwanted signal at receiver input (dBm)**
88 - 104	+15
106	+10
107	+5
107.9	0

Note. - The relationship is linear between adjacent poins designed by the above frequencies.

Link layer

Note.— Details on link layer functions are contained in the Manual on VDL Mode 4 Technical Specifications.

2. Subnetwork layer and SNDCF

Note.— Details on subnetwork layer functions and SNDCF are contained in the Manual on VDL Mode 4 Technical Specifications.

3. ADS-B applications

Note.— Details on ADS-B application functions are contained in the Manual on VDL Mode 4 Technical Specifications.

ELEVENTH SCHEDULE (regulation 66)

TECHNICAL PROVISIONS RELATING TO INTERNATIONAL GROUND-GROUND DATA INTERCHANGE AT MEDIUM AND HIGHER SIGNALLING RATES

Note.— Throughout this section in the context of coded character sets, the term "unit" means the unit of selective information and is essentially equivalent to the term "bit".

1.1 General

1.1.1 In international data interchange of characters, a 7-unit coded character set providing a repertoire of 128 characters and designated as International Alphabet No. 5 (IA--5) shall be used.

1.1.2 When the provisions of 1.1.1 are applied, International Alphabet No. 5 (IA-5) contained in Table 8-2 shall be used.

1.1.2.1 The serial transmission of units comprising an individual character of IA-5 shall be with the low order unit (b1) transmitted first.

1.1.2.2 When IA-5 is used, each character shall include an additional unit for parity in the eighth level position.

1.1.2.3 When the provisions of 1.1.2.2 are applied, the sense of the character parity bit shall produce even parity in links which operate on the start-stop principle, and odd parity in links using end-to-end synchronous operations.

1.1.2.4 Character-for-character conversion shall be as listed in Tables 8-3 and 8-4 for all characters which are authorized in the AFTN format for transmission on the AFS in IA--.

1.1.2.5 Characters which appear in only one code set, or which are not authorized for transmission on the AFS shall be as depicted in the code conversion tables.

1.2 Data transmission characteristics

1.2.1 8.6.2.1 The data signalling rate shall be chosen from among the following:

1 600 bits/s	4 800 bits/s
1 200 bits/s	9 600 bits/s
2 400 bits/s	

1.2.2 The type of transmission for each data signalling rate shall be chosen as follows:

Data signalling	rate Type of transmission
1. 600 bits/s	Synchronous or asynchronous serial transmission
1. 200 bits/s	Synchronous or asynchronous serial transmission
2. 400 bits/s	Synchronous serial transmission
4. 800 bits/s	Synchronous serial transmission
9. 600 bits/s	Synchronous serial transmission

1.2.3 The type of modulation for each data signalling rate shall be chosen as follows:

Data signalling rate	Type of modulation
1. 600 bits/s	Frequency
1. 200 bits/s	Frequency
2. 400 bits/s	Phase
4. 800 bits/s Phase	Phase
9. 600 bits/s	Phase-amplitude

Note.— This standard does not necessarily apply to ground-ground extensions of air-ground links used exclusively for the transfer of air-ground data, inasmuch as such circuits may be considered as part of the air-ground link.

1.2.4 CHARACTER STRUCTURE ON DATA LINKS

1.2.4.1 Character parity shall not be used for error checking on CIDIN links. Parity appended to IA-5 coded characters per 1.1.2.2, prior to entry to the CIDIN shall be ignored. For messages exiting the CIDIN, parity shall be generated in accordance with 1.1.2.3 –Not applicable.

1.2.4.1 Characters of less than eight bits in length shall be padded out to eight bits in length before transmission over any octet-based or bit-oriented communications network. The padding bits shall occupy the higher order end of the octet, i.e. bit 8, bit 7 as required, and shall have the binary values 0.

1.2.5 When exchanging data over CIDIN links using bit-oriented procedures, the entry centre address, exit centre addresses and destination addresses in the Transport and CIDIN Packet Headers shall be in the IA-5 character set contained in Table 8-2- Not applicable

1.2.6 When transmitting messages in AFTN format over CIDIN links using bit-oriented procedures, the messages shall be in the IA-5 character set contained in Table 8-2-Not applicable

1.3 Ground-ground character-oriented data link control procedures

Note.— The provisions of this section pertain to ground-ground data interchange applications using IA-5 prescribed by 1.1 and which employ the ten transmission control

characters (SOH, STX, ETX, EOT, ENQ, ACK, DLE, NAK, SYN, and ETB) for data link control, over synchronous or asynchronous transmission facilities.

1.3.1 Descriptions. The following descriptions shall apply to data link applications contained in this section:

(a) A master station is that station which has control of the data link at a given instant.

(b) A slave station is one that has been selected to receive a transmission from the master station.

(c) A control station is the single station on a multipoint link that is permitted to assume master status and deliver messages to one or more individually selected (non-control) tributary stations, or it is permitted to assign temporary master status to any of the other tributary stations.

1.3.2 MESSAGE COMPOSITION

(a) A transmission shall consist of characters from IA-5 transmitted in accordance with 1.1.2.2 and shall be either an information message or a supervisory sequence.

(b) An information message used for the exchange of data shall take one of the following forms:

```
1) S             E B
   T  ---TEXT--- T C
   X             X C

2) S             E B
   T  ---TEXT--- T C
   X             B C

3) S                S             E B
   O ---HEADING--- T  ---TEXT--- T C
   H                X             X C

4) S                S             E B
   O ---HEADING--- T  ---TEXT--- T C
   H                X             B C

5) S                E  B
   O ---HEADING--- T  C
   H                B  C
```

Note 1.— B C is a block check character (BCC). C

Note 2.— In formats 2), 4), and 5) above which end with ETB, some continuation is required.

(c) A supervisory sequence shall be composed of either a single transmission control character (EOT, ENQ, ACK or NAK) or a single transmission control (ENQ) preceded by a prefix of up to 15 non-control characters, or the character DLE used in conjunction with other graphic and control characters to provide additional communication control functions.

1.3.3 Three system categories are specified in terms of their respective circuit characteristics, terminal configurations, and message transfer procedures as follows:

System category A: two-way alternate, multipoint allowing either centralized or non--centralized operation and single or multiple message-oriented information transfers without

replies (but with delivery verification). System category B: two-way simultaneous, point--to-point employing message associated blocking and modulo 8 numbering of blocks and acknowledgements.

System category C: two-way alternate, multipoint allowing only centralized (computer--to-terminal) operation, single or multiple message transfers with replies.

1.3.3.1 In addition to the characteristics prescribed in the paragraphs that follow for both system categories A and B, other parameters that shall be accounted for in order to ensure viable, operationally reliable communications include:

(a) the number of SYN characters required to establish and maintain synchronization;

Note.— Normally the transmitting station sends three contiguous SYN characters and the receiving station detects at least two before any action is taken.

(b) the values of system time-outs for such functions as "idle line" and "no response" as well as the number of automatic retries that are to be attempted before manual intervention is signalled;

(c) the composition of prefixes within a 15 character maximum.

Note.— By agreement between the administrations concerned, it is permissible for supervisory signals to contain a station identification prefix using characters selected from columns 4 through 7 of IA-5.

1.3.3.1 For multipoint implementations designed to permit only centralized (computer--toterminal) operations, the provisions of 1.3.7 shall be employed.

1.3.4 BLOCK CHECK CHARACTER

1.3.4.1 Both system category A and B shall utilize a block check character to determine the validity of a transmission.

1.3.4.2 The block check character shall be composed of 7 bits plus a parity bit.

1.3.4.3 Each of the first 7 bits of the block check character shall be the modulo 2 binary sum of every element in the same bit 1 to bit 7 column of the successive characters of the transmitted block.

1.3.4.4 The longitudinal parity of each column of the block, including the block check character, shall be even.

1.3.4.5 The sense of the parity bit of the block check character shall be the same as for the information characters (see 1.1.2.3).

1.3.4.6 SUMMATION

1.3.4.6.1 The summation to obtain the block check character shall be started by the first appearance of either SOH (start of heading) or STX (start of text).

1.3.4.6.2 The starting character shall not be included in the summation.

1.3.4.6.3 If an STX character appears after the summation has been started by SOH, then the STX character shall be included in the summation as if it were a text character.

1.3.4.6.4 With the exception of SYN (synchronous idle), all the characters which are transmitted after the start of the block check summation shall be included in the summation, including the ETB (end of transmission/block) or ETX (end of text) control character which signals that the following character is the block check character.

1.3.4.7 No character, SYN or otherwise, shall be inserted between the ETB or ETX character and the block check character.

1.3.5 DESCRIPTION OF SYSTEM CATEGORY A System category A is one in which a number of stations are connected by a multipoint link and one station is permanently

designated as the control station which monitors the link at all times to ensure orderly operation.

1.3.5.1 LINK ESTABLISHMENT PROCEDURE

1.3.5.1.1 To establish the link for transmission, the control station shall either:

(a) poll one of the tributary stations to assign it master status; or

(b) assume master status and select one or more tributary (slave) stations to receive a transmission.

1.3.5.1.2 Polling shall be accomplished by the control station sending a polling supervisory sequence consisting of a prefix identifying a single tributary station and ending in ENQ.

1.3.5.1.3 A tributary station detecting its assigned polling supervisory sequence shall assume master status and respond in one of two ways:

(a) if the station has a message to send, it shall initiate a selection supervisory sequence as described in 1.3.5.1.5;

(b) if the station has no message to send, it shall send EOT, and master status shall revert to the control station.

1.3.5.1.4 If the control station detects an invalid or no response resulting from a poll, it shall terminate by sending EOT prior to resuming polling or selection.

1.3.5.1.5 Selection shall be accomplished by the designated master station sending a selection supervisory sequence consisting of a prefix identifying a single station and ending in ENQ.

1.3.5.1.6 A station detecting its assigned selection supervisory sequence shall assume slave status and send one of two replies:

(a) if the station is ready to receive, it shall send a prefix followed by ACK. Upon detecting this reply, the master station shall either select another station or proceed with message transfer;

(b) if the station is not ready to receive, it shall send a prefix followed by NAK and thereby relinquish slave status. If the master station receives NAK, or no reply, it shall either select another or the same tributary station or terminate;

(c) it shall be permissible for N retries ($N \geq 0$) to be made to select a station for which NAK, an invalid reply, or no response has been received.

1.3.5.1.7 If one or more stations have been selected and have properly responded with ACK, the master station shall proceed with message transfer.

1.3.5.2 MESSAGE TRANSFER PROCEDURE

1.3.5.2.1 The master station shall send a message or series of messages, with or without headings to the selected slave station(s).

1.3.5.2.2 The transmission of a message shall:

(d) begin with:

1 SOH if the message has a heading,

2 STX if the message has no heading;

(e) be continuous, ending with ETX, immediately followed by a block check character (BCC).

1.3.5.2.3 After transmitting one or more messages, the master station shall verify successful delivery at each selected slave station.

1.3.5.3 DELIVERY VERIFICATION PROCEDURE

1.3.5.3.1 The master station shall send a delivery verification supervisory sequence consisting of a prefix identifying a single slave station and ending in ENQ.

1.3.5.3.2 A slave station detecting its assigned delivery verification supervisory sequence shall send one of two replies:

(a) if the slave station properly received all of the transmission, it shall send an optional prefix followed by ACK;

(b) if the slave station did not receive all of the transmission properly, it shall send an optional prefix followed by NAK.

1.3.5.3.3 If the master station receives no reply or an invalid reply, it shall request a reply from the same or another slave station until all selected stations have been properly accounted for.

1.3.5.3.4 If the master station receives a negative reply (NAK) or, after N ≥ 0 repeat attempts, no reply, it shall repeat that transmission to the appropriate slave stations at a later opportunity.

1.3.5.3.5 After all messages have been sent and delivery verified, the master station shall proceed with link termination.

1.3.5.4 LINK TERMINATION PROCEDURE

1.3.5.4.1 The terminate function, negating the master or slave status of all stations and returning master status to the control station, shall be accomplished by the master station transmitting EOT.

1.3.6 DESCRIPTION OF SYSTEM CATEGORY B System category B is one in which two stations are on a point-to-point, full- duplex link and each station has the capability to maintain concurrent master and slave status, i.e. master status on its transmit side and slave status on its receive side and both stations can transmit simultaneously.

1.3.6.1 LINK ESTABLISHMENT PROCEDURE

1.3.6.1.1 To establish the link for message transfers (from the calling to the called station), the calling station shall request the identity of the called station by sending an identification supervisory sequence consisting of a DLE character followed by a colon character, an optional prefix, and ENQ.

1.3.6.1.2 The called station, upon detecting ENQ, shall send one of two replies:

(a) if ready to receive, it shall send a sequence consisting of a DLE followed by a colon, a prefix which includes its identity and ended by ACK0 (see 1.3.6.2.5). This establishes the link for message transfers from the calling to the called station;

(b) if not ready to receive, it shall send the above sequence with the ACK0 replaced by NAK.

1.3.6.1.3 Establishment of the link for message transfers in the opposite direction can be initiated at any time following circuit connection in a similar manner to that described above.

1.3.6.2 MESSAGE TRANSFER PROCEDURE

1.3.6.2.1 System category B message transfer provides for message associated blocking with longitudinal checking and modulo 8 numbered acknowledgements.

1.3.6.2.2 It is permissible for a transmission block to be a complete message or a portion of a message. The sending station shall initiate the transmission with SOTB N followed by:

(a) SOH if it is the beginning of a message that contains a heading;

(b) STX if it is the beginning of a message that has no heading;

(c) SOH if it is an intermediate block that continues a heading;

(d) STX if it is an intermediate block that continues a text.

Note.— SOTBN is the two-character transmission control sequence DLE = (characters 1/0, and 3/13) followed by the block number, N, where N is one of the IA-5 characters 0, 1 ... 7 (characters 3/0, 3/1 ... 3/7).

1.3.6.2.3 A block which ends at an intermediate point within a message shall be ended with ETB; a block which ends at the end of a message shall be ended with ETX.

1.3.6.2.4 It shall be permissible for each station to initiate and continue to send messages to the other concurrently according to the following sequence.

(a) It shall be permissible for the sending station (master side) to send blocks, containing messages or parts of messages, continuously to the receiving station (slave side) without waiting for a reply.

(b) It shall be permissible for replies, in the form of slave responses, to be transmitted by the receiving station while the sending station is sending subsequent blocks.

Note.— By use of modulo 8 numbering of blocks and replies, it shall be permissible for the sending station to send as many as seven blocks ahead of the received replies before being required to stop transmission until six or less blocks are outstanding.

(c) If a negative reply is received, the sending station (master side) shall start retransmission with the block following the last block for which the proper affirmative acknowledgement was received.

1.3.6.2.5 Slave responses shall be according to one of the following:

(a) if a transmission block is received without error and the station is ready to receive another block, it shall send DLE, a colon, an optional prefix, and the appropriate acknowledgement ACKN (referring to the received block beginning with SOTB N, e.g. ACK0, transmitted as DLE0 is used as the affirmative reply to the block numbered SOTB0, DLE1 for SOTB1, etc.);

(b) if a transmission block is not acceptable, the receiving station shall send DLE, a colon, an optional prefix, and NAK.

1.3.6.2.6 Slave responses shall be interleaved between message blocks and transmitted at the earliest possible time.

1.3.6.3 LINK TERMINATION PROCEDURE

1.3.6.3.1 If the link has been established for message transfers in either or both directions, the sending of EOT by a station shall signal the end of message transfers in that direction. To resume message transfers after sending EOT, the link shall be re-established in that direction.

1.3.6.3.2 EOT shall only be transmitted by a station after all outstanding slave responses have been received or otherwise accounted for.

1.3.6.4 CIRCUIT DISCONNECTION

1.3.6.4.1 On switched connections, the data links in both directions shall be terminated before the connection is cleared. In addition, the station initiating clearing of the connection shall first announce its intention to do so by transmitting the two-character sequence DLE EOT, followed by any other signals required to clear the connection.

1.3.7 DESCRIPTION OF SYSTEM CATEGORY C (CENTRALIZED) System category C (centralized) is one (like system category A) in which a number of stations are connected by a multipoint link and one station is designated as the control station but (unlike system category A) provides only for centralized (computer-to-terminal) operations where message interchange

(with replies) shall be constrained to occur only between the control and a selected tributary station.

1.3.7.1 LINK ESTABLISHMENT PROCEDURE

1.3.7.1.1 To establish the link for transmission the control station shall either:

(a) poll one of the tributary stations to assign it master status; or

(b) assume master status and select a tributary station to assume slave status and receive a transmission according to either of two prescribed selection procedures:

1. selection with response (see 1.3.7.1.5); or

2. fast select (see 1.3.7.1.7)

1.3.7.1.2 Polling is accomplished by the control station sending a polling supervisory sequence consisting of a prefix identifying a single tributary station and ending in ENQ.

1.3.7.1.3 A tributary station detecting its assigned polling supervisory sequence shall assume master status and respond in one of two ways:

(a) if the station has a message to send, it shall initiate message transfer. The control station assumes slave status;

(b) if the station has no message to send, it shall send EOT and master status shall revert to the control station.

1.3.7.1.4 If the control station detects an invalid or no response resulting from a poll, it shall terminate by sending EOT prior to resuming polling or selection.

1.3.7.1.5 Selection with response is accomplished by the control station assuming master status and sending a selection supervisory sequence consisting of a prefix identifying a single tributary station and ending in ENQ.

1.3.7.1.6 A tributary station detecting its assigned selection supervisory sequence shall assume slave status and send one of two replies:

(a) if the station is ready to receive, it shall send an optional prefix followed by ACK. Upon detecting this reply, the master station shall proceed with message transfer;

(b) if the station is not ready to receive, it shall send an optional prefix followed by NAK. Upon detecting NAK, it shall be permissible for the master station to again attempt selecting the same tributary station or initiate termination by sending EOT.

Note.— If the control station receives an invalid or no reply, it is permitted to attempt again to select the same tributary or after N retries (N ≥ 0) either to exit to a recovery procedure or to initiate termination by sending EOT.

1.3.7.1.7 Fast select is accomplished by the control station assuming master status and sending a selection supervisory sequence, and without ending this transmission with ENQ or waiting for the selected tributary to respond, proceeding directly to message transfer.

1.3.7.2 MESSAGE TRANSFER PROCEDURE

1.3.7.2.1 The station with master status shall send a single message to the station with slave status and wait for a reply.

1.3.7.2.2 The message transmission shall begin with:

(a) SOH if the message has a heading, — STX if the message has no heading; and

(b) be continuous, ending with ETX, immediately followed by BCC.

1.3.7.2.3 The slave station, upon detecting ETX followed by BCC, shall send one of two replies:

(a) if the messages were accepted and the slave station is ready to receive another message, it shall send an optional prefix followed by ACK. Upon detecting ACK, the master station shall be permitted either to transmit the next message or initiate termination;

(b) if the message was not accepted and the slave station is ready to receive another message, it shall send an optional prefix followed by NAK. Upon detecting NAK, the master

station may either transmit another message or initiate termination. Following the NAK reply, the next message transmitted need not be a retransmission of the message that was not accepted.

1.3.7.2.4 If the master station receives an invalid or no reply to a message, it shall be permitted to send a delivery verification supervisory sequence consisting of an optional prefix followed by ENQ. Upon receipt of a delivery verification supervisory sequence, the slave station repeats its last reply.

1.3.7.2.5 N retries (N ≥ 0) may be made by the master station in order to get a valid slave reply. If a valid reply is not received after N retries, the master station exits to a recovery procedure.

1.3.7.3 LINK TERMINATION PROCEDURE

1.3.7.3.1 The station with master status shall transmit EOT to indicate that it has no more messages to transmit. EOT shall negate the master/slave status of both stations and return master status to the control station.

1.4 Ground-ground bit-oriented data link control procedures

Note.— The provisions of this section pertain to ground-ground data interchange applications using bit-oriented data link control procedures enabling transparent, synchronous transmission that is independent of any encoding; data link control functions are accomplished by interpreting designated bit positions in the transmission envelope of a frame.

1.4.1 The following descriptions shall apply to data link applications contained in this section:

(a) Bit-oriented data link control procedures enable transparent transmission that is independent of any encoding.

(b) A data link is the logical association of two interconnected stations, including the communication control capability of the interconnected stations.

(c) A station is a configuration of logical elements, from or to which messages are transmitted on a data link, including those elements which control the message flow on the link via communication control procedures.

(d) A combined station sends and receives both commands and responses and is responsible for control of the data link.

(e) Data communication control procedures are the means used to control and protect the orderly interchange of information between stations on a data link.

(f) A component is defined as a number of bits in a prescribed order within a sequence for the control and supervision of the data link.

(g) An octet is a group of 8 consecutive bits.

(h) A sequence is one or more components in prescribed order comprising an integral number of octets.

(i) A field is a series of a specified number of bits or specified maximum number of bits which performs the functions of data link or communications control or constitutes data to be transferred.

(j) A frame is a unit of data to be transferred over the data link, comprising one or more fields in a prescribed order.

1.4.2 BIT-ORIENTED DATA LINK CONTROL PROCEDURES FOR POINT-TO--POINT, GROUND-GROUND DATA INTERCHANGE APPLICATIONS EMPLOYING SYNCHRONOUS TRANSMISSION FACILITIES

1.4.2.1 Frame format. Frames shall contain not less than 32 bits, excluding the opening and closing flags, and shall conform to the following format:

FLAG	ADDRESS	CONTROL	INFORMATION	FCS	FLAG
F	A	C	I		F

1.4.2.1.1 A frame shall consist of an opening flag (F), an address field (A), a control field (C), an optional information field (I), a frame check sequence (FCS), and a closing flag sequence (F), and shall be transmitted in that order.

1.4.2.1.1.1 The flag (F) shall be the 8-bit sequence 01111110 which delimits the beginning and ending of each frame. It shall be permissible for the closing flag of a frame to also serve as the opening flag of the next frame.

1.4.2.1.1.2 The address (A) field shall consist of one octet, excluding 0 bits added to achieve transparent transmission, which shall contain the link address of the combined station.

1.4.2.1.1.3 The control (C) field shall consist of one octet, excluding 0 bits added to achieve transparent transmission, and shall contain the commands, responses, and frame sequence number components for the control of the data link.

1.4.2.1.1.4 The information (I) field shall contain digital data which may be presented in any code or sequence but shall not exceed a maximum of 259 octets, excluding 0 bits added to achieve transparent transmission. The I field shall always be a multiple of 8 bits in length.

1.4.2.1.1.5 The frame check sequence (FCS) shall consist of two octets, excluding 0 bits added to achieve transparent transmission, and shall contain the error detecting bits.

1.4.2.2 A frame check sequence (FCS) shall be included in each frame for the purpose of error checking.

1.4.2.2.1 The error checking algorithm shall be a cyclic redundancy check (CRC).

1.4.2.2.2 The CRC polynomial (P(x)) shall be

$X^{16} + X^{12} + X^5 + 1$

1.4.2.2.3 The FCS shall be a 16-bit sequence. This FCS shall be the ones' complement of the remainder, R(x), obtained from the module 2 division of

$X^{16}[G(X)] + X^K(X^{15} + X^{14} + X^{13} + ... + X^2 + X^1 + 1$

by the CRC polynomial, P(x).

G(x) shall be the contents of the frame existing between, but including neither, the final bit of the opening flag northe first bit of the FCS, excluding bits inserted for transparent transmission.

K shall be the length of G(x) (number of bits).

1.4.2.2.4 The generation and checking of the FCS accumulation shall be as follows:

(a) the transmitting station shall initiate the FCS accumulation with the first (least significant) bit of the address (A) field and shall include all bits up to and including the last bit preceding the FCS sequence, but shall exclude all 0 bits (if any) inserted to achieve transparent transmission;

(b) upon completion of the accumulation the FCS shall be transmitted, starting with bit b1 (highest order coefficient) and proceeding in sequence to bit b16 (lowest order coefficient) as shown below;

First bit transmitted ↓

First bit transmitted ↓

(c) the receiving station shall carry out the cyclic redundancy check (CRC) on the content of the frame commencing with the first bit received following the opening flag, and shall include all bits up to and including the last bit preceding the closing flag, but shall exclude all 0 bits (if any) deleted according to the rules for achievement of transparency;

(d) upon completion of the FCS accumulation, the receiving station shall examine the remainder. In the absence of transmission error, the remainder shall be 1111000010111000 (X^0 through x^{15}, respectively) redundancy check (CRC.

1.4.2.3 Achievement of transparency. The frame format contents (A, C, link data field, and FCS) shall be capable of containing any bit configuration.

1.4.2.3.1 The following rules shall apply to all frame contents, except flag sequences:

(a) the transmitting station shall examine the frame contents before transmission, and shall insert a single 0 bit immediately following each sequence of 5 consecutive 1 bits;

(b) the receiving station shall examine the received frame contents for patterns consisting of 5 consecutive 1 bits immediately followed by one (or more) 0 bit(s) and shall remove the 0 bit which directly follows 5 consecutive 1 bits.

1.4.2.4 Special transmission sequences and related link States. In addition to employing the prescribed repertoire of commands and responses to manage the interchange of data and control information, stations shall use the following conventions to signal the indicated conditions:

(a) Abort is the procedure by which a station in the process of sending a frame ends the frame in an unusual manner such that the receiving station shall ignore the frame. The conventions for aborting a frame shall be:

1. transmitting at least seven, but less than fifteen, one bits (with no inserted zeros);

2. receiving seven one bits.

(b) Active link State. A link is in an active State when a station is transmitting a frame, an abort sequence, or interframe time fill. When the link is in the active State, the right of the transmitting station to continue transmission shall be reserved.

(c) Interframe time fill. Interframe time fill shall be accomplished by transmitting continuous flags between frames. There is no provision for time fill within a frame.

(d) Idle link State. A link is in an idle State when a continuous one condition is detected that persists for 15 bit times, or longer. Idle link time fill shall be a continuous one condition on the link.

(e) Invalid frame. An invalid frame is one that is not properly bounded by two flags or one which is shorter than 32 bits between flags.

1.4.2.5 MODES

1.4.2.5.1 Operational mode. The operational mode shall be the asynchronous balanced mode (ABM).

1.4.2.5.1.1 It shall be permissible for a combined station in ABM to transmit without invitation from the associated station.

1.4.2.5.1.2 A combined station in ABM shall be permitted to transmit any command or response type frame except DM.

1.4.2.5.2 Non-operational mode. The non-operational mode shall be the asynchronous disconnected mode (ADM) in which a combined station is logically disconnected from the data link.

1.4.2.5.2.1 It shall be permissible for a combined station in ADM to transmit without invitation from the associated station.

1.4.2.5.2.2 A combined station in ADM shall transmit only SABM, DISC, UA and DM frames. (See 1.4.2.7 for a description of the commands and responses to which these frame types refer.)

1.4.2.5.2.3 A combined station in ADM shall transmit a DM when a DISC is received, and shall discard all other received command frames except SABM. If a discarded command frame has the P bit set to "1", the combined station shall transmit a DM with the F bit set to "1".

1.4.2.6 Control field functions and parameters. Control fields contain a command or a response and sequence numbers where applicable. Three types of control fields shall be used to perform:

(a) numbered information transfer (I-frames);

(b) numbered supervisory functions (S-frames); and

(c) unnumbered control functions (U-frames).

The control field formats shall be as shown in Table 8-5. The functional frame designation associated with each type control field as well as the control field parameters employed in performing these functions shall be described in the following paragraphs.

1.4.2.6.1 The I-frame type is used to perform information transfers. Except for some special cases it is the only format which shall be permitted to contain an information field.

1.4.2.6.2 The S-frame type is used for supervisory commands and responses that perform link supervisory control functions such as acknowledge information frames, request transmission or retransmission of information frames, and to request a temporary suspension of transmission of I-frames. No information field shall be contained in the S-frame.

1.4.2.6.3 The U-frame type is used for unnumbered commands and responses that provide additional link control functions. One of the U-frame responses, the frame reject (FRMR) response, shall contain an information field; all other frames of the U-frame type shall not contain an information field.

1.4.2.6.4 The station parameters associated with the three control field types shall be as follows:

(a) Modulus. Each I-frame shall be sequentially numbered with a send sequence count, N(S), having value 0 through modulus minus one (where modulus is the modulus of the sequence numbers). The modulus shall be 8. The maximum number of sequentially numbered I- frames that a station shall have outstanding (i.e. unacknowledged) at any given time shall never exceed one less than the modulus of the sequence numbers. This restriction on the number of outstanding frames is to prevent any ambiguity in the association of transmission frames with sequence numbers during normal operation and/or error recovery.

(b) The send State variable V(S) shall denote the sequence number of the next in-sequence I-frame to be transmitted.

1. The send State variable shall take on the value 0 through modulus minus one (modulus is the modulus of the sequence numbering and the numbers cycle through the entire range).

2. The value of V(S) shall be incremented by one with each successive in-sequence I-frame transmission, but shall not exceed the value of N(R) contained in the last received frame by more than the maximum permissible number of outstanding I-frames (k). See i) below for the definition of k.

(c) Prior to transmission of an in-sequence I-frame, the value of N(S) shall be updated to equal the value of V(S).

(d) The receive State variable V(R) shall denote the sequence number of the next in-sequence I-frame to be received.

1. V(R) shall take on the values 0 through modulus minus one.

2. The value of V(R) shall be incremented by one after the receipt of an error-free, in-sequence I-frame whose send sequence number N(S), equals V(R).

(e) All I-frames and S-frames shall contain N(R), the expected sequence number of the next received frame. Prior to transmission of either an I or an S type frame, the value of N(R) shall be updated to equal the current value of the receive State variable. N(R) indicates that the station transmitting the N(R) has correctly received all I-frames numbered up to and including N(R) – 1.

(f) Each station shall maintain an independent send State variable, V(S), and receive State variable, V(R), on the I-frames it sends and receives. That is, each combined station shall maintain a V(S) count on the I- frames it transmits and a V(R) count on the I-frames it has correctly received from the remote combined station.

(g) The poll (P/F) bit shall be used by a combined station to solicit (poll) a response or sequence of responses from the remote combined station.

(h) The final (P/F) bit shall be used by the remote combined station to indicate the response frame transmitted as the result of a soliciting (poll) command.

(i) The maximum number (k) of sequentially numbered I-frames that a station may have outstanding (i.e. unacknowledged) at any given time is a station parameter which shall never exceed the modulus.

Note.— k is determined by station buffering limitations and should be the subject of bilateral agreement at the time of circuit establishment.

1.4.2.7 Commands and responses. It shall be permissible for a combined station to generate either commands or responses. A command shall contain the remote station address while a response shall contain the sending station address. The mnemonics associated with all of the commands and responses prescribed for each of the three frame types (I, S, and U) and the corresponding encoding of the control field are as shown in Table 8-6.

1.4.2.7.1 The I-frame command provides the means for transmitting sequentially numbered frames, each of which shall be permitted to contain an information field.

1.4.2.7.2 The S-frame commands and responses shall be used to perform numbered supervisory functions (such as acknowledgement, polling, temporary suspension of information transfer, or error recovery).

1.4.2.7.2.1 The receive ready command or response (RR) shall be used by a station to:

(a) indicate that it is ready to receive an I-frame;

(b) acknowledge previously received I-frames numbered up to and including N(R) – 1;

(c) clear a busy condition that was initiated by the transmission of RNR.

Note.— It is permissible for a combined station to use the RR command to solicit a response from the remote combined station with the poll bit set to "1".

1.4.2.7.2.2 It shall be permissible to issue a reject command or response (REJ) to request retransmission of frames starting with the I-frame numbered N(R) where:

(a) I-frames numbered N(R) – 1 and below are acknowledged;

(b) additional I-frames pending initial transmission are to be transmitted following the retransmitted I-frame(s);

(c) only one REJ exception condition, from one given station to another station, shall be established at any given time: another REJ shall not be issued until the first REJ exception condition has been cleared;

(d) the REJ exception condition is cleared (reset) upon the receipt of an I- frame with an N(S) count equal to the N(R) of the REJ command/response.

1.4.2.7.2.3 The receive not ready command or response (RNR) shall be used to indicate a busy condition, i.e. temporary inability to accept additional incoming I- frames, where:

(a) frames numbered up to and including N(R) – 1 are acknowledged;

(b) frame N(R) and any subsequent I-frames received, if any, are not acknowledged (the acceptance status of these frames shall be indicated in subsequent exchanges);

(c) the clearing of a busy condition shall be indicated by the transmission of an RR, REJ, SABM, or UA with or without the P/F bit set to "1".

1.4.2.7.2.3.1

(a) A station receiving an RNR frame when in the process of transmitting shall stop transmitting I-frames at the earliest possible time.

(b) Any REJ command or response which was received prior to the RNR shall be actioned before the termination of transmission.

(c) It shall be permissible for a combined station to use the RNR command with the poll bit set to "1" to obtain a supervisory frame with the final bit set to "1" from the remote combined station.

1.4.2.7.2.4 It shall be permissible for the selective reject command or response (SREJ) to be used to request retransmission of the single I-frame numbered N(R) where:

(a) frames numbered up to N(R) – 1 are acknowledged; frame N(R) is not accepted; the only I-frames accepted are those received correctly and in sequence following the I-frame requested; the specific I-frame to be retransmitted is indicated by the N(R) in the SREJ command/response;

(b) the SREJ exception condition is cleared (reset) upon receipt of an I- frame with an N(S) count equal to the N(R) of the SREJ;

(c) after a station transmits a SREJ it is not permitted to transmit SREJ or REJ for an additional sequence error until the first SREJ error condition has been cleared;

(d) I-frames that have been permitted to be transmitted following the I- frame indicated by the SREJ are not retransmitted as the result of receiving a SREJ; and

(e) it is permissible for additional I-frames pending initial transmission to be transmitted following the retransmission of the specific I-frame requested by the SREJ.

1.4.2.7.3 The U-frame commands and responses shall be used to extend the number of link control functions. Transmitted U-frames do not increment the sequence counts at either the transmitting or receiving station.

(a) The U-frame mode-setting commands (SABM, and DISC) shall be used to place the addressed station in the appropriate response mode (ABM or ADM) where:

1. upon acceptance of the command, the station send and receive State variables, V(S) and V(R), are set to zero;

2. the addressed station confirms acceptance at the earliest possible time by transmission of a single unnumbered acknowledgement, UA;

3. previously transmitted frames that are unacknowledged when the command is actioned remain unacknowledged;

4. the DISC command is used to perform a logical disconnect, i.e. to inform the addressed combined station that the transmitting combined station is suspending operation. No information field shall be permitted with the DISC command.

(b) The unnumbered acknowledge response (UA) shall be used by a combined station to acknowledge the receipt and acceptance of an unnumbered command. Received unnumbered commands are not actioned until the UA response is transmitted. No information field shall be permitted with the UA response.

(c) The frame reject response (FRMR), employing the information field described below, shall be used by a combined station in the operational mode (ABM) to report that one of the following conditions resulted from the receipt of a frame without an FCS error:

1. a command/response that is invalid or not implemented;

2. a frame with an information field that exceeds the size of the buffer available;

3. a frame having an invalid N(R) count.

Note.— An invalid N(R) is a count which points to an I-frame which has previously been transmitted and acknowledged or to an I-frame which has not been transmitted and is not the next sequential I-frame pending transmission.

(d) The disconnected mode response (DM) shall be used to report a non- operational status where the station is logically disconnected from the link. No information field shall be permitted with the DM response.

Note.— The DM response shall be sent to request the remote combined station to issue a mode-setting command or, if sent in response to the reception of a mode-setting command, to inform the remote combined station that the transmitting station is still in ADM and cannot action the mode-setting command.

1.4.3 EXCEPTION CONDITION REPORTING AND RECOVERY

This section specifies the procedures that shall be employed to effect recovery following the detection or occurrence of an exception condition at the link level. Exception conditions described are those situations that may occur as the result of transmission errors, station malfunction, or operational situations.

1.4.3.1 Busy condition. A busy condition occurs when a station temporarily cannot receive or continue to receive I-frames due to internal constraints, e.g. due to buffering limitations. The busy condition shall be reported to the remote combined station by the transmission of an RNR frame with the N(R) number of the next I-frame that is expected. It shall be permissible for traffic pending transmission at the busy station to be transmitted prior to or following the RNR.

Note.— The continued existence of a busy condition must be reported by retransmission of RNR at each P/F frame exchange.

1.4.3.1.1 Upon receipt of an RNR, a combined station in ABM shall cease transmitting I-frames at the earliest possible time by completing or aborting the frame in process. The combined station receiving an RNR shall perform a time-out operation before resuming asynchronous transmission of I-frames unless the busy condition is reported as cleared by the remote combined station. If the RNR was received as a command with the P bit set to "1", the receiving station shall respond with an S-frame with the F bit set to "1".

1.4.3.1.2 The busy condition shall be cleared at the station which transmitted the RNR when the internal constraint ceases. Clearance of the busy condition shall be reported to the remote station by transmission of an RR, REJ, SABM, or UA frame (with or without the P/F bit set to "1").

1.4.3.2 N(S) sequence error. An N(S) sequence exception shall be established in the receiving station when an I-frame that is received error free (no FCS error) contains an N(S) sequence number that is not equal to the receive variable V(R) at the receiving station. The receiving station shall not acknowledge (shall not increment its receive variable V(R)) the frame causing the sequence error, or any I-frames which may follow, until an I-frame with the correct N(S) number is received. A station that receives one or more I-frames having sequence errors, but which are otherwise error free, shall accept the control information contained in the N(R) field and the P/F bit to perform link control functions, e.g. to receive acknowledgement of previously transmitted I-frames (via the N(R)), to cause the station to respond (P bit set to "1").

1.4.3.2.1 The means specified in 1.4.3.2.1.1 and 1.4.3.2.1.2 shall be available for initiating the retransmission of lost or errored I-frames following the occurrence of a sequence error.

1.4.3.2.1.1 Where the REJ command/response is used to initiate an exception recovery following the detection of a sequence error, only one "sent REJ" exception condition, from one station to another station, shall be established at a time. A "sent REJ" exception shall be cleared when the requested I-frame is received. A station receiving REJ shall initiate sequential (re)transmission of I-frames starting with the I-frame indicated by the N(R) contained in the REJ frame.

FRMR INFORMATION FIELD BITS FOR BASIC (SABM) OPERATION

First bit transmitted

1 8	9	10 12	13	14 16	17	18	19	20	21 24
rejected basic control field	0	*V(S)*	*v*	*V(R)*	*w*	*x*	*y*	*z*	set to zero

where:

rejected basic control field is the control field of the received frame which caused the frsme reject,

V(S) is the current value of the send state variable at the remote combined station reporting the error condition

(bit 10 = low order bit);

*V(R)*is the current value of the receive state variable at the remote combined station reporting the error condition

(bit 14 = low order bit);

v set to "1" indicates that the received frame which casued rejection was a response:

w set to "1" indicates that the control received and returned in bits 1 through 8 are invalid or not implemented:

I set to "1" indicates that the control received and returned in bits 1 through 8 considered invalid because the frame contained an information field which is not permitted with this command. Bit *w* must be set to "1" in conjunction with this bit;

y set to "1" indicates that the information field receivered exceeded the maximum information field length which can be accommodated by the station reporting the error condition. This bit is mutually exclusive with bits w and x above;

z set to "1" indicates that the control field received and returned in bits 1 through 8 contained an invalid *N(R)* count. This bit is mutually exclusive with bit w.

1.4.3.2.1.2 In the event a receiving station, due to a transmission error, does not receive (or receives and discards) a single I-frame or the last I-frame(s) in a sequence of I-frames, it shall not detect an out-of-sequence exception and, therefore, shall not transmit REJ. The station which transmitted the unacknowledged I-frame(s) shall, following the completion of a system-specified time-out period, take appropriate recovery action to determine the sequence number at which retransmission must begin.

1.4.3.2.1.3 A combined station which has timed out waiting for a response shall not retransmit all unacknowledged frames immediately. The station may enquire about status with a supervisory frame.

Note 1.— If a station does retransmit all unacknowledged I-frames after a time-out, it must be prepared to receive a subsequent REJ frame with an N(R) greater than its send variable V(S).

Note 2.— Since contention may occur in the case of two-way alternate communications in ABM or ADM, the time-out interval employed by one combined station must be greater than that employed by the other combined station so as to permit contention to be resolved.

1.4.3.3 FCS error. Any frame with an FCS error shall not be accepted by the receiving station and will be discarded. No action shall be taken by the receiving station as the result of that frame.

1.4.3.4 Frame reject exception condition. A frame reject exception condition shall be established upon the receipt of an error-free frame which contains an invalid or unimplemented control field, an invalid N(R), or an information field which has exceeded the maximum established storage capability. If a frame reject exception condition occurs in a combined station, the station shall either:

(a) take recovery action without reporting the condition to the remote combined station; or

(b) report the condition to the remote combined station with a FRMR response. The remote station will then be expected to take recovery action; if, after waiting an appropriate time, no recovery action appears to have been taken, the combined station reporting the frame reject exception condition may take recovery action. Recovery action for balanced operation includes the transmission of an implemented mode-setting command. Higher level functions may also be involved in the recovery.

1.4.3.5 Mode-setting contention. A mode-setting contention situation exists when a combined station issues a modesetting command and, before receiving an appropriate response (UA or DM), receives a mode-setting command from the remote combined station. Contention situations shall be resolved in the following manner:

(a) when the send and receive mode-setting commands are the same, each combined station shall send a UA response at the earliest respond opportunity. Each combined station shall either enter the indicated mode immediately or defer entering the indicated mode until receiving a UA response. In the latter case, if the UA response is not received:

1. the mode may be entered when the response timer expires; or

2. the mode-setting command may be reissued;

(b) when the mode-setting commands are different, each combined station shall enter ADM and issue a DM response at the earliest respond opportunity. In the case of DISC contention with a different mode-setting command, no further action is required.

1.4.4 Time-out functions. Time-out functions shall be used to detect that a required or expected acknowledging action or response to a previously transmitted frame has not been received. Expiration of the time-out function shall initiate appropriate action, e.g. error recovery or reissuance of the P bit. The duration of the following time-out functions is system dependent and subject to bilateral agreement:

(a) combined stations shall provide a time-out function to determine that a response frame with F bit set to "1" to a command frame with the P bit set to "1" has not been received. The time-out function shall automatically cease upon receipt of a valid frame with the F bit set to "1";

(b) a combined station which has no P bit outstanding, and which has transmitted one or more frames for which responses are anticipated shall start a time-out function to detect the no-response condition. The time-out function shall cease when an I- or S-frame is received with the N(R) higher than the last received N(R) (actually acknowledging one or more I--frames).

TABLES FOR THE ELEVENTH SCHEDULE

GRAPHIC CHARACTERS

Graphic	Note	Name	Position in the code table
(space)		Space (see 7.2)	2/0
!		Exclamation mark	2/1
"	4	Quotation mark, Diaeresis	2/2
#		Number sign	2/3
¤	2	Currency sign	2/4
%		Percent sign	2/5
&		Ampersand	2/6
'	4	Apostrophe, Acute accent	2/7
(		Left parenthesis	2/8
)		Right parenthesis	2/9
*		Asterisk	2/10
+		Plus sign	2/11
,	4	Comma, Cedilla	2/12
-		Hyphen, Minus sign	2/13
.		Full stop (period)	2/14
/		Solidus	2/15
:		Colon	3/10
;		Semi-colon	3/11
<		Less-than sign	3/12
=		Equal sign	3/13
>		Greater-than sign	3/14
?		Question mark	3/15
@		Commercial "at"	4/0
[		Left square bracket	5/11
\		Reverse solidus	5/12
]		Right square bracket	5/13
^	4	Upward arrow head, Circumflex accent	5/14
_		Underline	5/15
`		Grave accent	6/0
{		Left curly bracket	7/11
|		Vertical line	7/12
}		Right curly bracket	7/13
~	3	Overline, Tilde	7/14

CONTROL CHARACTERS

Abbreviation	Meaning	Position in the code table
ACK	Acknowledge	0/6
BEL	Bell	0/7
BS	Backspace	0/8
CAN	Cancel	1/8
CR	Carriage return*	0/13
DC	Device control	-
DEL	Delete	7/15
DLE	Data link escape	1/0
EM	End of medium	1/9
ENQ	Enquiry	0/5
EOT	End of transmission	0/4
ESC	Escape	1/11
ETB	End of transmission block	1/7
ETX	End of text	0/3
FE	Format effector	-
FF	Form feed	0/12
FS	File separator	1/12
GS	Group separator	1/13
HT	Horizontal tabulation	0/9
IS	Information separator	-
LF	Line feed*	0/10
NAK	Negative acknowledge	1/5
NUL	Null	0/0
RS	Record separator	1/14
SI	Shift-in	0/15
SO	Shift-out	0/14
SOH	Start of heading	0/1
SP	Space	2/0
STX	Start of text	0/2
SUB	Substitute character	1/10
SYN	Synchronous idle	1/6
TC	Transmission control	-
US	Unit separator	1/15
VT	Vertical tabulation	0/11

* see Note 1.

DIACRITICAL SIGNS

In the character set, some printing symbols may be designed to permit their use for the composition of accented letters when necessary for general interchange of information. A sequence of three characters, comprising a letter, BACKSPACE and one of these symbols, is needed for this composition, and the symbol is then regarded as a diacritical sign. It should be noted that these symbols take on their diacritical significance only when they are preceded or followed by the BACKSPACE character: for example, the symbol corresponding to the code combination 2/7 (') normally has the significance of APOSTROPHE, but becomes the diacritical sign ACUTE ACCENT when it precedes or follows the BACKSPACE character.

NAMES, MEANINGS AND FONTS OF GRAPHIC CHARACTERS

At least one name is assigned to denote each of the graphic characters. These names are intended to reflect their customary meanings and are not intended to define or restrict the meanings of graphic characters. No particular style or font design is specified for the graphic characters.

UNIQUENESS OF CHARACTER ALLOCATION

A character allocated to a position in the table may not be placed elsewhere in the table.

FUNCTIONAL CHARACTERISTICS RELATED TO CONTROL CHARACTERS

Some definitions given below are stated in general terms and more explicit definitions of use may be needed for specific implementation of the code table on recording media or on transmission channels. These more explicit definitions and the use of these characters are the subject of ISO publications.

General designations of control characters

The general designation of control characters involves a specific class name followed by a subscript number. They are defined as follows:

TC — *Transmission control characters* — Control characters intended to control or facilitate transmission of information over telecommunication networks.
The use of the TC characters on the general telecommunication networks is the subject of ISO publications.
The transmission control characters are:
ACK, DLE, ENQ, EOT, ETB, ETX, NAK, SOH, STX and SYN.

FE — *Format effectors* — Control characters mainly intended for the control of the layout and positioning of information on printing and/or display devices. In the definitions of specific format effectors, any reference to printing devices should be interpreted as including display devices. The definitions of format effectors use the following concept:

a) a page is composed of a number of lines of characters;

b) the characters forming a line occupy a number of positions called character positions;

c) the active position is that character position in which the character about to be processed would appear if it were to be printed. The active position normally advances rote character position at a time.

The format effector characters are:
BS, CR, FF, HT, LF and VT.

DC — *Device control characters* — Control characters for the control of a local or remote ancillary device (or devices) connected to a data processing and/or telecommunication system. These control characters are not intended to control telecommunication systems; this should be achieved by the use of TCs.
Certain preferred uses of the individual DCs are given below under *Specific control characters*.

IS — *Information separators* — Control characters that are used to separate and qualify data logically. There are four such characters. They may be used either in hierarchical order or non-hierarchically; in the latter case their specific meanings depend on their applications.
When they are used hierarchically, the ascending order is:
US, RS, GS, FS.
In this case, a data item normally delimited by a particular separator cannot be split by a higher order separator but will be considered as delimited by any higher order separator.

Specific control characters

Individual members of the classes of controls are sometimes referred to by their abbreviated class name and a subscript number (e.g. TC_4) and sometimes by a specific name indicative of their use (e.g. ENQ).

Different but related meanings may be associated with some of the control characters but in an interchange of data this normally requires agreement between the sender and the recipient.

ACK — *Acknowledge* — A transmission control character transmitted by a receiver as an affirmative response to the sender.

BEL — *Bell* — A control character that is used when there is a need to call for attention; it may control alarm or attention devices.

BS — *Backspace* — A format effector which moves the active position one character position backwards on the same line.

CAN — *Cancel* — A character, or the first character of a sequence, indicating that the data preceding it are in error. As a result these data are to be ignored. The specific meaning of this character must be defined for each application and/or between sender and recipient.

CR — *Carriage return* — A format effector which moves the active position to the first character position on the same line.

Device controls

DC_1 — A device control character which is primarily intended for turning on or starting an ancillary device. If it is not required for this purpose, it may be used to restore a device to the basic mode of operation (see also DC_2 and DC_3), or for any other device control function not provided by other DCs.

DC_2 — A device control character which is primarily intended for turning on or starting an ancillary device. If it is not required for this purpose, it may be used for any other device control function that requires the same type of operation (in which case DC_1 is used to restore the device to the basic mode), or for any other device control function not provided by other DCs.

DC_3 — A device control character which is primarily intended for turning off or stopping an ancillary device. This function may be a secondary level stop, e.g. wait, pause, stand-by or halt (in which case DC_1 is used to restore normal operation). If it is not required for this purpose, it may be used for any other device control function not provided by other DCs.

DC_4 — A device control character which is primarily intended for turning off, stopping or interrupting an ancillary device. If it is not required for this purpose, it may be used for any other device control function not provided by other DCs.

Examples of use of the device controls

1) One switching
on — DC_1 off — DC_4

2) Two independent switchings
First one on — DC_1 off — DC_4
Second one on — DC_1 off — DC_5

3) Two dependent switchings
General on — DC_1 off — DC_4
Particular on — DC_2 off — DC_5

4) Input and output switching
Output on — DC_2 off — DC_4
Input on — DC_1 off — DC_3

DEL — *Delete* — A character used primarily to erase or obliterate an erroneous or unwanted character in punched tape. DEL characters may also serve to accomplish media-fill or time-fill. They may be inserted into or removed from a stream of data without affecting the information content of that stream, but then the addition or removal of these characters may affect the information layout and/or the control of equipment.

DLE — *Data link escape* — A transmission control character which will change the meaning of a limited number of contiguously following characters. It is used exclusively to provide supplementary data transmission control functions. Only graphic characters and transmission control characters can be used in DLE sequences.

EM — *End of medium* — A control character that may be used to identify the physical end of a medium, or the end of the wanted portion of data recorded on a medium. The position of this character does not necessarily correspond to the physical end of the medium.

ENQ — *Enquiry* — A transmission control character used as a request for a response from a remote station — the response may include station identification and/or station status. When a "Who are you?" function is required on the general switched transmission network, the first use of ENQ after establishing connection shall initiate the transmission of "Who are you?" (station identification). Subsequent use of ENQ may, or may not, include the function "Who are you?", as determined by agreement.

EOT — *End of transmission* — A transmission control character used to indicate the conclusion of the transmission of one or more texts.

ESC — *Escape* — A control character which is used to provide an additional control function. It alters the meaning of a limited number of contiguously following bit combinations which constitute the escape sequence.
Escape sequences consist of two or more graphic characters which may provide among other things graphic sets outside the standard set. Such control functions must not be used as additional transmission controls.
The use of the character ESC and of the escape sequences in conjunction with code extension techniques is the subject of an ISO Standard.

ETB — *End of transmission block* — A transmission control character used to indicate the end of a transmission block of data where data are divided into such blocks for transmission purposes.

ETX — *End of text* — A transmission control character which terminates a text.

FF — *Form feed* — A format effector which advances the active position to the same character position on a predetermined line of the next form or page.

HT — *Horizontal tabulation* — A format effector which advances the active position to the next predetermined character position on the same line.

Information separators

IS_1 (US) — A control character used to separate and qualify data logically; its specific meaning has to be defined for each application. If this character is used in hierarchical order as specified in the general definition of IS, it delimits a data item called a UNIT.

IS_2 (RS) — A control character used to separate and qualify data logically; its specific meaning has to be defined for each application. If this character is used in hierarchical order as specified in the general definition of IS, it delimits a data item called a RECORD.

IS_3 (GS) — A control character used to separate and qualify data logically, its specific meaning has to be defined for each application. If this character is used in hierarchical order as specified in the general definition of IS, it delimits a data item called a GROUP.

IS_4 (FS) — A control character used to separate and qualify data logically, its specific meaning has to be defined for each application. If this character is used in hierarchical order as specified in the general definition of IS, it delimits a data item called a FILE.

LF — *Line feed* — A format effector which advances the active position to the same character position of the next line.

NAK — *Negative acknowledge* — A transmission control character transmitted by a receiver as a negative response to the sender.

NUL — *Null* — A control character used to accomplish media-fill or time-fill. NUL characters may be inserted into or removed from a stream of data without affecting the information content of that stream, but then the addition or removal of these characters may affect the information layout and/or the control of equipment.

SI	– *Shift-in* – A control character which is used in conjunction with SHIFT-OUT and ESCAPE to extend the graphic character set of the code. It may reinstate the standard meanings of the bit combinations which follow it. The effect of this character when using code extension techniques is described in an ISO Standard.
SO	– *Shift-out* – A control character which is used in conjunction with SHIFT-IN and ESCAPE to extend the graphic character set of the code. It may alter the meaning of the bit combinations of columns 2 to 7 which follow it until a SHIFT-IN character is reached. However, the characters SPACE (2/0) and DELETE (7/15) are unaffected by SHIFT-OUT. The effect of this character when using code extension techniques is described in an ISO Standard.
SOH	– *Start of heading* – A transmission control character used as the first character of a heading of an information message.
SP	– *Space* – A character which advances the active position one character position on the same line. This character is also regarded as a non-printing graphic.
STX	– *Start of text* – A transmission control character which precedes a text and which is used to terminate a heading.
SUB	– *Substitute character* – A control character used in the place of a character that has been found to be invalid or in error. SUB is intended to be introduced by automatic means.
SYN	– *Synchronous idle* – A transmission control character used by a synchronous transmission system in the absence of any other character (idle condition) to provide a signal from which synchronism may be achieved or retained between data terminal equipment.
VT	– *Vertical tabulation* – A format effector which advances the active position to the same character position on the next predetermined line.

Table 8-5 Control field formats

Control field format for	Control field bits							
	1	2	3	4	5	6	7	8
Information transfer (I frame)	0	N(S)			P	N(R)		
Supervisory commands/responses (S frame)	1	0	S	S	P/F	N(R)		
Unnumbered commands/responses	1	1	M	M	P/F	M	M	M

where:
N(S) = send sequence count (bit 2 = low order bit)
N(R) = receive sequence count (bit 6 = low order bit)
S = supervisory function bits
M = modifier function bits
P = poll bit (in commands)
F = final bit (in responses)

Table 8-6. Commands and responses

Type	*Commands*		*Responses*		*C field encoding* *1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Information transfer	I	(information)			0		*N(S)*		*P*		*N(R)*	
Supervisory	RR	(receive ready)	RR	(receive ready)	1	0	0	0	*P/F*		*N(R)*	
	RNR	(receive not ready)	RNR	(receive not ready)	1	0	1	0	*P/F*		*N(R)*	
	REJ	(reject)	REJ	(reject)	1	0	0	1	*P/F*		*N(R)*	
Unnumbered			DM	(disconnected mode)	1	1	1	1	*P/F*	0	0	0
	SABM	(set asynchronous balanced mode)			1	1	1	1	*P*	1	0	0
	DISC	(disconnect)			1	1	0	0	*P*	0	1	0
			UA	(unnumbered acknowledgement)	1	1	0	0	*F*	1	1	0
			FRMR	(frame reject)	1	1	1	0	*F*	0	0	1

TWELFTH SCHEDULE (regulation 67)

A WORLDWIDE SCHEME FOR THE ALLOCATION, ASSIGNMENT AND APPLICATION OF AIRCRAFT ADDRESSES

1. GENERAL

1.1 Global communications, navigation and surveillance systems shall use an individual aircraft address composed of 24 bits. At any one time, no address shall be assigned to more than one aircraft. The assignment of aircraft addresses requires a comprehensive scheme providing for a balanced and expandable distribution of aircraft addresses applicable worldwide.

2. DESCRIPTION OF THE SCHEME

2.1 Table 9-1 provides for blocks of consecutive addresses available to States for assignment to aircraft. Each block is defined by a fixed pattern of the first 4, 6, 9, 12, or 14 bits of the 24-bit address. Thus, blocks of different sizes (1 048 576, 262, 144, 32 768, 4 096 and 1 024 consecutive addresses, respectively) are made available.

3. MANAGEMENT OF THE SCHEME

3.1 The International Civil Aviation Organization (ICAO) shall administer the scheme so that appropriate international distribution of aircraft addresses can be maintained.

4.0 ALLOCATION OF AIRCRAFT ADDRESSES

4.1 Blocks of aircraft addresses shall be allocated by ICAO to the State of Registry or common mark registering authority. Address allocations to States shall be as shown in Table 9-1.

4.2 A State of Registry or common mark registering authority shall notify ICAO when allocation to that State of an additional block of addresses is required for assignment to aircraft

4.3 In the future management of the scheme, advantage shall be taken of the blocks of aircraft addresses not yet allocated. These spare blocks shall be distributed on the basis of the relevant ICAO region:

Addresses starting with bit combination 00100: AFI region

Addresses starting with bit combination 00101: SAM region

Addresses starting with bit combination 0101: EUR and NAT regions

Addresses starting with bit combination 01100: MID region

Addresses starting with bit combination 01101: ASIA region

Addresses starting with bit combination 1001: NAM and PAC regions

Addresses starting with bit combination 111011: CAR region

In addition, aircraft addresses starting with bit combinations 1011, 1101 and 1111 have been reserved for future use.

4.4 Any future requirement for additional aircraft addresses shall be accommodated through coordination between ICAO and the States of Registry or common mark registering authority concerned. A request for additional aircraft addresses shall only be made by a registering authority when at least 75 per cent of the number of addresses already allocated to that registering authority have been assigned to aircraft.

4.5 ICAO shall allocate blocks of aircraft addresses to non-Contracting States upon request.

5.0 ASSIGNMENT OF AIRCRAFT ADDRESSES

5.1 Using its allocated block of addresses, the State of Registry or common mark registering authority shall assign an individual aircraft address to each suitably equipped aircraft entered on a national or international register (Table 9-1).

Note.— For an aircraft delivery, the aircraft operator is expected to inform the airframe manufacturer of an address assignment. The airframe manufacturer or other organization responsible for a delivery flight is expected to ensure installation of a correctly assigned address supplied by the State of Registry or common mark registering authority. Exceptionally, a temporary address may be supplied under the arrangements detailed in paragraph 7.

5.2 Aircraft addresses shall be assigned to aircraft in accordance with the following principles:

(a) at any one time, no address shall be assigned to more than one aircraft with the exception of aerodrome surface vehicles on surface movement areas. If such exceptions are applied by the State of Registry, the vehicles which have been allocated the same address shall not operate on aerodromes separated by less than 1 000 km;

(b) only one address shall be assigned to an aircraft, irrespective of the composition of equipment on board. In the case when a removable transponder is shared by several light aviation aircraft such as balloons or gliders, it shall be possible to assign a unique address to the removable transponder. The registers 0816, 2016, 2116, 2216 and 2516 of the removable transponder shall be correctly updated each time the removable transponder is installed in any aircraft;

(c) the address shall not be changed except under exceptional circumstances and shall not be changed during flight;

(d) when an aircraft changes its State of Registry, the new registering State shall assign the aircraft a new address from its own allocation address block, and the old aircraft address shall be returned to the allocation address block of the State that previously registered the aircraft;

(e) the address shall serve only a technical role for addressing and identification of aircraft and shall not be used to convey any specific information; and

(f) the addresses composed of 24 ZEROS or 24 ONES shall not be assigned to aircraft.

5.2.1 Any method used to assign aircraft addresses shall ensure efficient use of the entire address block that is allocated to Uganda.

6. APPLICATION OF AIRCRAFT ADDRESSES

6.1 The aircraft addresses shall be used in applications which require the routing of information to or from individual suitably equipped aircraft.

Note 1.— Examples of such applications are the aeronautical telecommunication network (ATN), SSR Mode S and airborne collision avoidance system (ACAS).

Note 2.— This Standard does not preclude assigning the aircraft addresses for special applications associated with the general applications defined therein. Examples of such special applications are the utilization of the 24-bit address in a pseudo-aeronautical earth station to monitor the aeronautical mobile-satellite service ground earth station and in the fixed Mode S transponders (reporting the on-the-ground status as specified in ANS Technical Standards, Part II, Volume IV, 3.1.2.6.10.1.2) to monitor the Mode S ground station operation. Address assignments for special applications are to be carried out in conformance with the procedure established by Uganda to manage the 24-bit address assignments to aircraft.

6.2 An address consisting of 24 ZEROs shall not be used for any application.

7. ADMINISTRATION OF THE TEMPORARY AIRCRAFT ADDRESS ASSIGNMENTS

7.1 Temporary addresses shall be assigned to aircraft in exceptional circumstances, such as when operators have been unable to obtain an address from their individual States of Registry or Common Mark Registering Authority in a timely manner. ICAO shall assign temporary addresses from the block "ICAO1" shown in Table 9-1.

7.2 When requesting a temporary address, the aircraft operator shall supply to ICAO: aircraft identification, type and make of aircraft, name and address of the operator, and an explanation of the reason for the request.

7.2.1 Upon issuance of the temporary address to the aircraft operators, ICAO shall inform the State of Registry of the issuance of the temporary address, reason and duration.

7.3 The aircraft operator shall:

(a) inform the State of Registry of the temporary assignment and reiterate the request for a permanent address; and

(b) inform the airframe manufacturer.

7.4 When the permanent aircraft address is obtained from the State of Registry, the operator shall:

(a) inform ICAO without delay;

(b) relinquish his/her temporary address; and

(c) arrange for encoding of the valid unique address within 180 calendar days.

7.5 If a permanent address is not obtained within one year, the aircraft operator shall reapply for a new temporary aircraft address. Under no circumstances shall a temporary aircraft address be used by the aircraft operator for over one year.

Table 9-1. Allocation of aircraft addresses to States

Note.— The left-hand column of the 24-bit address patterns represents the most significant bit (MSB) of the address.

State	Number of addresses in block					Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)					Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)				
	1 024	*4 096*	*32 768*	*262 144*	*1 048 576*										
Afghanistan		*				0111	00	000	000	--	0111	00	000	000	--
Albania	*					0101	00	000	001	00	0101	00	000	001	00
Algeria			*			0000	10	100	---	--	0000	10	100	---	--
Angola						0000	10	010	000	--	0000	10	010	000	--
Antigua and Barbuda		*				0000	11	001	010	00	0000	11	001	010	00
Argentina				*		1110	00	---	---	--	1110	00	---	---	--
Armenia		*				0110	00	000	000	00	0110	00	000	000	00
Australia						0111	11	---	---	--	0111	11	---	---	--
Austria			*			0100	01	000	---	--	0100	01	000	---	--
Azerbaijan		*				0110	00	000	000	10	0110	00	000	000	10
Bahamas						0000	10	101	000	--	0000	10	101	000	--
Bahrain						1000	10	010	100	--	1000	10	010	100	--
Bangladesh						0111	00	000	010	--	0111	00	000	010	--
Barbados		*				0000	10	101	010	00	0000	10	101	010	00
Belarus		*				0101	00	010	000	00	0101	00	010	000	00
Belgium			*			0100	01	001	---	--	0100	01	001	---	--
Belize		*				0000	10	101	011	00	0000	10	101	011	00
Benin		*				0000	10	010	100	00	0000	10	010	100	00
Bhutan		*				0110	10	000	000	00	0110	10	000	000	00
Bolivia						1110	10	010	100	--	1110	10	010	100	--
Bosnia and Herzegovina		*				0101	00	010	011	00	0101	00	010	011	00
Botswana		*				0000	00	110	000	00	0000	00	110	000	00
Brazil				*		1110	01	---	---	--	1110	01	---	---	--
Brunei Darussalam		*				1000	10	010	101	00	1000	10	010	101	00
Bulgaria			*			0100	01	010	---	--	0100	01	010	---	--
Burkina Faso						0000	10	011	100	--	0000	10	011	100	--
Burundi		*				0000	00	110	010	--	0000	00	110	010	--
Cambodia		*				0111	00	001	110	--	0111	00	001	110	--
Cameroon		*				0000	00	110	100	--	0000	00	110	100	--
Canada				*		1100	00	---	---	--	1100	00	---	---	--
Cape Verde	*					0000	10	010	110	00	0000	10	010	110	00
Central African Republic		*				0000	01	101	100	--	0000	01	101	100	--
Chad		*				0000	10	000	100	--	0000	10	000	100	--
Chile				*		1110	10	000	000	--	1110	10	000	000	--
China						0111	10	---	---	--	0111	10	---	---	--
Colombia		*				0000	10	101	100	--	0000	10	101	100	--
Comoros		*				0000	00	110	101	00	0000	00	110	101	00
Congo		*				0000	00	110	110	--	0000	00	110	110	--
Cook Islands	*					1001	00	000	001	00	1001	00	000	001	00
Costa Rica		*				0000	10	101	110	--	0000	10	101	110	--
Côte d'Ivoire		*				0000	00	111	000	--	0000	00	111	000	--
Croatia	*					0101	00	000	001	11	0101	00	000	001	11
Cuba		*				0000	10	110	000	--	0000	10	110	000	--
Cyprus	*					0100	11	001	000	00	0100	11	001	000	00
Czech Republic			*			0100	10	011	---	--	0100	10	011	---	--

State	Number of addresses in block					Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)					Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)				
	1 024	*4 096*	*32 768*	*262 144*	*1 048 576*										
Democratic People's Republic of Korea			*			0111	00	100	---	--					
Democratic Republic of the Congo		*				0000	10	001	100	--					
Denmark			*			0100	01	011	---	--					
Djibouti	*					0000	10	011	000	00					
Dominican Republic		*				0000	11	000	100	--					
Ecuador			*			1110	10	000	100	--					
Egypt		*				0000	00	010	---	--					
El Salvador		*				0000	10	110	010	--					
Equatorial Guinea		*				0000	01	000	010	--					
Eritrea	*					0010	00	000	010	00					
Estonia	*					0101	00	010	001	00					
Ethiopia		*				0000	01	000	000	--					
Fiji		*				1100	11	001	000	--					
Finland			*			0100	01	100	---	--					
France				*		0011	10	---	---	--					
Gabon		*				0000	00	111	110	--					
Gambia		*				0000	10	011	010	--					
Georgia	*					0101	00	010	100	00					
Germany			*			0011	11	---	---	--					
Ghana		*				0000	01	000	100	--					
Greece	*					0100	01	101	---	--					
Grenada		*				0000	11	001	100	00					
Guatemala		*				0000	10	110	100	--					
Guinea		*				0000	01	000	110	--					
Guinea-Bissau	*					0000	01	001	000	00					
Guyana		*				0000	10	110	110	--					
Haiti		*				0000	10	111	000	--					
Honduras		*				0000	10	111	010	--					
Hungary			*			0100	11	110	---	--					
Iceland						0100	11	001	100	--					
India				*		1000	00	---	---	--					
Indonesia		*				1000	10	100	---	--					
Iran, Islamic Republic of		*				0111	00	110	---	--					
Iraq		*				0111	00	101	---	--					
Ireland						0100	11	001	010	--					
Israel		*				0111	00	111	---	--					
Italy			*			0011	00	111	---	--					
Jamaica		*				0000	10	111	110	--					
Japan				*		1000	01	---	---	--					
Jordan		*				0111	01	000	---	--					
Kazakhstan	*					0110	10	000	011	00					
Kenya		*				0000	01	001	100	--					
Kiribati	*					1100	10	001	110	00					
Kuwait		*				0111	00	000	110	--					
Kyrgyzstan	*					0110	00	000	001	00					
Lao People's Democratic Republic		*				0111	00	001	000	--					
Latvia	*					0101	00	000	010	11					

State	1 024	4 096	32 768	262 144	1 048 576	Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)
Lebanon			*			0111 01 001 --- -- ----------
Lesotho	*					0000 01 001 010 00 ----------
Liberia		*				0000 01 010 000 -- ----------
Libyan Arab Jamahiriya			*			0000 00 011 --- -- ----------
Lithuania	*					0101 00 000 011 11 ----------
Luxembourg	*					0100 11 010 000 00 ----------
Madagascar		*				0000 01 010 100 -- ----------
Malawi		*				0000 01 011 000 -- ----------
Malaysia			*			0111 01 010 --- -- ----------
Maldives	*					0000 01 011 010 00 ----------
Mali		*				0000 01 011 100 -- ----------
Malta	*					0100 11 010 010 00 ----------
Marshall Islands	*					1001 00 000 000 00 ----------
Mauritania	*					0000 01 011 110 00 ----------
Mauritius	*					0000 01 100 000 00 ----------
Mexico			*			0000 11 010 --- -- ----------
Micronesia, Federated States of	*					0110 10 000 001 00 ----------
Monaco	*					0100 11 010 100 00 ----------
Mongolia	*					0110 10 000 010 00 ----------
Montenegro	*					0101 00 010 110 00 ----------
Morocco			*			0000 00 100 --- -- ----------
Mozambique		*				0000 00 000 110 -- ----------
Myanmar		*				0111 00 000 100 -- ----------
Namibia	*					0010 00 000 001 00 ----------
Nauru	*					1100 10 001 010 00 ----------
Nepal		*				0111 00 001 010 -- ----------
Netherlands, Kingdom of the			*			0100 10 000 --- -- ----------
New Zealand			*			1100 10 000 --- -- ----------
Nicaragua		*				0000 11 000 000 -- ----------
Niger		*				0000 01 100 010 -- ----------
Nigeria		*				0000 01 100 100 -- ----------
Norway			*			0100 01 111 --- -- ----------
Oman	*					0111 00 001 100 00 ----------
Pakistan			*			0111 01 100 --- -- ----------
Palau	*					0110 10 000 100 00 ----------
Panama		*				0000 11 000 010 -- ----------
Papua New Guinea		*				1000 10 011 000 -- ----------
Paraguay		*				1110 10 001 000 -- ----------
Peru		*				1110 10 001 100 -- ----------
Philippines			*			0111 01 011 --- -- ----------
Poland			*			0100 10 001 --- -- ----------
Portugal			*			0100 10 010 --- -- ----------
Qatar	*					0000 01 101 010 00 ----------
Republic of Korea			*			0111 00 011 --- -- ----------
Republic of Moldova	*					0101 00 000 100 11 ----------
Romania			*			0100 10 100 --- -- ----------
Russian Federation					*	0001 -- --- --- -- ----------
Rwanda		*				0000 01 101 110 -- ----------

State	1 024	4 096	32 768	262 144	1 048 576	Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)
Saint Lucia	*					1100 10 001 100 00 ----------
Saint Vincent and the Grenadines	*					0000 10 111 100 00 ----------
Samoa	*					1001 00 000 010 00 ----------
San Marino	*					0101 00 000 000 00 ----------
Sao Tome and Principe	*					0000 10 011 110 00 ----------
Saudi Arabia			*			0111 00 010 --- -- ----------
Senegal		*				0000 01 110 000 -- ----------
Serbia			*			0100 11 000 --- -- ----------
Seychelles	*					0000 01 110 100 00 ----------
Sierra Leone	*					0000 01 110 110 00 ----------
Singapore			*			0111 01 101 --- -- ----------
Slovakia	*					0101 00 000 101 11 ----------
Slovenia	*					0101 00 000 110 11 ----------
Solomon Islands	*					1000 10 010 111 00 ----------
Somalia		*				0000 01 111 000 -- ----------
South Africa			*			0000 00 001 --- -- ----------
Spain				*		0011 01 --- --- -- ----------
Sri Lanka			*			0111 01 110 --- -- ----------
Sudan		*				0000 01 111 100 -- ----------
Suriname		*				0000 11 001 000 -- ----------
Swaziland	*					0000 01 111 010 00 ----------
Sweden			*			0100 10 101 --- -- ----------
Switzerland			*			0100 10 110 --- -- ----------
Syrian Arab Republic			*			0111 01 111 --- -- ----------
Tajikistan	*					0101 00 010 101 00 ----------
Thailand			*			1000 10 000 --- -- ----------
The former Yugoslav Republic of Macedonia	*					0101 00 010 010 00 ----------
Togo		*				0000 10 001 000 -- ----------
Tonga	*					1100 10 001 101 00 ----------
Trinidad and Tobago		*				0000 11 000 110 -- ----------
Tunisia			*			0000 00 101 --- -- ----------
Turkey			*			0100 10 111 --- -- ----------
Turkmenistan	*					0110 00 000 001 10 ----------
Uganda		*				0000 01 101 000 -- ----------
Ukraine			*			0101 00 001 --- -- ----------
United Arab Emirates		*				1000 10 010 110 -- ----------
United Kingdom				*		0100 00 --- --- -- ----------
United Republic of Tanzania		*				0000 10 000 000 -- ----------
United States					*	1010 -- --- --- -- ----------
Uruguay		*				1110 10 010 000 -- ----------
Uzbekistan	*					0101 00 000 111 11 ----------
Vanuatu	*					1100 10 010 000 00 ----------
Venezuela			*			0000 11 011 --- -- ----------
Viet Nam			*			1000 10 001 --- -- ----------
Yemen		*				1000 10 010 000 -- ----------
Zambia		*				0000 10 001 010 -- ----------
Zimbabwe	*					0000 00 000 100 00 ----------

State	Number of addresses in block					Allocation of blocks of addresses (a dash represents a bit value equal to 0 or 1)
	1 024	4 096	32 768	262 144	1 048 576	
Other allocations						
ICAO[2]			*			1111 00 000 --- -- ----------
ICAO[2]	*					1000 10 011 001 00 ----------
ICAO[2]	*					1111 00 001 001 00 ----------

1. ICAO administers this block for assigning temporary aircraft addresses as described in section 7.

2. Block allocated for special use in the interest of flight safety.

THIRTEENTH SCHEDULE (regulation 77)

1. HF DATA LINK PROTOCOL

Note.— The HFDL protocol is a layered protocol and is compatible with the open systems interconnection (OSI) reference model. It permits the HFDL to function as an aeronautical telecommunication network (ATN)-compatible subnetwork. The details of the protocol are described in the Manual on HF Data Link (ICAO Doc 9741).

1.1 Physical layer RF characteristics The aircraft and ground stations shall access the physical medium operating in simplex mode.

1.1.1 FREQUENCY BANDS

HFDL installations shall be capable of operating at any single sideband (SSB) carrier (reference) frequency available to the aeronautical mobile (R) service in the band 2.8 to 22 Megahertz, and in compliance with the relevant provisions of the Radio Regulations.

* All tables and figures are located at the end of this chapter.

1.1.2 CHANNELS

Channel utilization shall be in conformity with the table of carrier (reference) frequencies of Appendix 27 to the ITU Radio Regulations.

1.1.3 TUNING

The equipment shall be capable of operating on integral multiples of 1 kiloHertz.

1.1.4 SIDEBAND

The sideband used for transmission shall be on the higher side of its carrier (reference) frequency.

1.1.5 MODULATION

HFDL shall employ M-ary phase shift keying (M-PSK) to modulate the radio frequency carrier at the assigned frequency. The symbol rate shall be 1 800 symbols per second ±10 parts per million (i.e. 0.018 symbols per second). The value of M and the information data rate shall be as specified in Table 11-2.

1.1.5.1 M-PSK CARRIER

The M-PSK carrier expressed mathematically shall be defined as:

$$s(t) = A\Sigma(p(t-kT)\cos[2\pi f_0 t + \varphi(k)]),\ k = 0, 1 \ldots, N-1$$

where:

N	=	number of M-PSK symbols in transmitted physical layer protocol data unit (PPDU)
s(t)	=	analog waveform or signal at time t
A	=	peak amplitude
f_0	=	SSB carrier (reference) + 1 440 Hz
T	=	M-PSK symbol period (1/1 800 s)
φ (k)	=	phase of kth M-PSK symbol
p(t-kT)	=	pulse shape of kth M-PSK symbol at time t.

Note.— The number of M-PSK symbols sent, N, defines the length (duration = NT seconds) of the PPDU. These parameters are defined in the Manual on HF Data Link (ICAO Doc 9741).

1.1.5.2 PULSE SHAPE

The pulse shape, p(t), shall determine the spectral distribution of the transmitted signal. The Fourier transform of the pulse shape, P(f), shall be defined by:

$$\begin{aligned} P(f) &= 1, && \text{if } 0 < |f| < (1-b)/2T \\ P(f) &= \cos\{\pi(2|f|T - 1 + b)/4b\}, && \text{if } (1-b)/2T < |f| < (1+b)/2T \\ P(f) &= 0, && \text{if } |f| > (1+b)/2T \end{aligned}$$

where the spectral roll-off parameter, b = 0.31, has been chosen so that the –20 dB points of the signal are at SSB carrier (reference) + 290 Hertz and SSB carrier (reference) + 2 590 Hertz and the peak-to-average power ratio of the waveform is less than 5 dB.

1.1.6 TRANSMITTER STABILITY

The basic frequency stability of the transmitting function shall be better than:

(a) ±20 Hertz for HFDL aircraft station subsystems; and

(b) ±10 Hertz for HFDL ground station subsystems.

1.1.7 RECEIVER STABILITY

The basic frequency stability of the receiving function shall be such that, with the transmitting function stability specified in 1.1.6, the overall frequency difference between ground and airborne functions achieved in service does not exceed 70 Hertz.

1.1.8 PROTECTION

A 15 dB desired to undesired (D/U) signal ratio shall apply for the protection of co-channel assignments for HFDL as follows:

(a) data versus data;

(b) data versus voice; and

(c) voice versus data.

1.1.9 CLASS OF EMISSION

The class of emission shall be 2K80J2DEN

1.1.10 ASSIGNED FREQUENCY

The HFDL assigned frequency shall be 1 400 Hertz higher than the SSB carrier (reference) frequency.

Note.— By convention, the HFDL assigned frequency is offset from the SSB carrier (reference) frequency by 1 400 Hertz.

The HFDL M-PSK carrier of the digital modulation is offset from the SSB carrier (reference) frequency by 1 440 Hertz. The digital modulation is fully contained within the same overall channel bandwidth as the voice signal and complies with the provisions of Appendix 27 to the ITU Radio Regulations.

1.1.11 EMISSION LIMITS

For HFDL aircraft and ground station transmitters, the peak envelope power (Pp) of any emission on any discrete frequency shall be less than the peak envelope power (Pp) of the transmitter in accordance with the following (see Figure 11-1):

(a) on any frequency between 1.5 kiloHertz and 4.5 kiloHertz lower than the HFDL assigned frequency, and on any frequency between 1.5 kiloHertz and 4.5 kiloHertz higher than the HFDL assigned frequency: at least 30 dB;

(b) on any frequency between 4.5 kiloHertz and 7.5 kiloHertz lower than the HFDL assigned frequency, and on any frequency between 4.5 kiloHertz and 7.5 kiloHertz higher than the HFDL assigned frequency: at least 38 dB; and

(c) on any frequency lower than 7.5 kiloHertz below the HFDL assigned frequency and on any frequency higher than 7.5 kiloHertz above the HFDL assigned frequency:

1. HFDL aircraft station transmitters: 43 dB;

2. HFDL ground station transmitters up to and including 50 W: [43 + 10 log10 Pp(W)] dB; and

3. HFDL ground station transmitters more than 50 W: 60 dB.

1.1.12 POWER

1.1.12.1 Ground station installations. The peak envelope power (Pp) supplied to the antenna transmission line shall not exceed a maximum value of 6 kW as provided for in Appendix 27 of the Radio Regulations.

1.1.12.2 Aircraft station installations. The peak envelope power supplied to the antenna transmission line shall not exceed 400 W, except as provided for in Appendix 27/62 of the Radio Regulations.

1.1.13 UNDESIRED SIGNAL REJECTION

For HFDL aircraft and ground station receivers, undesired input signals shall be attenuated in accordance with the following:

(a) on any frequency between fc and (fc – 300 Hertz), or between (fc + 2 900 Hertz) and (fc + 3 300 Hertz): at least 35 dB below the peak of the desired signal level; and

(b) on any frequency below (fc – 300 Hertz), or above (fc + 3 300 Hertz): at least 60 dB below the peak of the desired signal level, where fc is the carrier (reference) frequency.

1.1.14 RECEIVER RESPONSE TO TRANSIENTS

The receiving function shall recover from an instantaneous increase in RF power at the antenna terminal of 60 dB within 10 milliseconds. The receiving function shall recover from an instantaneous decrease in RF power at the antenna terminal of 60 dB within 25 milliseconds.

1.2 PHYSICAL LAYER FUNCTIONS

1.2.1 FUNCTIONS

The functions provided by the physical layer shall include the following:

(a) transmitter and receiver control;

(b) transmission of data; and

(c) reception of data.

1.2.2 TRANSMITTER AND RECEIVER CONTROL

The HFDL physical layer shall implement the transmitter/receiver switching and frequency tuning as commanded by the link layer. The physical layer shall perform transmitter keying on demand from the link layer to transmit a packet.

1.2.2.1 TRANSMITTER TO RECEIVER TURNAROUND TIME

The transmitted power level shall decay at least by 10 dB within 100 milliseconds after completing a transmission. An HFDL station subsystem shall be capable of receiving and demodulating, with nominal performance, an incoming signal within 200 milliseconds of the start of the subsequent receive slot.

1.2.2.2 RECEIVER TO TRANSMITTER TURNAROUND TIME

An HFDL station subsystem shall provide nominal output power within plus or minus 1 dB to the antenna transmission line within 200 milliseconds of the start of the transmit slot.

1.2.3 TRANSMISSION OF DATA

Transmission of data shall be accomplished using a time division multiple access (TDMA) technique. The HFDL data link ground station subsystems shall maintain TDMA frame and slot synchronization for the HFDL system. To ensure that slot synchronization is maintained, each HF data link modulator shall begin outputting a pre-key segment at the beginning of a time slot plus or minus 10 milliseconds.

1.2.3.1 TDMA STRUCTURE

Each TDMA frame shall be 32 seconds. Each TDMA frame shall be divided into thirteen equal duration slots as follows-

(a) the first slot of each TDMA frame shall be reserved for use by the HFDL ground station subsystem to broadcast link management data in SPDU packets; and

(b) the remaining slots shall be designated either as uplink slots, downlink slots reserved for specific HFDL aircraft station subsystems, or as downlink random access slots for use by all HFDL aircraft station subsystems on a contention basis. These TDMA slots shall be assigned on a dynamic basis using a combination of reservation, polling and random access assignments.

1.2.3.2 BROADCAST

The HFDL ground station subsystem shall broadcast a squitter protocol data unit (SPDU) every 32 seconds on each of its operating frequencies.

Note.— Details on the TDMA frame and slot structures, pre-key segment, data structures, including the SPDU, are contained in the Manual on HF Data Link (ICAO Doc 9741).

1.2.4 RECEPTION OF DATA

1.2.4.1 FREQUENCY SEARCH

Each HFDL aircraft station shall automatically search the assigned frequencies until it detects an operating frequency.

1.2.4.2 RECEPTION OF PPDUS

The HF data link receiver shall provide the means to detect, synchronize, demodulate and decode PPDUs modulated according to the waveform defined in 1.1.5, subject to the following distortion:

(a) the 1 440 Hertz audio carrier offset by plus or minus 70 Hertz;

(b) discrete and/or diffuse multipath distortion with up to 5 ms multipath spread;

(c) multipath amplitude fading with up to 2 Hertz two-sided RMS Doppler spread and Rayleigh statistics; and

(d) additive Gaussian and broadband impulsive noise with varying amplitude and random arrival times.

Note.— Reference CCIR Report 549-2.

1.2.4.3 DECODING OF PPDUS

Upon receipt of the preamble segment the receiver shall:

(a) detect the beginning of a burst of data;

(b) measure and correct the frequency offset between the transmitter and receiver due to Doppler shift and transmitter/receiver frequency offsets;

(c) determine the data rate and interleaver settings to use during data demodulation;

(d) achieve M-PSK symbol synchronization; and

(e) train the equalizer.

1.2.4.4 SYNCHRONIZATION

Each HFDL aircraft station subsystem shall synchronize its slot timing to that of its corresponding ground station with respect to the reception time of the last received SPDU.

1.2.4.5 SPECIFIED PACKET ERROR RATE PERFORMANCE

1.2.4.5.2 The number of HFDL MPDUs received with one or more bit errors shall not exceed 5 per cent of the total number of MPDUs received, when using a 1.8 second interleaver under the conditions shown in Table 11-3a.

1.3 LINK LAYER

Note.— Details on link layer functions are contained in the Manual on HF Data Link (ICAO Doc 9741).

The link layer shall provide control functions for the physical layer, link management and data service protocols.

1.3.1 CONTROL FUNCTIONS

The link layer shall pass commands for frequency tuning, transmitter keying and transmitter/receiver switching to the physical layer.

1.3.2 LINK MANAGEMENT

The link layer shall manage TDMA slot assignments, log-on and log-off procedures, ground station and aircraft station TDMA synchronization, and other functions necessary, taking into account message priority, for the establishment and maintenance of communications.

1.3.3 DATA SERVICE PROTOCOLS

The link layer shall support a reliable link service (RLS) protocol and a direct link service (DLS) protocol.

1.3.3.1 RLS

1.4

1.5 The RLS protocol shall be used to exchange acknowledged user data packets between aircraft and ground peer link layers.

1.6

1.7 11.3.3.3.2 DLS

1.8

1.9 The DLS protocol shall be used to broadcast unsegmented uplink high frequency network protocol data units (HFNPDUs) and other HFNPDUs not requiring automatic retransmission by the link layer.

1.4 SUB NETWORK LAYER

Note.— Details on sub network layer protocols and services are contained in the Manual on HF Data Link (ICAO Doc 9741).

1.4.1 PACKET DATA

The HFDL sub network layer in the HFDL aircraft station subsystem and HFDL ground station subsystem shall provide connection-oriented packet data service by establishing sub network connections between sub network service users.

1.4.2 CONNECTIVITY NOTIFICATION SERVICE

The HFDL sub network layer in the HFDL aircraft station subsystem shall provide the additional connectivity notification service by sending connectivity notification event messages to the attached ATN router.

1.4.2.1 CONNECTIVITY NOTIFICATION EVENT MESSAGES

The connectivity notification service shall send connectivity notification event messages to the attached ATN router through the sub network access function.

1.4.3 HFDL SUBNETWORK LAYER FUNCTIONS

The HFDL sub network layer in both the HFDL aircraft station subsystem and HFDL ground station subsystem shall include the following three functions:

(a) HFDL sub network dependent (HFSND) function;

(b) sub network access function; and

(c) interworking function.

1.4.3.1 HFSND FUNCTION

The HFSND function shall perform the HFSND protocol between each pair of HFDL aircraft station subsystems and HFDL ground station subsystems by exchanging HFNPDUs. It shall perform the HFSND protocol aircraft function in the HFDL aircraft station subsystem and the HFSND protocol ground function in the HFDL ground station subsystem.

1.4.3.2 SUBNETWORK ACCESS FUNCTION

The sub network access function shall perform the ISO 8208 protocol between the HFDL aircraft station subsystem or HFDL ground station subsystem and the attached routers by exchanging ISO 8208 packets. It shall perform the ISO 8208 DCE function in the HFDL aircraft station subsystem and the HFDL ground station subsystem.

1.4.3.3 INTERWORKING FUNCTION

The interworking function shall provide the necessary harmonization functions between the HFSND, the sub network access and the connectivity notification functions.

TABLES FOR THIRTEENTH SCHEDULE

	Direction	Priority	Delay
Transit delay	To-aircraft	7 through 14	45 s
	From-aircraft	7 through 14	60 s
	To-aircraft	11 through 14	90 s
		7 through 14	120 s
	To-aircraft	11 through 14	150 s
		7 through 14	250 s

Table 11-1. Transfer delays

M	//Information date rate (bits per second)//
2	300 or 600
4	1200
8	1800

Table 11-2. Value of M and information data rate

Note.— When M equals the value 2, the data rate may be 300 or 600 bits per second as determined by the channel

coding rate. The value of M may change from one data transmission to another depending on the data rate selected.

The channel coding rate is described in the Manual on HF Data Link (Doc 9741).

Table 11-3. HF signal-in-space conditions

//Data rate (bits per second)//	//Number of channel paths//	//Multipath spread (milliseconds)//	//Fading bandwidth (Hz) per CCIR Report 549//2	// Frequency offset (Hz)//	//Signal to noise (dB) in a kHz bandwidth//	//MPDU size (octets)//
1200	1 fixed	-	-	40	4	256
1800	2 fading	2	1	40	16	400
1200	2 fading	2	1	40	11.5	256
600	2 fading	2	1	40	8	128
300	2 fading	2	1	40	5	64

Table 11-3a. HF signal-in-space conditions

//Data rate (bits per second)//	//Number of channel paths//	//Multipath spread (milliseconds)//	//Fading bandwidth (Hz) per CCIR Report 5492//	// Frequency offset (Hz)//	//Signal to noise (dB) in a kHz bandwid//th	//MPDU size (octets)//
1200	2 fading	4	1	40	13	256
1200	2 fading	4	2	40	11.5	256

FIGURES FOR THE THIRTEENTH SCHEDULE

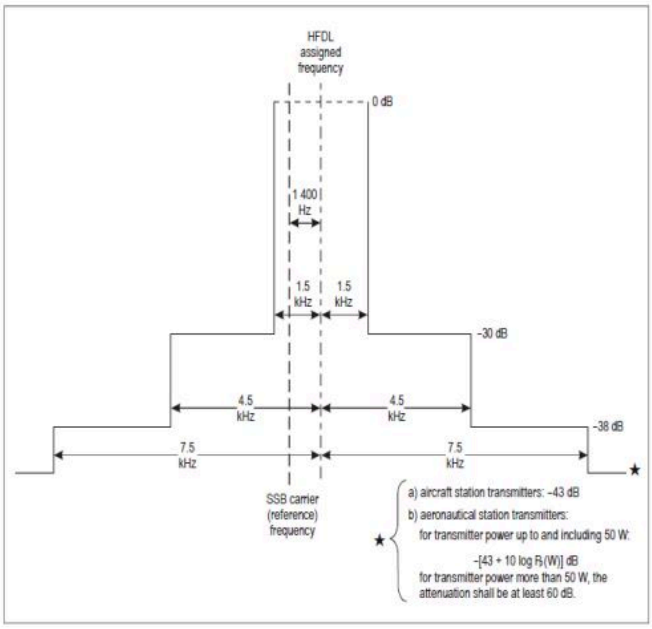


Figure 11-1. Required spectrum limits (in terms of peak power)

for HFDL aircraft and ground station transmitters

FOURTEENTH SCHEDULE (regulation 79)

UNIVERSAL ACCESS TRANSCEIVER (UAT) regulation 79

1. UAT overall system characteristics of aircraft and ground stations

Note.— Details on technical requirements related to the implementation of UAT SARPs are contained in Part I of the Manual on the Universal Access Transceiver (UAT) (IACO Doc 9861). Part II of the Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861) (in preparation) will provide additional guidance material.

1.1 TRANSMISSION FREQUENCY

The transmission frequency shall be 978 Megahertz.

1.2 FREQUENCY STABILITY

The radio frequency of the UAT equipment shall not vary more than ±0.002 per cent (20 ppm) from the assigned frequency.

1.3 TRANSMIT POWER

1.3.1 TRANSMIT POWER LEVELS

UAT equipment shall operate at one of the power levels shown in Table 12-1*.

1.3.2 MAXIMUM POWER

The maximum equivalent isotropically radiated power (EIRP) for a UAT aircraft or ground station shall not exceed +58 dBm.

Note.— For example, the maximum EIRP listed above could result from the maximum allowable aircraft transmitter power shown in Table 12-1 with a maximum antenna gain of 4 dBi.

1.3.3 TRANSMIT MASK

The spectrum of a UAT ADS-B message transmission modulated with pseudorandom message data blocks (MDB) shall fall within the limits specified in Table 12-2 when measured in a 100 kiloHertz bandwidth.

Note.— Figure 12-1 is a graphical representation of Table 12-2.*

1.4 SPURIOUS EMISSIONS

Spurious emissions shall be kept at the lowest value which the State of the technique and the nature of the service permit.

Note.— Appendix 3 of the ITU Radio Regulations requires that transmitting stations shall conform to the maximum permitted power levels for spurious emissions or for unwanted emissions in the spurious domain.

1.5 POLARIZATION

* All tables and figures are located at the end of the chapter.

The design polarization of emissions shall be vertical.

1.6 TIME/AMPLITUDE PROFILE OF UAT MESSAGE TRANSMISSION

The time/amplitude profile of a UAT message transmission shall meet theMfollowing requirements, in which the reference time is defined as the beginning of the first bit of the synchronization sequence appearing at the output port of the equipment.

Notes.—

1. All power requirements for subparagraphs "a" through "f" below apply to the PMP. For installations that support transmitter diversity, the RF power output on the non-selected antenna port should be at least 20 dB below the level on the selected port.

2. All power requirements for subparagraphs "a" and "f" assume a 300 kiloHertz measurement bandwidth. All power requirements for subparagraphs "b", "c", "d" and "e" assume a 2 Megahertz measurement bandwidth.

3. The beginning of a bit is 1/2 bit period prior to the optimum sample point.

4. These requirements are depicted graphically in Figure 12-2.

(a) Prior to 8 bit periods before the reference time, the RF output power at the PMP shall not exceed –80 dBm.

Note.— This unwanted radiated power restriction is necessary to ensure that the UAT transmitting subsystem does not prevent closely located UAT receiving equipment on the same aircraft from meeting its requirements. It assumes that the isolation between transmitter and receiver equipment at the PMP exceeds 20 dB.

(b) Between 8 and 6 bit periods prior to the reference time, the RF output power at the PMP shall remain at least 20 dB below the minimum power requirement for the UAT equipment class.

Note.— Guidance on definition of UAT equipment classes will be provided in Part II of the Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861) (in preparation).

(c) During the Active State, defined as beginning at the reference time and continuing for the duration of the message, the RF output power at the PMP shall be greater than or equal to the minimum power requirement for the UAT equipment class.

(d) The RF output power at the PMP shall not exceed the maximum power for the UAT equipment class at any time during the Active State.

(e) Within 6 bit periods after the end of the Active State, the RF output power at the PMP shall be at a level at least 20 dB below the minimum power requirement for the UAT equipment class.

(f) Within 8 bit periods after the end of the Active State, the RF output power at the PMP shall fall to a level not to exceed –80 dBm.

Note.— This unwanted radiated power restriction is necessary to ensure that the transmitting subsystem does not prevent closely located UAT receiving equipment on the same aircraft from meeting its requirements. It assumes that the isolation between transmitter and receiver equipment at the PMP exceeds 20 dB.

2. SYSTEM CHARACTERISTICS OF UNIVERSAL ACCESS TRANSCEIVER GROUND INSTALLATION

2.1 Ground station transmitting function

2.1.1 GROUND STATION TRANSMITTER POWER

2.1.1.1 The effective radiated power shall be such as to provide a field strength of at least microvolts per metre (minus 97 dBW/m2) within the service volume of the facility on the basis of free-space propagation.

Note.— This is determined on the basis of delivering a –91 dBm (corresponds to microvolts per metre) signal level at the PMP (assuming an omnidirectional antenna). The 280 μV/m standard corresponds to the delivery of a -88 dBm signal level at the PMP of the receiving equipment. The 3 dB difference between –88 dBm and –91 dBm provides margin for excess path loss over free-space propagation.

2.2 Ground station receiving function

Note.— An example ground station receiver is discussed in Section 2.5 of Part II of the Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861), with UAT air-to-ground performance estimates consistent with use of that receiver provided in Appendix B of that manual.

3. SYSTEM CHARACTERISTICS OF THE AIRCRAFT INSTALLATION

3.1 Aircraft transmitting function

3.1.1 AIRCRAFT TRANSMITTER POWER

The effective radiated power shall be such as to provide a field strength of at least microvolts per metre (minus 99 dBW/m2) on the basis of free-space propagation, at ranges and altitudes appropriate to the operational conditions pertaining to the areas over which the aircraft is operated. Transmitter power shall not exceed 54 dBm at the PMP.

Note 1.— The above field strength is determined on the basis of delivering a –93 dBm (corresponds to 160 microvolts per metre) signal level at the PMP (assuming an omnidirectional antenna). The 3 dB difference between 225 μV/m and 160 μV/m provides margin for excess path loss over free-space propagation when receiving a long UAT ADS-B message. A 4 dB margin is provided when receiving a basic UAT ADS-B message.

Note 2.—Various aircraft operations may have different air-air range requirements depending on the intended ADS-B function of the UAT equipment. Therefore different installations may operate at different power levels.

3.2 Receiving function

3.2.1 RECEIVER SENSITIVITY

3.2.1.1 LONG UAT ADS-B MESSAGE AS DESIRED SIGNAL

A desired signal level of –93 dBm applied at the PMP shall produce a rate of successful message reception (SMR) of 90 per cent or better under the following conditions:

(a) When the desired signal is of nominal modulation (i.e. FM deviation is 625 kiloHertz) and at the maximum signal frequency offsets, and subject to relative Doppler shift at ±1 200 knots;

(b) When the desired signal is of maximum modulation distortion allowed in 12.4.3, at the nominal transmission frequency ±1 parts per million (ppm), and subject to relative Doppler shift at ±1 200 knots.

Note. — The receiver criteria for successful message reception of UAT ADS-B messages are provided in Section 4 of Part I of the Manual on the Universal Access Transceiver (UAT) (Doc 9861).

3.2.1.2 BASIC UAT ADS-B MESSAGE AS DESIRED SIGNAL

A desired signal level of –94 dBm applied at the PMP shall produce a rate of SMR of 90 per cent or better under the following conditions:

(a) When the desired signal is of nominal modulation (i.e. FM deviation is 625 kiloHertz) and at the maximum signal frequency offsets, and subject to relative Doppler shift at ±1 200 knots;

(b) When the desired signal is of maximum modulation distortion allowed in 12.4.3 , at the nominal transmission frequency ±1 ppm, and subject to relative Doppler shift at ±1 200 knots.

Note.— The receiver criteria for successful message reception of UAT ADS-B messages are provided in Section 4 of Part I of the Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861).

3.2.1.3 UAT GROUND UPLINK MESSAGE AS DESIRED SIGNAL

A desired signal level of –91 dBm applied at the PMP shall produce a rate of an SMR of 90 per cent or better under the following conditions:

(a) When the desired signal is of nominal modulation (i.e. FM deviation is 625 kiloHertz) and at the maximum signal frequency offsets, and subject to relative Doppler shift at ±850 knots;

(b) When the desired signal is of maximum modulation distortion allowed in 12.4.3, at the nominal transmission frequency ±1 ppm, and subject to relative Doppler shift at ±850 knots.

Notes.—

1. The receiver criteria for successful message reception of UAT ground uplink messages are provided in Section 4 of Part I of the Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861) (in preparation).

2. This requirement ensures the bit rate accuracy supporting demodulation in the UAT equipment is adequate to properly receive the longer UAT ground uplink message.

3.2.2 RECEIVER SELECTIVITY

Notes.—

1. The undesired signal used is an unmodulated carrier applied at the frequency offset.

2. This requirement establishes the receiver's rejection of the off-channel energy.

3. It is assumed that ratios in between the specified offsets will fall near the interpolated value.

4. The desired signal used is a UAT ADS-B long message at -90 dBm at the PMP, to be received with a 90 per cent successful message reception rate.

5. The tolerable co-channel continuous wave interference power level for aircraft UAT receivers is assumed to be -101 dBm or less at the PMP.

6. See Section 2.4.2 of Part II of the Manual on the Universal Access Transceiver (UAT) (Doc 9861) for a discussion of when a high-performance receiver is desirable.

a) Standard UAT receivers shall meet the selectivity characteristics given in Table 12-3.

b) High-performance receivers shall meet the more stringent selectivity characteristics given in Table 12-4.

Note.— See Section 2.4.2 of Part II of the Manual on the Universal Access Transceiver (UAT) (Doc 9861) for guidance material on the implementation of high-performance receivers.

3.2.3 RECEIVER DESIRED SIGNAL DYNAMIC RANGE

The receiver shall achieve a successful message reception rate for long ADS-B messages of 99 per cent or better when the desired signal level is between –90 dBm and –10 dBm at the PMP in the absence of any interfering signals.

Note.— The value of –10 dBm represents 120-foot separation from an aircraft transmitter transmitting at maximum allowed power./

3.2.4 RECEIVER TOLERANCE TO PULSED INTERFERENCE

Note.— All power level requirements in this section are referenced to the PMP.

(a) For Standard and High-Performance receivers the following requirements shall apply:

1. The receiver shall be capable of achieving 99 per cent SMR of long UAT ADS-B messages when the desired signal level is between –90 dBm and – 10 dBm when subjected to DISTANCE MEASURING EQUIPMENT interference under the following conditions: DISTANCE MEASURING EQUIPMENT pulse pairs at a nominal rate of 3 600 pulse pairs per second at either 12 or 30 microseconds pulse spacing at a level of –36 dBm for any 1 Megahertz DISTANCE MEASURING EQUIPMENT channel frequency between 980 Megahertz and 1 213 Megahertz inclusive.

2. Following a 21 microsecond pulse at a level of ZERO (0) dBm and at a frequency of 1 090 Megahertz, the receiver shall return to within 3 dB of the specified sensitivity level (see 3.2.1) within 12 microseconds.

(b) For the standard UAT receiver the following additional requirements shall apply:

1. The receiver shall be capable of achieving 90 per cent SMR of long UAT ADS-B messages when the desired signal level is between –87 dBm and – 10. dBm when subjected to DISTANCE MEASURING EQUIPMENT interference under the following conditions: DISTANCE MEASURING EQUIPMENT pulse pairs at a nominal rate of 3 600 pulse pairs per second at a 12 microseconds pulse spacing at a level of –56 dBm and a frequency of 979 Megahertz.

2. The receiver shall be capable of achieving 90 per cent SMR of long UAT ADS-B messages when the desired signal level is between –87 dBm and – 10 dBm when subjected to DISTANCE MEASURING EQUIPMENT interference under the following conditions: DISTANCE MEASURING EQUIPMENT pulse pairs at a nominal rate of 3 600 pulse pairs per second at a 12 microseconds pulse spacing at a level of –70 dBm and a frequency of 978 Megahertz.

(c) For the high-performance receiver the following additional requirements shall apply:

1. The receiver shall be capable of achieving 90 per cent SMR of long UAT ADS-B messages when the desired signal level is between –87 dBm and – 10 dBm when subjected to DISTANCE MEASURING EQUIPMENT interference under the following conditions: DISTANCE MEASURING EQUIPMENT pulse pairs at a nominal rate of 3 600 pulse pairs per second at a 12 microseconds pulse spacing at a level of –43 dBm and a frequency of 979 Megahertz.

2. The receiver shall be capable of achieving 90 per cent SMR of long UAT ADS-B messages when the desired signal level is between –87 dBm and – 10 dBm when subjected to DISTANCE MEASURING EQUIPMENT interference under the following conditions: DISTANCE MEASURING EQUIPMENT pulse pairs at a nominal rate of 3 600 pulse pairs

per second at a 12 microseconds pulse spacing at a level of –79 dBm and a frequency of 978 Megahertz.

4. PHYSICAL LAYER CHARACTERISTICS

4.1 Modulation rate

The modulation rate shall be 1.041 667 Mbps with a tolerance for aircraft transmitters of ±20 ppm and a tolerance for ground transmitters of ±2 ppm.

Note.— The tolerance on the modulation rate is consistent with the requirement on modulation distortion.

4.2 Modulation type

(a) Data shall be modulated onto the carrier using binary continuous phase frequency shift keying. The modulation index, h, shall be no less than 0.6;

(b) A binary ONE (1) shall be indicated by a shift up in frequency from the nominal carrier frequency and a binary ZERO (0) by a shift down from the nominal carrier frequency.

Notes.—

1. Filtering of the transmitted signal (at base band and/or after frequency modulation) will be required to meet the spectral containment requirement of 1.3.3 . This filtering may cause the deviation to exceed these values at points other than the optimum sampling points.

Because of the filtering of the transmitted signal, the received frequency offset varies continuously between the nominal values of ±312.5 kiloHertz (and beyond), and the optimal sampling point may not be easily identified. This point can be defined in terms of the so-called "eye diagram" of the received signal.

The ideal eye diagram is a superposition of samples of the (undistorted) post detection waveform shifted by multiples of the bit period (0.96 microseconds).

The optimum sampling point is the point during the bit period at which the opening of the eye diagram (i.e. the minimum separation between positive and negative frequency offsets at very high signal-to-noise ratios) is maximized. An example "eye diagram" can be seen in Figure 12-3. The timing of the points where the lines converge defines the "optimum sampling point". Figure 12-4 shows an eye pattern that has been partially closed by modulation distortion.

4.3 Modulation distortion

(a) For aircraft transmitters, the minimum vertical opening of the eye diagram of the transmitted signal (measured at the optimum sampling points) shall be no less than 560 kiloHertz when measured over an entire long UAT ADS-B message containing pseudorandom message data blocks.

(b) For ground transmitters, the minimum vertical opening of the eye diagram of the transmitted signal (measured at the optimum sampling points) shall be no less than 560 kiloHertz when measured over an entire UAT ground uplink message containing pseudorandom message data blocks.

(c) For aircraft transmitters, the minimum horizontal opening of the eye diagram of the transmitted signal (measured at 978 Megahertz) shall be no less than 0.624 microseconds (0.65 symbol periods) when measured over an entire long UAT ADS-B message containing pseudorandom message data blocks.

(d) For ground transmitters, the minimum horizontal opening of the eye diagram of the transmitted signal (measured at 978 Megahertz) shall be no less than 0.624 microseconds (0.65 symbol periods) when measured over an entire UAT ground uplink message containing pseudorandom message data blocks.

Notes.—

1. Section 4.4 defines the UAT ADS-B message types.

2. The ideal eye diagram is a superposition of samples of the (undistorted) post detection waveform shifted by multiples of the bit period (0.96 microseconds).

4.4 Broadcast message characteristics

The UAT system shall support two different message types: the UAT ADS-B message and the UAT ground uplink message.

4.4.1 UAT ADS-B MESSAGE

The Active portion (see 1.6) of a UAT ADS-B message shall contain the following elements, in the following order:

- Bit synchronization

- Message data block

- FEC parity.

4.4.1.1 BIT SYNCHRONIZATION

The first element of the Active portion of the UAT ADS-B message shall be a 36-bit synchronization sequence. For the UAT ADS-B messages the sequence shall be:

111010101100110111011010010011100010.

with the left-most bit transmitted first.

4.4.1.2 THE MESSAGE DATA BLOCK

The second element of the Active portion of the UAT ADS-B message shall be the message data block. There shall be two lengths of UAT ADS-B message data blocks supported. The basic UAT ADS-B message shall have a 144-bit message data block and the long UAT ADS-B message shall have a 272-bit message data block.

Note.— The format, encoding and transmission order of the message data block element is provided in Section 2.1 of Part I of the Manual on the Universal Access Transceiver (UAT) (Doc 9861).

4.4.1.3 FEC PARITY

The third and final element of the Active portion of the UAT ADS-B message shall be the FEC parity.

4.4.1.3.1 Code type

The FEC parity generation shall be based on a systematic Reed-Solomon (RS) 256-ary code with 8-bit code word symbols. FEC parity generation shall be per the following code:

(a) Basic UAT ADS-B message: Parity shall be a RS (30, 18) code.

Note.— This results in 12 bytes (code symbols) of parity capable of correcting up to 6 symbol errors per block.

(b) Long UAT ADS-B message: Parity shall be a RS (48, 34) code.

For either message length the primitive polynomial of the code shall be as follows:

$P(X)=X^8 + X^7 + X^2 + X + 1$

The generator polynomial shall be as follows:

$$\prod_{i=120}^{P}(x-\alpha^{i})$$

where:
P = 131 for RS (30, 18) code,
P = 133 for RS (48, 34) code, and
α is a primitive element of a Galois field of size 256 (i.e. GF(256)).

4.4.1.3.2 Transmission order of FEC parity

FEC parity bytes shall be ordered most significant to least significant in terms of the polynomial coefficients they represent. The ordering of bits within each byte shall be most significant to least significant. FEC parity bytes shall follow the message data block.

4.4.2 UAT GROUND UPLINK MESSAGE

The Active portion of a UAT ground uplink message shall contain the following elements, in the following order:

- Bit synchronization

- Interleaved message data block and FEC parity.

4.4.2.1 BIT SYNCHRONIZATION

The first element of the Active portion of the UAT ground uplink message shall be a 36--bit synchronization sequence. For the UAT ground uplink message thesequence shall be:

000101010011001000100101101100011101.

with the left-most bit transmitted first.

4.4.2.2 INTERLEAVED MESSAGE DATA BLOCK AND FEC PARITY

4.4.2.2.1 Message data block (before interleaving and after de-interleaving)

The UAT ground uplink message shall have 3 456 bits of message data block.

These bits are divided into 6 groups of 576 bits. FEC is applied to each group as described in 4.4.2.2.2.

Note.— Further details on the format, encoding and transmission order of the UAT ground uplink message data block are provided in Section 2.2 of Part I of the Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861).

4.4.2.2.2 FEC parity (before interleaving and after de-interleaving)

4.4.2.2.2.1 Code type

The FEC parity generation shall be based on a systematic RS 256-ary codeN with 8-bit code word symbols. FEC parity generation for each of the six blocks shall be a RS (92,72) code.

Notes.—

1. Section 4.4.2.2.3 provides details on the interleaving procedure.

2. This results in 20 bytes (symbols) of parity capable of correcting up to 10 symbol errors per block. The additional use of interleaving for the UAT ground uplink message allows additional robustness against burst errors.

The primitive polynomial of the code is as follows:

$P(X) = X^8 + X^7 + X^2 + X + 1$

The generator polynomial is as follows:

$$\prod_{i=120}^{P}(x-\alpha^{i})$$

where:

where:
P = 139, and
α is a primitive element of a Galois field of size 256 (i.e. GF(256)).

4.4.2.2.2.2 Transmission order of FEC parity FEC parity bytes are ordered most significant to least significant in terms of the polynomial coefficients they represent. The ordering of bits within each byte shall be most significant to least significant. FEC parity bytes shall follow the message data block.

4.4.2.2.3 Interleaving procedure UAT ground uplink messages shall be interleaved and transmitted by the ground station, as listed below:

(a) Interleaving procedure: The interleaved message data block and FEC parity consists of 6 interleaved Reed- Solomon blocks. The interleaver is represented by a 6×92 matrix, where each entry is a RS 8-bit symbol. Each row comprises a single RS (92,72) block as shown in Table 12-5. In this table, block numbers prior to interleaving are represented as "A" through "F". The information is ordered for transmission column by column, starting at the upper left corner of the matrix.

(b) Transmission order: The bytes are then transmitted in the following order:

1,73,145,217,289,361,2,74,146,218,290,362,3,..,C/20,D/20,E/20,F/20.

Note.— On reception these bytes need to be de-interleaved so that the RS blocks can be reassembled prior to error correction decoding.

5. GUIDANCE MATERIAL

Notes.—

1. The Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861), Part I, provides detailed technical specifications on UAT, including ADS-B message data blocks and formats, procedures for operation of UAT transmitting subsystems, and avionics interface requirements with other aircraft systems.

2. The Manual on the Universal Access Transceiver (UAT) (ICAO Doc 9861), Part II, provides information on UAT system operation, description of a range of example avionics equipment classes and their applications, guidance on UAT aircraft and ground station installation aspects, and detailed information on UAT system performance simulation.

TABLES FOR THE FOURTEENTH SCHEDULE

Table 12-1. Transmitter power levels

Transmitter type	//Minimum power at PMP//	*Maximum power at PMP*	*Intended minimum air-to-air range*
Aircraft (low)	7 watts(+38.5 dBm)	18 watts (+42.5 dBm)	20 NM
Aircraft (Medium)	16 watts (+42 dBm)	40 watts (+46 dBm)	40 NM
Aircraft (High)	100 watts (+50 dBm)	250 watts (+54 dBm)	120 NM
Ground Station	Specified by the service provider to meet local requirements within the constraints of 12.1.2..3.2		

Notes.—

1. The three levels listed for the avionics are available to support applications with varying rangerequirements. See the discussion of UAT aircraft Equipage Classes in Section 2.4.2 of Part II of the Manual on the Universal Access Transceiver (UAT) (Doc 9861) (in preparation).

2. The intended minimum air-to-air ranges are for high-density air traffic environments.

Larger air-toair ranges will be achieved in low-density air traffic environments.

Table 12-2. UAT transmit spectrum

Frequency offset from centre	*Requirement attenuation from maximum power level (dB as measured at the PMP)*
All frequencies in the range 0 -0.5 MHz	0
All frequencies in the range 0.5-1.0 MHz	Based on linear* interpolation between these point
1.0 MHz	18
All frequencies in the range 1.0 - 2.25 MHz	Based on linear* interpolation between these point
2.25 MHz	50
All frequencies in the range 2.25 - 3.25 MHz	Based on linear* interpolation between these point
3.25 MHz	60
	based on attenuation in dB and a linear frequency scale

Table 12-3. Standard UAT receiver rejection ratios

//Frequency Offset from centre//	//Minimum rejection ratio (Undesired/desired level in dB)//
-1.0 MHz	10
+1.0 MHz	15
(±)2.0 MHz	50
(±)10.0.0 MHz	60

Note.— It is assumed that ratios in between the specified offsets will fall near the interpolated value.

Table 12-4. High-performance receiver rejection ratios

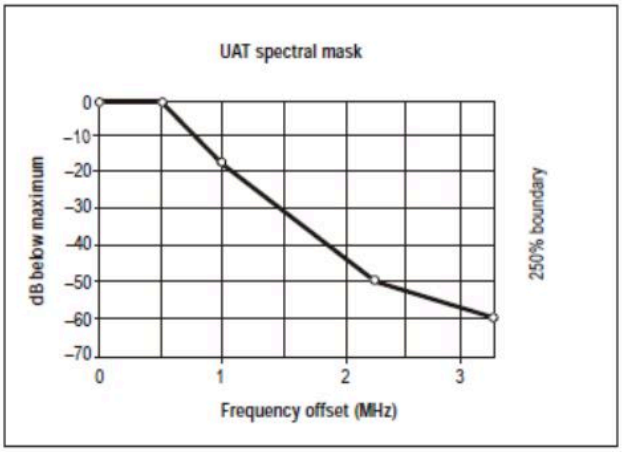
//Frequency Offset from centre//	//Minimum rejection ratio (Undesired/desired level in dB)//
-1.0 MHz	30
+1.0 MHz	40
(±)2.0 MHz	50
(±)10.0.0 MHz	60

Table 12-5. Ground uplink interleaver matrix

RS Block	MDB Byte #						*FEC Parity (Block/Byte #)*			
A	1	2	3	....	71	72	A/1	....	A/19	A/120
B	73	74	75	....	143	144	B/1	....	B/19	B/120
C	145	146	147	....	215	216	C/1	....	C/19	C/20
D	217	218	219	....	287	288	D/1	....	D/19	D/20
E	289	290	291	....	359	360	E/1	....	E/19	E/20
F	361	362	363	....	431	431	F/1	....	F/19	F/20

Note.— In Table 12-5, message data block Byte #1 through #72 are the 72 bytes (8 bits each) of message data block information carried in the first RS (92,72) block. FEC parity A/1 through A/20 are the 20 bytes of FEC parity associated with hat block (A).

Figures for the Fourteenth Schedule



Notes.—

1. 99 per cent of the power of the UAT spectrum is contained in 1.3 Megahertz (±0.65 Megahertz). This is roughly equivalent to the 20 dB bandwidth.

2. Spurious emissions requirements begin at ±250 per cent of the 1.3 Megahertz value, therefore the transmit mask requirement extends to ±3.25 Megahertz.

Figure 12-1. UAT transmit spectrum

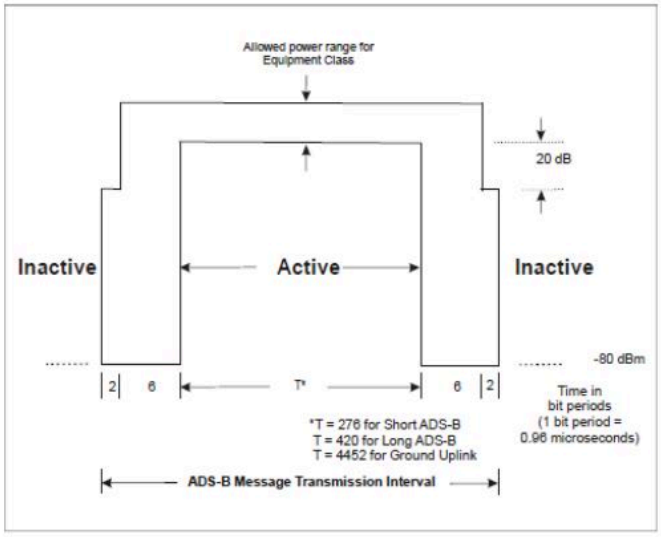


Figure 12-2. Time/amplitude profile of UAT message transmission

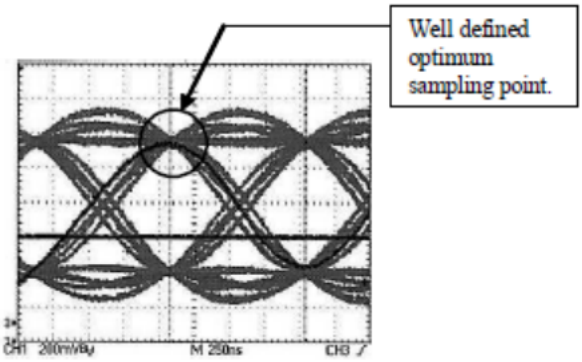


Figure 12-3. Ideal eye diagram

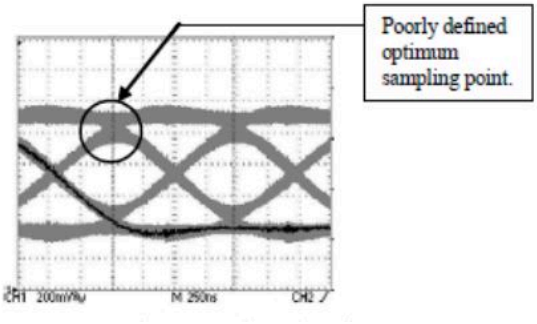


Figure 12-4. Distorted eye diagram

FIFTEENTH SCHEDULE (Regulations 76, 81 and 82)

AERONAUTICAL MOBILE SERVICE

1. AIR-GROUND VHF COMMUNICATION SYSTEM CHARACTERISTICS

Note.— In the following text the channel spacing for 8.33 kiloHertz channel assignments is defined as 25 kiloHertz divided by 3 which is 8.3333 ... kiloHertz.

1.1 The characteristics of the air-ground VHF communication system used in the International Aeronautical Mobile Service shall be in conformity with the following specifications:

1.1.1 Radiotelephone emissions shall be double sideband (DSB) amplitude modulated(AM) carriers. The designation of emission is A3E, as specified in the ITU Radio Regulations.

1.1.2 Spurious emissions shall be kept at the lowest value which the State of technique and the nature of the service permit.

Note.— Appendix S3 to the ITU Radio Regulations specifies the levels of spurious emissions to which transmitters must conform.

1.1.3 The radio frequencies used shall be selected from the radio frequencies in the band 117.975 – 137 Megahertz. The separation between assignable frequencies (channel spacing) and frequency tolerances applicable to elements of the system shall be as specified in Civil Aviation (Aeronautical Frequency Management) Regulations 2017.

Note.— The band 117.975 – 132 Megahertz was allocated to the Aeronautical Mobile (R) Service in the ITU Radio Regulations (1947). By subsequent revisions at ITU World Administrative Radio Conferences the bands 132 – 136 Megahertz and 136 – 137 Megahertz were added under conditions which differ for ITU Regions, or for specified countries or combinations of countries (see RRs S5.203, S5.203A and S5.203B for additional allocations in the band 136 – 137 Megahertz, and S5.201 for the band 132 – 136 Megahertz).

1.1.4 The design polarization of emissions shall be vertical.

2. SYSTEM CHARACTERISTICS OF THE GROUND INSTALLATION

2.1 Transmitting function

2.1.1 Frequency stability. The radio frequency of operation shall not vary more than plus or minus 0.005 per cent from the assigned frequency. Where 25 kiloHertz channel spacing is introduced in accordance with Volume V, the radio frequency of operation shall not vary more than plus or minus 0.002 per cent from the assigned frequency. Where 8.33 kiloHertz channel spacing is introduced in accordance with Volume V, the radio frequency of operation shall not vary more than plus or minus 0.0001 per cent from the assigned frequency.

Note.— The above frequency stability requirements will not be sufficient for offset carrier systems using 25 kiloHertz channel spacing or higher.

2.1.1.1 Offset carrier systems in 8.33 kiloHertz, 25 kiloHertz, 50 kiloHertz and 100 kiloHertz channel spaced environments. The stability of individual carriers of an offset carrier system shall be such as to prevent first-order heterodyne frequencies of less than 4 kiloHertz and, additionally, the maximum frequency excursion of the outer carrier frequencies from the assigned carrier frequency shall not exceed 8 kiloHertz. Offset carrier systems for 8.33 kiloHertz channel spacing shall be limited to two-carrier systems using a carrier offset of plus and minus 2.5 kiloHertz.

2.1.2 POWER

On a high percentage of occasions, the effective radiated power shall be such as to provide a field strength of a least 75 microvolts per metre (minus 109 dBW/m2) within the defined operational coverage of the facility, on the basis of free-space propagation.

2.1.3 Modulation. A peak modulation factor of at least 0.85 shall be achievable.

2.1.4 Means shall be provided to maintain the average modulation factor at the highest practicable value without over-modulation.

2.2 RECEIVING FUNCTION

2.2.1 *Frequency stability.* Where 8.33 kiloHertz channel spacing is introduced in accordance with Volume V, the radio frequency of operation shall not vary more than plus or minus 0.0001 per cent from the assigned frequency.

2.2.2 Sensitivity. After due allowance has been made for feeder loss and antenna polar diagram variation, the sensitivity of the receiving function shall be such as to provide on a high percentage of occasions an audio output signal with a wanted/unwanted ratio of 15 dB, with a 50 per cent amplitude modulated (A3E) radio signal having a field strength of 20 microvolts per metre (minus 120 dBW/m2) or more.

2.2.3 Effective acceptance bandwidth. When tuned to a channel having a width of 25 kiloHertz, 50 kiloHertz or 100 kiloHertz, the receiving system shall provide an adequate and intelligible audio output when the signal specified at 2.2.2 has a carrier frequency within plus or minus 0.005 per cent of the assigned frequency.

When tuned to a channel having a width of 8.33 kiloHertz, the receiving system shall provide an adequate and intelligible audio output when the signal specified at 2.2.2.2 has a carrier frequency within plus or minus 0.0005 per cent of the assigned frequency.

2.2.4 Note.— The effective acceptance bandwidth includes Doppler shift.

2.2.5 Adjacent channel rejection. The receiving system shall ensure an effective rejection of 60 dB or more at the next assignable channel.

Note.— The next assignable frequency will normally be plus or minus 50 kiloHertz. Where this channel spacing will not suffice, the next assignable frequency will be plus or minus 25 kiloHertz, or plus or minus 8.33 kiloHertz, implemented in accordance with the provisions of Volume V. It is recognized that in certain areas of the world receivers designed for 25 kiloHertz, 50 kiloHertz or 100 kiloHertz channel spacing may continue to be used.

3. SYSTEM CHARACTERISTICS OF THE AIRBORNE INSTALLATION

3.1 Transmitting function

3.1.1 Frequency stability. The radio frequency of operation shall not vary more than plus or minus 0.005 per cent from the assigned frequency. Where 25 kiloHertz channel spacing is introduced, the radio frequency of operation shall not vary more than plus or minus 0.003 per cent from the assigned frequency. Where 8.33 kiloHertz channel spacing is introduced, the radio frequency of operation shall not vary more than plus or minus 0.0005 per cent from the assigned frequency.

3.1.2 Power. On a high percentage of occasions, the effective radiated power shall be such as to provide a field strength of at least 20 microvolts per metre (minus 120 dBW/m2) on the basis of free space propagation, at ranges and altitudes appropriate to the operational conditions pertaining to the areas over which the aircraft is operated.

3.1.3 Adjacent channel power. The amount of power from a 8.33 kiloHertz airborne transmitter under all operating conditions when measured over a 7 kiloHertz channel bandwidth centred on the first 8.33 kiloHertz adjacent channel shall not exceed -45 dB below the transmitter carrier power. The above adjacent channel power shall take into account the typical voice spectrum Note.— The voice spectrum is assumed to be a constant level between 300 and 800 Hertz and attenuated by 10 dB per octave above 800 Hertz.

3.1.4 Modulation. A peak modulation factor of at least 0.85 shall be achievable.

3.1.5 Means shall be provided to maintain the average modulation factor at the highest practicable value without over-modulation.

3.2 RECEIVING FUNCTION

3.2.1 Frequency stability. Where 8.33 kiloHertz channel spacing is introduced in accordance with Volume V, the radio frequency of operation shall not vary more than plus or minus 0.0005 per cent from the assigned frequency.

3.2.2 SENSITIVITY

3.2.2.1 After due allowance has been made for aircraft feeder mismatch, attenuation loss and antenna polar diagram variation, the sensitivity of the receiving function shall be such as to provide on a high percentage of occasions an audio output signal with a wanted/unwanted ratio of 15 dB, with a 50 per cent amplitude modulated (A3E) radio signal having a field strength of 75 microvolts per metre (minus 109 dBW/m2).

Note.— For planning extended range VHF facilities, an airborne receiving function sensitivity of 30 microvolts per metre may be assumed.

3.2.3 Effective acceptance bandwidth for 100 kiloHertz, 50 kiloHertz and 25 kiloHertz channel spacing receiving installations. When tuned to a channel designated in Volume V as having a width of 25 kiloHertz, 50 kiloHertz or 100 kiloHertz, the receiving function shall ensure an effective acceptance bandwidth as follows:

(a) in areas where offset carrier systems are employed, the receiving function shall provide an adequate audio output when the signal specified at 2.3.2.2 has a carrier frequency within 8 kiloHertz of the assigned frequency;

(b) in areas where offset carrier systems are not employed, the receiving function shall provide an adequate audio output when the signal specified at 2.3.2.2 has a carrier frequency of plus or minus 0.005 per cent of the assigned frequency.

3.2.4 Effective acceptance bandwidth for 8.33 kiloHertz channel spacing receiving installations. When tuned to a channel designated in ANS Technical Standards Part II, Volume V, as having a width of 8.33 kiloHertz, the receiving function shall ensure an effective acceptance bandwidth as follows:

(a) in areas where offset carrier systems are employed, the receiving function shall provide an adequate audio output when the signal specified in 3.2.2 has a carrier frequency of plus or minus 2.5 kiloHertz of the assigned frequency; and

(b) in areas where offset carrier systems are not employed, the receiving function shall provide an adequate audio output when the signal specified in

3.2.2 has a carrier frequency within plus or minus 0.0005 per cent of the assigned frequency.

Note 1.— The effective acceptance bandwidth includes Doppler shift.

Note 2.— When using offset carrier systems (ref. 2.3.2.3 and 2.3.2.4), receiver performance may become degraded when receiving two or more similar strength offset carrier signals. Caution is therefore advised with the implementation of offset carrier systems.

3.2.5 Adjacent channel rejection. The receiving function shall ensure an effective adjacent channel rejection as follows:

(a) 8.33 kiloHertz channels: 60 dB or more at plus or minus 8.33 kiloHertz with respect to the assigned frequency, and 40 dB or more at plus or minus 6.5 kiloHertz;

Note.— The receiver local oscillator phase noise should be sufficiently low to avoid any degradation of the receiver capability to reject off carrier signals. A phase noise level better than minus 99 dBc/Hertz 8.33 kiloHertz away from the carrier is necessary to comply with 45 dB adjacent channel rejection under all operating conditions.

(b) 25 kiloHertz channel spacing environment: 50 dB or more at plus or minus 25 kiloHertz with respect to the assigned frequency and 40 dB or more at plus or minus 17 kiloHertz;

(c) 50 kiloHertz channel spacing environment: 50 dB or more at plus or minus 50 kiloHertz with respect to the assigned frequency and 40 dB or more at plus or minus 35 kiloHertz;

(d) 100 kiloHertz channel spacing environment: 50 dB or more at plus or minus 100 kiloHertz with respect to the assigned frequency.

3.2.6 Whenever practicable, the receiving system shall ensure an effective adjacent channel rejection characteristic of 60 dBor more at plus or minus 25 kiloHertz, 50 kiloHertz and 100 kiloHertz from the assigned frequency for receiving systems intended to operate in channel spacing environments of 25 kiloHertz, 50 kiloHertz and 100 kiloHertz, respectively.

/Note.— Frequency planning is normally based on an assumption of 60 dB effective adjacent channel rejection at plus or minus 25 kiloHertz, 50 kiloHertz or 100 kiloHertz from the assigned frequency as appropriate to the channel spacing environment.

3.2.7 2.3.2.7 In the case of receivers complying with 3.2.3 or 3.2.4 used in areas where offset carrier systems are in force, the characteristics of the receiver shall be such that:

(a) the audio frequency response precludes harmful levels of audio heterodynes resulting from the reception of two or more offset carrier frequencies;

(b) the receiver muting circuits, if provided, operate satisfactorily in the presence of audio heterodynes resulting from the reception of two or more offset carrier frequencies.

3.2.8 VDL — INTERFERENCE IMMUNITY PERFORMANCE

3.2.8.1 For equipment intended to be used in independent operations of services applying DSB-AM and VDL technology on board the same aircraft, the receiving function shall provide an adequate and intelligible audio output with a desired signal field strength of not more than 150 microvolts per metre (minus 102 dBW/m2) and with an undesired VDL signal field strength of at least 50 dB above the desired field strength on any assignable channel 100 kiloHertz or more away from the assigned channel of the desired signal.

Note.— This level of VDL interference immunity performance provides a receiver performance consistent with the influence of the VDL RF spectrum mask as specified in ANS Technical Standards, Part II, Volume III, Part I, 6.3.4 with an effective transmitter/receiver isolation of 68 dB. Better transmitter and receiver performance could result in less isolation required.

3.2.8.2 After 1 January 2002, the receiving function of all new installations intended to be used in independent operations of services applying DSB-AM and VDL technology on board the same aircraft shall meet the provisions 3.2.8.1.

3.2.8.3 After 1 January 2005, the receiving function of all installations intended to be used in independent operations of services applying DSB-AM and VDL technology on board the same aircraft shall meet the provisions of 3.2.8.1, subject to the conditions of 3.2.8.4.

3.2.8.4 Requirements for mandatory compliance of the provisions of 3.2.8.3 shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales.

3.2.8.4.1 The agreement indicated in 3.2.8.4 shall provide at least two years' notice of mandatory compliance of airborne systems.

3.3 2.3.3 INTERFERENCE IMMUNITY PERFORMANCE

3.3.1 After 1 January 1998, the VHF communications receiving system shall provide satisfactory performance in the presence of two signal, third-order intermodulation products caused by VHF FM broadcast signals having levels at the receiver input of minus 5 dBm.

3.3.2 After 1 January 1998, the VHF communications receiving system shall not be desensitized in the presence of VHF FM broadcast signals having levels at the receiver input of minus 5 dBm.

3.3.3 After 1 January 1995, all new installations of airborne VHF communications receiving systems shall meet the provisions of 3.3.1 and 3.3.2.

3.3.4 Airborne VHF communications receiving systems meeting the immunity performance Standards of 2.3.3.1 and 2.3.3.2 shall be placed into operation at the earliest possible date.

4. SINGLE SIDEBAND (SSB) HF COMMUNICATION SYSTEM CHARACTERISTICS FOR USE IN THE AERONAUTICAL MOBILE SERVICE

4.1 The characteristics of the air-ground HF SSB system, where used in the Aeronautical Mobile Service, shall be in conformity with the following specifications.

4.1.1 FREQUENCY RANGE

4.1.1.1 HF SSB installations shall be capable of operation at any SSB carrier (reference) frequency available to the Aeronautical Mobile (R) Service in the band 2.8 Megahertz to 22 Megahertz and necessary to meet the approved assignment plan for the region(s) in which the system is intended to operate, and in compliance with the relevant provisions of the Radio Regulations.

Note 1.— See Introduction to Volume V, Chapter 3, and Figures 2-1 and 2-2.*

Note 2.— The ITU World Administrative Radio Conference, Aeronautical Mobile (R) Service, Geneva, 1978, established a new Allotment Plan (Appendix 27, Aer to the Radio Regulations) based on single sideband replacing the earlier double sideband Allotment Plan.

The World Radio communication Conference 1995 redesignated it as Appendix S.27. Minor editorial changes were made at the World Radio communication Conference 1997.

4.1.1.2 The equipment shall be capable of operating on integral multiples of 1 kiloHertz.

4.1.2 SIDEBAND SELECTION

4.1.2.1 The sideband transmitted shall be that on the higher frequency side of its carrier (reference) frequency.

4.1.3 CARRIER (REFERENCE) FREQUENCY

4.1.3.1 Channel utilization shall be in conformity with the table of carrier (reference) frequencies at 27/16 and the Allotment Plan at 27/186 to 27/207 inclusive (or frequencies established on the basis of 27/21, as may be appropriate) of Appendix S27.

Note.— It is intended that only the carrier (reference) frequency be promulgated in Regional Plans and Aeronautical Publications.

4.1.4 CLASSES OF EMISSION AND CARRIER SUPPRESSION

4.1.4.1 The system shall utilize the suppressed carrier class of emission J3E (also J7B and J9B as applicable). When SELCAL is employed as specified in Chapter 3 of Part II, the installation shall utilize class H2B emission.

4.1.4.2 By 1 February 1982 aeronautical stations and aircraft stations shall have introduced the appropriate class(es) of emission prescribed in 2.4.1.4.1.

Effective this date the use of class A3E emission shall be discontinued except as provided in 2.4.1.4.4.

4.1.4.3 Until 1 February 1982 aeronautical stations and aircraft stations equipped for single sideband operations shall also be equipped to transmit class H3E emission where required to be compatible with reception by double sideband equipment.

Effective this date the use of class H3E emission shall be discontinued except as provided in 4.1.4.4.

4.1.4.4 For stations directly involved in coordinated search and rescue operations using the frequencies 3 023 kiloHertz and 5 680 kiloHertz, the class of emission J3E shall be used; however, since maritime mobile and land mobile services shall be involved, A3E and H3E classes of emission shall be used.

4.1.4.5 After 1 April 1981 no new DSB equipment shall be installed.

4.1.4.6 Aircraft station transmitters shall be capable of at least 26 dB carrier suppression with respect to peak envelope power (Pp) for classes of emission J3E, J7B or J9B.

All figures are located at the end of this chapter.

4.1.4.7 Aeronautical station transmitters shall be capable of 40 dB carrier suppression with respect to peak envelope power (Pp) for classes of emission J3E, J7B or J9B.

4.1.5 AUDIO FREQUENCY BANDWIDTH

4.1.5.1 For radiotelephone emissions the audio frequencies shall be limited to between 300 and 2 700 Hertz and the occupied bandwidth of other authorized emissions shall not exceed the upper limit of J3E emissions. In specifying these limits, however, no restriction in their extension shall be implied in so far as emissions other than J3E are concerned, provided that the limits of unwanted emissions are met (see 2.4.1.7).

Note.— For aircraft and aeronautical station transmitter types first installed before 1 February 1983 the audio frequencies will be limited to 3 000 Hertz.

4.1.5.2 For other authorized classes of emission the modulation frequencies shall be such that the required spectrum limits of 4.1.7 will be met.

4.1.6 FREQUENCY TOLERANCE

4.1.6.1 The basic frequency stability of the transmitting function for classes of emission J3E, J7B or J9B shall be such that the difference between the actual carrier of the transmission and the carrier (reference) frequency shall not exceed:

- 20 Hertz for airborne installations;

- 10 Hertz for ground installations.

4.1.6.2 The basic frequency stability of the receiving function shall be such that, with the transmitting function stabilities specified in 4.1.6.1, the overall frequency difference between ground and airborne functions achieved in service and including Doppler shift, does not exceed 45 Hertz. However, a greater frequency difference shall be permitted in the case of supersonic aircraft.

4.1.7 SPECTRUM LIMITS

4.1.7.1 For aircraft station transmitter types and for aeronautical station transmitters first installed before 1 February 1983 and using single sideband classes of emission H2B, H3E, J3E, J7B or J9B the mean power of any emission on any discrete frequency shall be less than the mean power (Pm) of the transmitter in accordance with the following:

- on any frequency removed by 2 kiloHertz or more up to 6 kiloHertz from the assigned frequency: at least 25 dB;

- on any frequency removed by 6 kiloHertz or more up to 10 kiloHertz from the assigned frequency: at least 35 dB;

- on any frequency removed from the assigned frequency by 10 kiloHertz or more:

(a) aircraft station transmitters: 40 dB;

(b) aeronautical station transmitters:

$[43+10\log_{10}P_m(W)]$ dB

4.1.7.2 For aircraft station transmitters first installed after 1 February 1983 and for aeronautical station transmitters in use as of 1 February 1983 and using single sideband classes of emission H2B, H3E, J3E, J7B or J9B, the peak envelope power (Pp) of any emission on any discrete frequency shall be less than the peak envelope power (Pp) of the transmitter in accordance with the following:

- on any frequency removed by 1.5 kiloHertz or more up to 4.5 kiloHertz from the assigned frequency: at least 30 dB;

- on any frequency removed by 4.5 kiloHertz or more up to 7.5 kiloHertz from the assigned frequency: at least 38 dB;

- on any frequency removed from the assigned frequency by 7.5 kiloHertz or more:

(a) aircraft station transmitters: 43 dB;

(b) aeronautical station transmitters: for transmitter power up to and including 50 W:

$[43+10\log_{10}P_p(W)]$ dB

For transmitter power more than 50 W: 60 dB

Note.— See Figures 2-1 and 2-2.

4.1.8 POWER

4.1.8.1 Aeronautical station installations. Except as permitted by the relevant provisions of Appendix S27 to the ITU Radio Regulations, the peak envelope power (Pp)

supplied to the antenna transmission line for H2B, H3E, J3E, J7B or J9B classes of emissions shall not exceed a maximum value of 6 kW.

4.1.8.2 Aircraft station installations. The peak envelope power supplied to the antenna transmission line for H2B, H3E, J3E, J7B or J9B classes of emission shall not exceed 400 W except as provided for in Appendix S27 of the ITU Radio Regulations as follows:

S27/68 It is recognized that the power employed by aircraft transmitters may, in practice, exceed the limits specified in No. 27/60. However, the use of such increased power (which normally should not exceed 600 W Pp) shall not cause harmful interference to stations using frequencies in accordance with the technical principles on which the Allotment Plan is based.

S27/60 Unless otherwise specified in Part II of this Appendix, the peak envelope powers supplied to the antenna transmission line shall not exceed the maximum values indicated in the table below; the corresponding peak effective radiated powers being assumed to be equal to two-thirds of these values:

Class of emission	Stations
H2B, J3E, J7B, J9B, A3E*, H3E* (100% Modulation)	Aeronautical stations Aircraft stations
Other emission such as A1A, F1B	Aeronautical stations Aircraft stations

*A3E and H3E to be used only on 3 023 kHz and 5 680 kHz

4.1.8.3 Method of operation. Single channel simplex shall be employed

4.2 SATELLITE VOICE COMMUNICATION (SATVOICE) SYSTEM CHARACTERISTICS

Manual on the Aeronautical Mobile Satellite (Route) Service (Doc 9925). Additional guidance for SATVOICE systems is contained in the Satellite Voice Operations Manual (Doc 10038), and the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

4.2.1 For ground-to-air calls, the SATVOICE system shall be capable of contacting the aircraft and enabling the ground party/system to provide, as a minimum, the

following:

a) secure calling;

b) priority level as defined in Table 2-1; and

c) aircraft SATVOICE number, which is the aircraft address expressed as an 8- digit octal number.

4.2.2 For ground-to-air calls, the SATVOICE system shall be capable of locating the aircraft in the appropriate airspace regardless of the satellite and ground earth station (GES) to which the aircraft is logged on.

4.2.3 For air-to-ground calls, the SATVOICE system shall be capable of:

a) contacting the aeronautical station via an assigned SATVOICE number, which is a unique 6-digit number or public switched telephone network (PSTN) number; and

b) allowing the flight crew and/or aircraft system to specify the priority level for the call as defined in Table 2-1.

Table 2-1. Priority levels for SATVOICE calls (air-to-ground/ground-to-air)

Priority level	Application category
1/EMG Q15 emergency (highest) Safety of flight	Distress and urgency For use by flight crew, when appropriate
2/HGH/Q12 operational high (second highest) Safety of flight	Flight safety Typically assigned to calls between aircraft and ANSPs.

3/LOW/Q10 operational low (third highest) Safety of flight	Regularity of flight, meteorological, administrative Typically assigned to calls between aircraft operators and their aircraft.
4/PUB/Q9 Non-operational (lowest) Non Safety of flight	Public correspondence

FIGURES FOR FIFTEENTH SCHEDULE

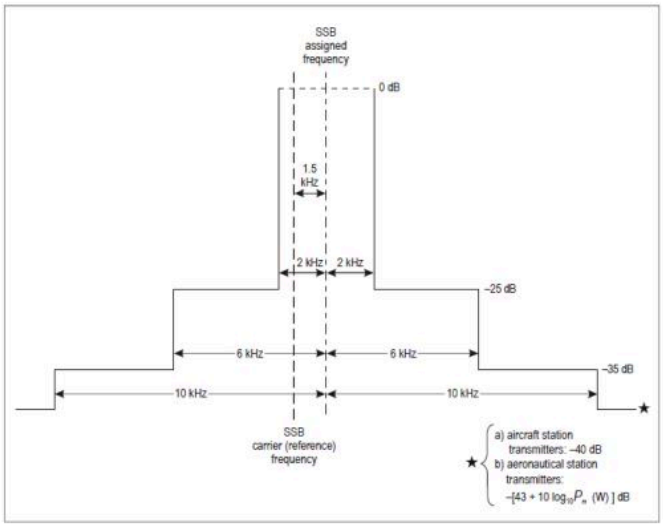


Figure 2-1. Required spectrum limits (in terms of mean power) for aircraft station Transmitter types and for aeronautical station transmitters first installed before 1 February, 1983

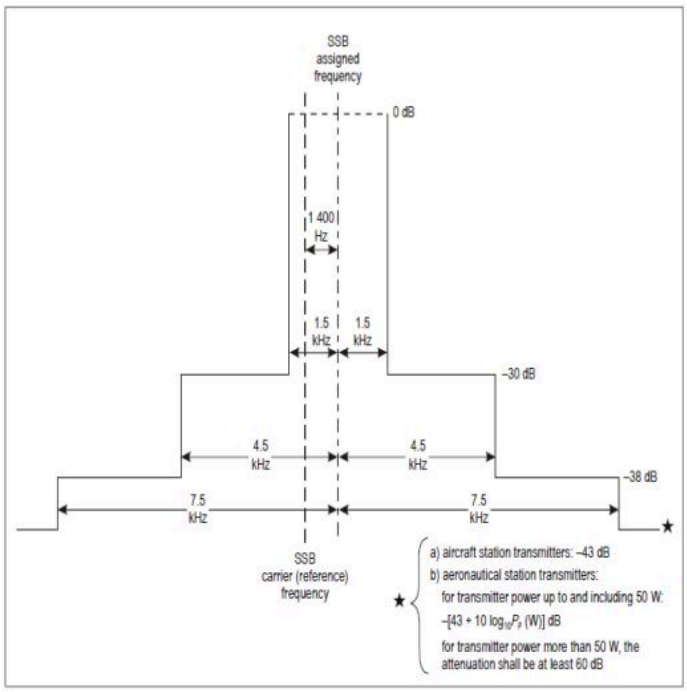


Figure 2-2. Required spectrum limits (in terms of peak power) for aircraft station transmitters first installed after 1 February 1983 and aeronautical station transmitters in use after 1 February 1983

SIXTEENTH SCHEDULE (regulation 83 (1) and (2))

1. SELCAL SYSTEM-

1.1 Where a SELCAL system is installed, the following system characteristics shall be applied:

(a) Transmitted code. Each transmitted code shall be made up of two consecutive tone pulses, with each pulse containing two simultaneously transmitted tones.

The pulses shall be of 1.0 plus or minus 0.25 seconds duration, separated by an interval of 0.2 plus or minus 0.1 second.

(b) Stability. The frequency of transmitted tones shall be held to plus or minus 0.15 per cent tolerance to ensure proper operation of the airborne decoder.

(c) Distortion. The overall audio distortion present on the transmitted RF signal shall not exceed 15 per cent.

(d) Per cent modulation. The RF signal transmitted by the ground radio station shall contain, within 3 dB, equal amounts of the two modulating tones. The combination of tones shall result in a modulation envelope having a nominal modulation percentage as high as possible and in no case less than 60 per cent.

(e) Transmitted tones. Tone codes shall be made up of various combinations of the tones listed in the following table and designated by colour and letter as indicated:

Designation	Frequency (Hertz)
Red A	312.6
Red B	346.7
Red C	384.6
Red D	426.6
Red E	473.2
Red F	524.8
Red G	582.1
Red H	645.7
Red J	716.1
Red K	794.3
Red L	881.0
Red M	977.2
Red P	1 083.9
Red Q	1 202.3
Red R	1 333.5
Red S	1 479.1

Note 1.— It shall be noted that the tones are spaced by Log–1 0.045 to avoid the possibility of harmonic combinations.

Note 2.— In accordance with the application principles developed by the Sixth Session of the Communications Division, the only codes at present used internationally are selected from the red group.

Note 3.— The tones Red P, Red Q, Red R, and Red S are applicable after 1 September 1985, in accordance with 3.2.

SEVENTEENTH SCHEDULE (Regulation 89(2))

EMERGENCY LOCATOR TRANSMITTER CODING

Note.— A detailed description of beacon coding is contained in Specification for COSPAS-SARSAT 406 Megahertz Distress Beacons (C/S T.001). The following technical specifications are specific to emergency locator transmitters used in aviation.

1. GENERAL

1.1 The emergency locator transmitter (ELT) operating on 406 Megahertz shall have the capacity to transmit a programmed digital message which contains information related to the ELT and/or the aircraft on which it is carried.

1.2 The ELT shall be uniquely coded in accordance with 1.3 and be registered with the appropriate authority.

1.3 The ELT digital message shall contain either the transmitter serial number or one of the following information elements:

(a) aircraft operating agency designator and a serial number;

(b) 24-bit aircraft address;

(c) aircraft nationality and registration marks.

1.4 All ELTs shall be designed for operation with the COSPAS-SARSAT* system and be type approved.

Note.— Transmission characteristics of the ELT signal can be confirmed by making use of the COSPAS-SARSAT Type

2. ELT CODING

2.1 The ELT digital message shall contain information relating to the message format, coding protocol, country code, identification data and location data, as appropriate.

2.2 For ELTs with no navigation data provided, the short message format C/S T.001 shall be used, making use of bits 1 through 112. For ELTs with navigation data, if provided, the long message format shall be used, making use of bits 1 through 144.

2.3 Protected data field

2.3.1 The protected data field consisting of bits 25 through 85 shall be protected by an error correcting code and shall be the portion of the message which shall be unique in every distress ELT.

2.3.2 A message format flag indicated by bit 25 shall be set to "0" to indicate the short message format or set to "1" to indicate the long format for ELTs capable of providing location data.

2.3.3 A protocol flag shall be indicated by bit 26 and shall be set to "1" for user and user location protocols, and "0" for location protocols.

2.3.4 A country code, which indicates the State where additional data are available on the aircraft on which the ELT is carried, shall be contained in bits 27 through 36 which designate a three-digit decimal country code number expressed in binary notation.

Note.— Country codes are based on the International Telecommunication Union (ITU) country codes shown in Table 4 of Part I, Volume I of the ITU List of Call Signs and Numerical Identities.

2.3.5 Bits 37 through 39 (user and user location protocols) or bits 37 through 40 (location protocols) shall designate one of the protocols where values "001" and "011" or "0011", "0100", "0101", and "1000" are used for aviation as shown in the examples contained in this appendix.

2.3.6 The ELT digital message shall contain either the transmitter serial number or an identification of the aircraft or operator as shown below.

2.3.7 In the serial user and serial user location protocol (designated by bit 26=1 and bits 37 through 39 being "011"), the serial identification data shall be encoded in binary notation with the least significant bit on the right. Bits 40 through 42 shall indicate type of ELT serial identification data encoded where:

(a) "000" indicates ELT serial number (binary notation) is encoded in bits 44 through 63;

(b) "001" indicates aircraft operator (3 letter encoded using modified Baudot code shown in Table 5-1) and a serial number (binary notation) are encoded in bits 44 through 61 and 62 through 73, respectively;

(c) "011" indicates the 24-bit aircraft address is encoded in bits 44 through 67 and each additional ELT number (binary notation) on the same aircraft is encoded in bits 68 through 73.

Note.— States will ensure that each beacon, coded with the country code of the State, is uniquely coded and registered in a database. Unique coding of serialized coded beacons can be facilitated by including the COSPAS-SARSAT Type Approval

2.3.8 Certificate Number which is a unique number assigned by COSPAS-SARSAT for each approved ELT model, as part of the ELT message.

2.3.9 Bits 84 and 85 (user or user location protocol) or bit 112 (location protocols) shall indicate any homing that may be integrated in the ELT.

2.3.10 In standard and national location protocols, all identification and location data shall be encoded in binary notation with the least significant bit right justified.

The aircraft operator designator (3 letter code) shall be encoded in 15 bits using a modified Baudot code (Table 5-1) using only the 5 right most bits per letter and dropping the left most bit which has a value of 1 for letters.

Table 5-1. Modified Baudot

letter	Code MSB LSB	Figure	Code MSB LSB
A	111000	(-)*	011000
B	110011		
C	101110		
D	110010		
E	110000	3	010000
F	110110		
G	101011		
H	100101		
I	101100		
J	111010	8	001100
K	101001		
L	101001		
M	100111		
N	100110		
O	100011	9	011000
P	101101	0	001101
Q	111101	1	011101
R	101010	4	001010
S	110100		
T	100001	5	000001
U	111100	7	011100

V	101111		
W	111001	2	011001
X	110111	/	010111
Y	110101	6	010101
Z	110001		
( )*	100100		

MSB = most significant bit

LSB = least significant bit

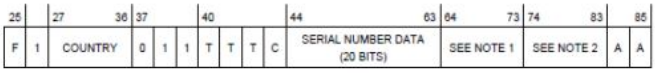
* = hyphen

** = space

code

EXAMPLES OF CODING

ELT serial number



Aircraft address

Aircraft operator designator and serial number

Aircraft registration marking

T = Beacon type TTT : = 000 indicates ELT serial number is encoded;
= 001 indicates operating agency and serial number are encoded;
= 011 indicates 24-bit aircraft address is encoded.

C = Certificate flag bit: 1 = to indicate that COSPAS-SARSAT Type Approval Certificate number is encoded in
Bits 74 through 83 and
0 = otherwise

F = Format flag: 0 = Short Message
1 = Long Message

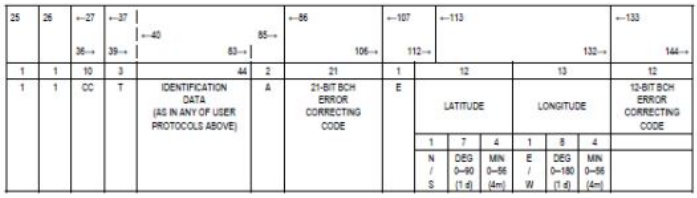
A = Auxiliary radio-locating device: 00 = no auxiliary radio-locating device
01 = 121.5 Megahertz
11 = other auxiliary radio-locating device

Note 1.— 10 bits, all 0s or National use.

Note 2.— COSPAS-SARSAT Type Approval Certificate number in binary notation with the least significant bit on the right, or National use.

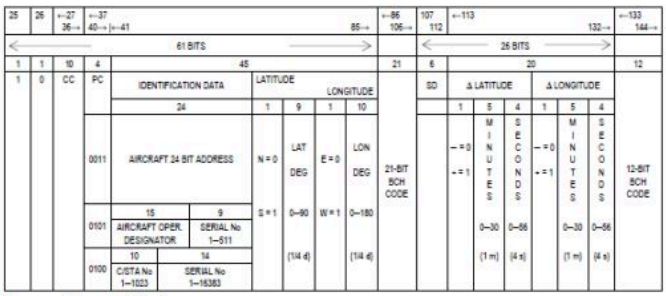
Note 3.— Serial number, in binary notation with the least significant bit on the right, of additional ELTs carried in the same aircraft or default to 0s when only one ELT is carried.

EXAMPLE OF CODING (USER LOCATION PROTOCOL)



CC = Country Code;
E = Encoded position data source: 1 = Internal navigation device, 0 = External navigation device

EXAMPLE OF CODING (STANDARD LOCATION PROTOCOL)



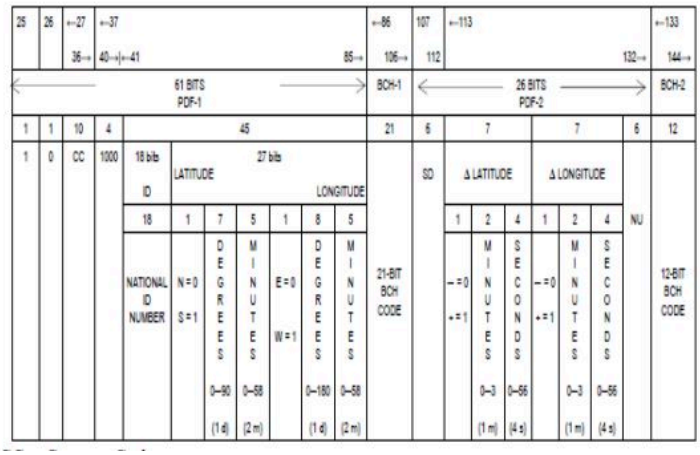
CC = Country Code;
PC = Protocol Code 0011 indicates 24-bit aircraft address is encoded;
0101 indicates operating agency and serial number are encoded;
0100 indicates ELT serial number is encoded.
SD = Supplementary Data bits 107 – 110 = 1101;
bit 111 = Encoded Position Data Source (1 = internal; 0 = external)
bit 112: 1 = 121.5 Megahertz auxiliary radio locating device;
0 = other or no auxiliary radio locating device.

Note 1.— Further details on protocol coding can be found in Specification for COSPAS-SARSAT 406 Megahertz Distress Beacon(C/S T.001).

Note 2. — All identification and location data are to be encoded in binary notation with the least significant bit on the right except for the aircraft operator designator (3 letter code).

Note 3. — For details on BCH error correcting code see Specification for COSPAS-SARSAT 406 Megahertz Distress Beacon (C/S T.001).

EXAMPLE OF CODING (NATIONAL LOCATION PROTOCOL)



CC = Country Code;

ID = Identification Data = 8 bit identification data consisting of a serial number assigned by the appropriate national authority

SD = Supplementary Data = bits 107 – 109 = 110;

bit 110 = Additional Data Flag describing the use of bits 113 to 132:
1 = Delta position; 0 = National assignment;
bit 111 = Encoded Position Data Source: 1 = internal, 0 = external;
bit 112: 1 = 121.5 Megahertz auxiliary radio locating device;
0 = other or no device

NU = National use = 6 bits reserved for national use (additional beacon type identification or other uses).

Note 1.— Further details on protocol coding can be found in Specification for COSPAS-SARSAT 406 Megahertz Distress Beacon (C/S T.001).

Note 2.— All identification and location data are to be encoded in binary notation with the least significant bit on the right.

Note 3.— For details on BCH error correcting code see Specification for COSPAS-SARSAT 406 MEGAHERTZ Distress Beacon (C/S T.001).

THE CIVIL AVIATION (AIR TRAFFIC SERVICES) REGULATIONS

ARRANGEMENT OF REGULATIONS

PART I – PRELIMINARY

Regulation

PART II – GENERAL PROVISIONS

THE CIVIL AVIATION (AIR TRAFFIC SERVICES) REGULATIONS

[Legal Notice 137 of 2018]

PART I – PRELIMINARY

1. Citation

These Regulations may be cited as the Civil Aviation (Air Traffic Services) Regulations, 2018.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"accepting unit" means air traffic control unit next to take control of an aircraft;

"accident" means an occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which—

(a) a person is fatally or seriously injured as a result of—

(i) being in the aircraft;

(ii) direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or

(iii) direct exposure to jet blast,

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew;

(b) the aircraft sustains damage or structural failure which—

(i) adversely affects the structural strength, performance or flight characteristics of the aircraft; and

(ii) would normally require major repair or replacement of the affected component,

except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

(c) the aircraft is missing or is completely inaccessible.

"accuracy" means a degree of conformance between the estimated or measured value and the true value;

"Act" means the Civil Aviation Act (No. 21 of 2013);

"automatic Dependent Surveillance - contract (ADS-C) agreement" means a reporting plan which establishes the conditions of ADS-C data reporting, that is data required by the air traffic services unit and frequency of ADS-C reports which have to be agreed to prior to using ADS-C in the provision of air traffic services;

"advisory airspace" means an airspace of defined dimensions, or designated route, within which air traffic advisory service is available;

"advisory route" means a designated route along which air traffic advisory service is available;

"aerodrome" means a defined area on land or water including any buildings, installations and equipment intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

"aerodrome control service" means an air traffic control service for aerodrome traffic;

"aerodrome control tower" means a unit established to provide air traffic control service to aerodrome traffic;

"Aeronautical Information Publication (AIP)" means a publication issued by or with the authority of the Authority and containing aeronautical information of a lasting character essential to air navigation;

"aeronautical mobile service" means a mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies;

"aeronautical telecommunication station" means a station in the aeronautical telecommunication service;

"airborne collision avoidance system (ACAS)" means an aircraft system based on secondary surveillance radar (SSR) transponder signals which operates independently of ground based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders;

"aircraft" means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface;

"air-ground communication" means two-way communication between aircraft and stations or locations on the surface of the earth;

"AIRMET information" means information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of low-level aircraft operations and which was not already included in the forecast issued for low-level flights in the flight information region concerned or sub-area thereof;

"air-taxiing" means movement of a helicopter/VTOL above the surface of an aerodrome, normally in ground effect and at a ground speed normally less than 37 km/h (20 kts);

"air traffic" means all aircraft in flight or operating on the maneuvering area of an aerodrome;

"air traffic advisory service" means a service provided within advisory airspace to ensure separation, in so far as practical, between aircraft which are operating on IFR flight plans;

"air traffic control clearance" means authorization for an aircraft to proceed under conditions specified by an air traffic control unit;

"air traffic controller schedule" means a plan for allocating air traffic controller duty periods and non-duty periods over a period of time, otherwise referred to as a roster;

"air traffic control service" means a service provided for the purpose of—

(a) preventing collisions—

(i) between aircraft, and

(ii) on the maneuvering area between aircraft and obstructions; and

(b) expediting and maintaining an orderly flow of air traffic;

"air traffic control unit" means a generic term meaning variously, area control centre, approach control unit or aerodrome control tower;

"Air Traffic Flow Management (ATFM)" means a service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity

is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority;

"air traffic service" means a generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service);

"air traffic services airspaces" means airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified;

"air traffic services reporting office" means a unit established for the purpose of receiving reports concerning air traffic services and flight plans submitted before departure;

"air traffic services unit" means a generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office;

"airway" means a control area or portion thereof established in the form of a corridor;

"ALERFA" means the code word used to designate an alert phase;

"alerting service" means a service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required;

"alert phase" means a situation wherein apprehension exists as to the safety of an aircraft and its occupants;

"alternate aerodrome" means an aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use;

"altitude" means the vertical distance of a level, a point or an object considered as a point, measured from mean sea level;

"approach control service" means air traffic control service for arriving or departing controlled flights;

"approach control unit" means a unit established to provide air traffic control service to controlled flights arriving at, or departing from, one or more aerodromes;

"appropriate ATS authority" means the relevant authority designated by the State responsible for providing air traffic services in the airspace concerned;

"apron" means a defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fueling, parking or maintenance;

"apron management service" means a service provided to regulate the activities and the movement of aircraft and vehicles on an apron;

"area control centre" means a unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction;

"area control service" means air traffic control service for controlled flights in control areas;

"area navigation (RNAV)" means a method of navigation which permits aircraft operation on any desired flight path within the coverage of ground - or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these;

"area navigation route" means an ATS route established for the use of aircraft capable of employing area navigation;

"ATS route" means a specified route designed for channeling the flow of traffic as necessary for the provision of air traffic services;

"Authority" means the Kenya Civil Aviation Authority established under section 4 of the Act;

"Automatic Dependent Surveillance - Broadcast (ADS-B) "means a means by which aircraft, aerodrome vehicles and other objects can automatically transmit or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link;

"Automatic Dependent Surveillance - Contract (ADS-C)" means a means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports;

"Automatic Terminal Information Service (ATIS)" means the automatic provision of current, routine information to arriving and departing aircraft throughout twenty four hours or a specified portion thereof;

"Base turn" means a turn executed by the aircraft during the initial approach between the end of the outbound track and the beginning of the intermediate or final approach track;

"calendar" means a discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day;

"change-over point" means the point at which an aircraft navigating on an ATS route segment defined by reference to very high frequency omni-directional radio ranges is expected to transfer its primary navigational reference from the facility behind the aircraft to the next facility ahead of the aircraft;

"clearance limit" means the point to which an aircraft is granted an air traffic control clearance;

"conference communications" means communication facilities whereby direct speech conversation may be conducted between three or more locations simultaneously;

"control area" means a controlled airspace extending upwards from a specified limit above the earth;

"controlled aerodrome" means an aerodrome at which air traffic control service is provided to aerodrome traffic;

"controlled airspace" means an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification;

"controlled flight" means any flight which is subject to an air traffic control clearance;

"Controller-Pilot Data Link Communications (CPDLC)" means a means of communication between controller and pilot, using data link for ATC communications;

"control zone" means a controlled airspace extending upwards from the surface of the earth to a specified upper limit;

"cruising level" means a level maintained during a significant portion of a flight;

"Cyclic Redundancy Checks (CRC)" means a mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data;

"danger area" means an airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

"Data link-Automatic Terminal Information Service (D-ATIS)" means the provision of ATIS via data link;

"data link communications" means a form of communication intended for the exchange of messages via a data link;

"Data quality" means a degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity;

"Data link-VOLMET (D-VOLMET)" means provision of current aerodrome routine meteorological reports and aerodrome special meteorological reports, aerodrome forecasts, SIGMET, special air reports not covered by a SIGMET and, where available, AIRMET via data link;

"Datum" means any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities;

"declared capacity" means a measure of the ability of the ATC system or any of its subsystems or operating positions to provide service to aircraft during normal activities. It is expressed as the number of aircraft entering a specified portion of airspace in a given period of time, taking due account of weather, ATC unit configuration, staff and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace;

"destination alternate" means an alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing;

"DETRESFA" means the code word used to designate a distress phase;

"distress phase" means a situation wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance;

"downstream clearance" means a clearance issued to an aircraft by an air traffic control unit that is not the current controlling authority of that aircraft;

"duty" means any task that an air traffic controller is required by the air traffic services provider to perform and include tasks performed during time-in-position, administrative work and training;

"duty period" means a period which starts when an air traffic controller is required by an air traffic services provider to report for or to commence a duty and ends when that person is free from all duties;

"emergency phase" means a generic term meaning, as the case may be, uncertainty phase, alert phase or distress phase;

"en-route alternate" means an alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route;

"fatigue" means a physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental or physical activity) that can impair a person's alertness and ability to perform safety-related operational duties;

"Fatigue Risk Management System (FRMS)" means a data driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles, knowledge and operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness;

"Final approach" means that part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified—

(a) at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or

(b) at the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which—

(i) a landing can be made; or

(ii) a missed approach procedure is initiated;

"flight crew member" means a licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period;

"flight information centre" means a unit established to provide flight information service and alerting service;

"flight information region" means an airspace of defined dimensions within which flight information service and alerting service are provided;

"flight information service" means a service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights;

"flight level" means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa) , and is separated from other such surfaces by specific pressure intervals;

"flight plan" means specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft;

"fly-by waypoint" means a waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure;

"flyover waypoint" means a waypoint at which a turn is initiated in order to join the next segment of a route or procedure;

"forecast" means a statement of expected meteorological conditions for a specified time or period, and for a specified area or portion of airspace;

"geodetic datum" means a minimum set of parameters required to define location and orientation of the local reference system with respect to the global reference system or frame;

"Gregorian calendar" means calendar in general use, first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar;

"height" means the vertical distance of a level, a point or an object considered as a point, measured from a specified datum;

"human factors principles" means principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance;

"human performance" means a human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;

"IFR" means the symbol used to designate the instrument flight rules;

"IFR flight" means a flight conducted in accordance with the instrument flight rules;

"instrument flight procedure design service" means a service established for the design, documentation, validation, maintenance and periodic review of instrument flight procedures necessary for the safety, regularity and efficiency of air navigation;

"IMC" means the symbol used to designate instrument meteorological conditions;

"INCERFA" means the code word used to designate an uncertainty phase;

"incident" means an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation;

"Instrument Meteorological Conditions (IMC)" means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions;

"integrity (aeronautical data)" means a degree of assurance that an aeronautical data and its value has not been lost nor altered since the data origination or authorized amendment;

"Integrity classification (aeronautical data)" means classification based upon the potential risk resulting from the use of corrupted data classified as—

(a) routine data: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

(b) essential data: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe and

(c) critical data: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

"international NOTAM office" means an office designated by the Authority for the exchange of NOTAM internationally;

"level" means a generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level;

"maneuvering area" means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons;

"meteorological office" means an office designated to provide meteorological service for international air navigation;

"movement area" means that part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the maneuvering area and the apron;

"navigation specification" means a set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace and consist of the following two kinds—

(a) "Required Navigation Performance (RNP) specification" means a navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH; and

(b) "Area navigation (RNAV) specification" means a navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1;

"night" means the time between fifteen minutes after sunset and fifteen minutes before sunrise, sunset and sunrise being determined at surface level and includes any time between sunset and sunrise when unlighted aircraft or other prominent unlighted object cannot clearly be seen at a distance of 4,572 m;

"non-duty period" means a continuous and defined period of time, subsequent to and/or prior to duty periods, during which the air traffic controller is free of all duties;

"NOTAM" means a notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations:

"Obstacle" means all fixed (whether temporary or permanent) and mobile objects, or parts thereof, that—

(a) are located on an area intended for the surface movement of aircraft;

(b) extend above a defined surface intended to protect aircraft in flight; or

(c) extend above a defined surface intended to protect aircraft in flight;

"Operator" means a person, organization or enterprise engaged in or offering to engage in an aircraft operation;

"Performance-Based Navigation (PBN)" means area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace;

"Performance-based communication (PBC)" means communication based on performance specifications applied to the provision of air traffic services;

"Performance-Based Surveillance (PBS)" means surveillance based on performance specifications applied to the provision of air traffic services;

"Pilot-in-Command" means the pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight

"printed communications" means communications which automatically provide a permanent printed record at each terminal of a circuit of all messages which pass over such circuit;

"prohibited area" means airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited;

"radio navigation service" means a service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids;

"radiotelephony" means a form of radio communication primarily intended for the exchange of information in the form of speech;

"reporting point" means a specified geographical location in relation to which the position of an aircraft can be reported;

"Required Communication Performance (RCP) specification" means a set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based communication;

"Required Communication Performance (RCP)" means a statement of the performance requirements for operational communication in support of specific ATM functions;

"Required Surveillance Performance (RSP) specification" means a set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based surveillance;

"rescue coordination centre" means a unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region;

"restricted area" means an airspace of defined dimensions, above the land areas or territorial waters of Kenya, within which the flight of aircraft is restricted in accordance to certain specified conditions;

"runway" means a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft;

"Runway Visual Range (RVR)" means the range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line;

"Safety Management System (SMS)" means a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures;

"SIGMET information" means information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operation;

"significant point" means a specified geographical location used in defining an ATS route or the flight path of an aircraft and for other navigation and ATS purposes;

"special VFR flight" means a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC or at night;

"State safety programme" means an integrated set of regulations and activities aimed at improving safety;

"station declination" means an alignment variation between the zero-degree radial of a VOR and true north, determined at the time the VOR station is calibrated;

"strayed aircraft" means an aircraft which has deviated significantly from its intended track or which reports that it is lost;

"take-off alternate" means an alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure;

"taxiing" means movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing;

"terminal control area" means a control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes;

"time-in-position" means the period of time when an air traffic controller is exercising the privileges of the air traffic controller's licence at an operational position;

"track" means the projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid);

"traffic avoidance advice" means advice provided by an air traffic services unit specifying maneuvers to assist a pilot to avoid a collision;

"traffic information" means information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision;

"transfer of control point" means a defined point located along the flight path of an aircraft, at which the responsibility for providing air traffic control service to the aircraft is transferred from one control unit or control position to the next;

"transferring unit" means air traffic control unit in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit along the route of flight;

"tribunal" means the National Civil Aviation Administrative Review Tribunal established by section 66 of the Act;

"uncertainty phase" means a situation wherein uncertainty exists as to the safety of an aircraft and its occupants;

"unidentified aircraft" means an aircraft which has been observed or reported to be operating in a given area but whose identity has not been established;

"VFR" means the symbol used to designate the visual flight rules;

"VFR flight" means a flight conducted in accordance with the visual flight rules.

"Visual Meteorological Conditions (VMC)" means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima;

"Voice-Automatic Terminal Information Service (Voice-ATIS)" means provision of ATIS by means of continuous and repetitive voice broadcasts;

"VOLMET" means Meteorological information for aircraft in flight; and

"Waypoint" means a specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation.

3. Application

(1) These Regulations shall apply to a person providing air traffic services within designated air spaces and at an aerodrome.

(2) These Regulations shall not apply to a person providing air traffic services in the course of his duties to state aircraft.

PART II – GENERAL PROVISIONS

4. Air Navigation Services Provider certificate

A person who wishes to provide Air Traffic services shall have an Air Navigation Services Provider certificate issued in accordance with the Civil Aviation (Certification of Air Navigation Services) Regulations.

5. Establishment of the ATS Provider

(1) The Authority shall determine, those portions of the airspace and those aerodromes where air traffic services shall be provided including territories over which it has jurisdiction.

(2) Air traffic services shall be provided in accordance with these regulations, except that, by mutual agreement, the Authority may delegate to another State the responsibility for establishing and providing air traffic services in flight information regions, control areas or control zones extending over the territory of Kenya.

(3) Those portions of the airspace over the high seas or in airspace of undetermined sovereignty where air traffic services will be provided shall be determined on the basis of regional air navigation agreements.

(4) Where Kenya has accepted the responsibility to provide air traffic services in such portions of airspace referred to in subregulation (3), the Authority shall arrange for those services to be established and provided in accordance with these Regulations.

(5) When it has been determined that air traffic services will be provided, the Authority shall designate the Air Navigation Services Provider to be responsible for providing such services.

(6) Where air traffic services are established, information shall be published in the Aeronautical Information Publication, as necessary to permit the utilization of such services.

6. Objectives of air traffic services

The objectives of the air traffic services shall be to—

(a) prevent collisions between aircrafts;

(b) prevent collisions between aircrafts on the manoeuvring area and obstructions on that area;

(c) expedite and maintain an orderly flow of air traffic;

(d) provide advice and information useful for the safe and efficient conduct of flights;

(e) notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

7. Divisions of the air traffic services

Air traffic services provided for the purpose of these Regulations shall comprise—

(a) the air traffic control service—

(i) area control service;

(ii) control service; and

(iii) aerodrome control service.

(b) the flight information service; and

(c) the alerting service.

8. Determination of the need for air traffic services

(1) The need for the provision of air traffic services shall be determined by consideration of the following—

(a) the type of air traffic involved;

(b) the density of air traffic;

(c) the meteorological conditions; and

(d) such other factors as may be relevant.

(2) The requirement for aircraft to carry Airborne Collision Avoidance Systems (ACAS) whilst flying in a given area shall not be considered as a factor in determining the need for air traffic services in that area.

9. Designation of the portions of the airspace and controlled aerodromes where air traffic services will be provided

(1) When it has been determined that air traffic services will be provided in particular portions of the airspace or at particular aerodromes, those portions of the airspace or those aerodromes shall be designated in relation to the air traffic services that are to be provided.

(2) The designation of the particular portions of the airspace or aerodromes shall be as follows—

(a) flight information regions;

(b) control areas and control zones, including—

(i) those portions of the airspace where it is determined that air traffic control service will be provided to IFR flights shall be designated as control areas or control zones;

(ii) those portions of controlled airspace wherein it is determined that air traffic control service will also be provided to VFR flights shall be designated as Classes B, C, or D airspace;

(iii) where designated within a flight information region, control areas and control zones shall form part of that flight information region;

(c) controlled aerodromes;

(d) reduced vertical separation minima airspace;

(e) a sector, if the Authority considers such a designation is necessary to facilitate the provision of air traffic services within the flight information region;

(f) air traffic services routes and significant points along the routes;

(3) The Authority may designate portions of the airspace as special use airspace if it considers such airspace necessary in the interest of safety or national security or for any other reasons in the public interest.

(4) Subject to subregulation (3), special use airspace maybe designated as—

(a) restricted areas;

(b) prohibited areas;

(c) danger areas;

(d) low flying zone; and

(e) flight training area.

(5) The lateral limits of the airspaces designated under this regulation shall be defined by—

(a) WGS-84 geographical coordinates;

(b) prominent geographical lines, circles or any part of a circle of a specified radius or great circle between two points or a parallel of latitude.

(6) The vertical limits of airspaces designated under these Regulations shall be defined by heights, altitudes or flight levels.

(7) The Authority shall publish the designation of particular portions of the airspace in the relevant aeronautical publications.

10. Classification of airspaces

(1) The Authority shall classify designated controlled airspace as specified in the First Schedule.

(2) The Authority shall select airspace classes in accordance with the needs of the State.

(3) The requirements for flights within each class of airspace shall be as set out in the First Schedule.

11. Perfomance based navigation (PBN) operations

(1) An air traffic services provider shall implement performance based navigation within designated airspaces and based navigation aerodromes in accordance with requirements prescribed by the Authority.

(2) The Authority shall prescribe navigation specification requirements for PBN operations on the basis of regional Air Navigation Agreements.

(3) In prescribing navigation specification requirements for PBN operations, the Authority shall consider any limitations arising from navigation infrastructure constraints or specific navigation functionality requirements.

(4) Performance-based navigation operations shall be implemented.

(5) The prescribed navigation specification shall be appropriate to the level of communications, navigation and air traffic services provided in the Nairobi Flight Information Region.

12. Perfomance based communication (PBC) operations

(1) The Authority shall prescribe Required Communication Performance- Performance Specifications when applying performance-based based communication (PBC).

(2) Where applicable, the RCP specifications shall be prescribed on the basis of regional air navigation agreements.

(3) The prescribed RCP specification shall be appropriate to the air traffic services provided in the airspace concerned.

13. Perfomance based surveillance (PBS) operations

(1) The Authority shall prescribe RSP specifications when applying performance-based surveillance (PBS). based surveillance

(2) Where applicable, the RSP specifications shall be prescribed on the basis of regional air navigation agreements.

(3) The prescribed RSP specification shall be appropriate to the air traffic services provided.

(4) The ATS units shall be provided with equipment capable of performance consistent with the prescribed RSP specifications where applicable.

14. Establishment and designation of the units providing air traffic services

The air traffic services shall be provided by units established Establishment and designated as follows—

(a) Flight information centers shall be established to provide flight information service and alerting service within flight information regions, unless the responsibility of providing such services within a flight information region is assigned to an air traffic control unit having adequate facilities for the discharge of such responsibility.

(b) Air traffic control units shall be established to provide air traffic control service, flight information service and alerting service within control areas, control zones and at controlled aerodromes.

15. Specifications for flight information regions, control areas and control zones

(1) Where the delineation of airspace is to be provided in air traffic services, it shall be related to the nature of the route structure and the need for efficient service rather than to national boundaries.

(2) Information regions shall be delineated to cover the whole of the air route structure to be served by such regions.

(3) A flight information region shall include all airspace within its lateral limits except as limited by an upper flight information region.

(4) Where a flight information region is limited by an upper flight information region, the lower limit specified for the upper flight information region shall constitute the upper vertical limit of the flight information region and shall coincide with a VFR cruising level as specified in the First Schedule to the Civil Aviation (Rules of the Air) Regulations, 2018.

(5) Control areas including, *inter alia*, airways and terminal control areas shall be delineated so as to encompass sufficient air space to contain the flight paths of those IFR flights or portions thereof to which it is desired to provide the applicable parts of the air traffic control service, taking into account the capabilities of the navigation aids normally used in that area.

(6) A lower limit of a control area shall be established at a height above the ground or water of not less than 200 m (700ft).

(7) The lower limit of a control area shall, when practicable and desirable in order to allow freedom of action for VFR flights below the control area, be established at a greater height than the minimum specified in subregulation(6).

(8) When the lower limit of a control area is above 900 m (3000 ft.) Mean Sea Level (MSL), it shall coincide with a VFR cruising level specified in the First Schedule to the Civil Aviation (Rules of the air) regulations 2018.

(9) An upper limit of a control area shall be established when either—

(a) air traffic control service will not be provided above such upper limit; or

(b) the control area is situated below an upper control area, in which case the upper limit shall coincide with the lower limit of the upper control area.

(5) When established, such upper limit shall coincide with a VFR cruising level specified in the First Schedule to the Civil Aviation (Rules of the air) regulations 2018.

16. Flight Information regions or control areas in the upper airspace

Where it is desirable to limit the number of flight information regions or control areas through which high flying aircraft would otherwise have to operate, a flight information region or control area, as appropriate, shall be delineated to include the upper air space within the lateral limits of a number of lower flight information regions or control areas.

17. Control zones

(1) The lateral limits of control zones shall encompass at least Control zones those portions of the airspace, which are not within control areas, containing the paths of IFR flights arriving at and departing from aerodromes to be used under instrument meteorological conditions.

(2) The lateral limits of a control zone shall extend to at least 9.3 km (5 NM) from the centre of the aerodrome or aerodromes concerned in the directions from which approaches may be made.

(3) If a control zone is located within the lateral limits of a control area, it shall extend upwards from the surface of the earth to at least the lower limit of the control area.

(4) If a control zone is located outside of the lateral limits of a control area, an upper limit shall be established.

(5) If it is desired to establish the upper limit of a control zone at a level higher than the lower limit of the control area established above it, or if the control zone is located outside of the lateral limits of a control area, its upper limit shall be established at a level which can easily be identified by pilots.

(6) When the limit in subregulation (5) is above 900 m (3 000 ft.) Mean Sea Level, it shall coincide with a VFR cruising level as described in the First Schedule to the Civil Aviation (Rules of the Air) Regulations, 2018.

18. Identification of air traffic service units and airspace

(1) An area control centre or flight information centre shall be identified by the name of a nearby town or city or geographic feature.

(2) An aerodrome control tower or approach control unit shall be identified by the name of the aerodrome at which it is located.

(3) A control zone, control area or flight information region shall be identified by the name of the unit having jurisdiction over such airspace.

19. Establishment and Identification of ATS routes

(1) When ATS routes are established, a protected airspace Establishment along each ATS route and a safe spacing between adjacent ATS routes shall be provided.

(2) When warranted by density, complexity or nature of the traffic, special routes shall be established for use by low-level traffic, including helicopters operating to and from helidecks on the high seas.

(3) When determining the lateral spacing between routes in sub- regulation (2), account shall be taken of the navigational means available and the navigation equipment carried on board helicopters.

(4) ATS routes shall be identified by designators.

(5) Designators for ATS routes other than standard departure and arrival routes shall be selected in accordance with the principles specified in the Second Schedule.

(6) Standard departure and arrival routes and associated procedures shall be identified in accordance with the principles specified in the Third Schedule.

20. Establishment of change over points

(1) Change-over points shall be established on ATS route segments defined by reference to very high frequency omni-directional change over radio ranges where this will assist accurate navigation along the route segments.

(2) The establishment of change-over points shall be limited to route segments of 110 km (60 NM) or more, except where the complexity of ATS routes, the density of navigation aids or other technical and operational reasons warrant the establishment of change- over points on shorter route segments.

(3) Unless otherwise established in relation to the performance of the navigation aids or frequency protection criteria, the changeover point on a route segment shall be the mid-point between the facilities in the case of a straight route segment or the intersection of radials in the case of a route segment which changes direction between the facilities.

21. Establishment and identification of significant points

(1) Significant points shall be established for the purpose of defining an ATS route or in relation to the requirements of air traffic and identification services for information regarding the progress of aircraft inflight.

(2) Significant points shall be identified by designators.

(3) Significant points shall be established and identified in accordance with the principles specified in the Fourth Schedule.

22. Coordination between the operator and air traffic services

(1) Air traffic services units shall have due regard for the requirements of the operators consequent on their obligations as specified in Civil Aviation (Operation of Aircraft) Regulations.

(2) The ATS units shall make available to the operators or their designated representatives such information as may be available to enable them or their designated presentatives to carry out their responsibilities.

(3) The ATS Units shall provide the operator or a designated representative whenever requested, with messages including position reports in so far as practicable in accordance with locally agreed procedures.

23. Coordination between military authorities and air traffic services

(1) Air traffic services authorities shall establish and maintain close cooperation with military authorities responsible for activities between military that may affect flights of civil aircraft.

(2) Coordination of activities that are potentially hazardous to civil aircraft shall be effected in accordance with regulation 24.

(3) Arrangements shall be made to permit information relevant to the safe and expeditious conduct of flights of civil aircraft to be promptly exchanged between air traffic services units and appropriate military units.

(4) Air traffic services units shall, in accordance with locally agreed procedures, provide appropriate military units with pertinent flight plan and other data concerning flights of civil aircraft.

(5) Air traffic services authorities shall designate any areas or routes where the requirements of Civil Aviation (Rules of the Air) regulations, 2018 concerning flight plans, two-way communications and position reporting apply to all flights to facilitate identification of civil aircraft.

(6) Special procedures shall be established in order to ensure that—

(a) air traffic services units are notified if a military unit observes that an aircraft which is or might be a civil aircraft is approaching or has entered any area in which interception might become necessary;

(b) all possible efforts are made to confirm the identity of the aircraft and to provide it with the navigational guidance necessary to avoid the need for interception.

24. Coordination of activities potentially hazardous to civil aircraft

(1) The arrangements for activities potentially hazardous to civil aircraft, whether over the territory of Kenya or over the high seas, activities shall be coordinated with the appropriate air traffic services authorities.

(2) The coordination shall be effected to permit timely promulgation of information regarding the activities in accordance with the Civil Aviation (Aeronautical Information Services) Regulations, 2018.

(3) If the appropriate ATS authority is not that of the State where the organization planning the activities is located, initial coordination shall be effected through the ATS authority responsible for the airspace over the State where the organization is located.

(4) The objective of the coordination shall be to achieve the best arrangements which may avoid hazards to civil aircraft and minimize interference with the normal operations of such aircraft.

(5) In determining the arrangements in subregulation (4), the appropriate Air Traffic Services Authorities shall apply the following conditions—

(a) the locations or areas, times and durations for the activities shall be selected as far as possible in order to avoid closure or realignment of established ATS

routes, blocking of the most economic flight levels, or delays of scheduled aircraft operations, unless no other options exist;

(b) the size of the airspace designated for the conduct of the activities shall be kept as small as possible;

(c) direct communication between the appropriate ATS authority or air traffic services unit and the organization or unit conducting the activities shall be provided for use in the event that civil aircraft emergencies or other unforeseen circumstances require discontinuation of the activities.

(6) The appropriate ATS authorities shall be responsible for initiating the promulgation of information regarding the activities.

(7) If activities potentially hazardous to civil aircraft take place on a regular or continuing basis, special committees shall be established as required to ensure that the requirements of all parties concerned are adequately coordinated.

(8) Adequate steps shall be taken to prevent emission of laser beams from adversely affecting flight operations subject to the provisions of the Civil Aviation (Aerodrome design and Operation) regulations.

(9) The Air Navigation Service Provider together with the military authorities, through the civil military coordination arrangements, shall establish procedures providing for the flexible use of airspace reserved for military or other special activities in order to provide added airspace capacity and to improve efficiency and flexibility of aircraft operations.

(10) The procedures in subregulation (9) shall permit all airspace users to have safe access to such reserved airspace

25. Aeronautical data

(1) Determination and reporting of air traffic services-related aeronautical data shall be in accordance with the accuracy and integrity requirements specified in Tables I to 5 set out in the Fifth Schedule while taking into account the established quality system procedures.

(2) Accuracy requirements for aeronautical data are based upon a 95 per cent confidence level, and in that respect three types of positional data shall be identified—

(i) surveyed points;

(ii) calculated points derived from mathematical calculations from the known surveyed points of points in space or fixes; and

(iii) declared points.

(3) The Air navigation Service Provider shall ensure that integrity of aeronautical data is maintained throughout the data process from survey or origin to the next intended user.

(4) The validation and verification procedures shall be based on the applicable integrity classification for—

(a) routine data to avoid corruption throughout the processing of the data;

(b) essential data to ensure corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and

(c) critical data to assure corruption does not occur at any stage of the entire process and include additional integrity assurance procedures to fully mitigate the effects of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.

(5) Electronic aeronautical data sets shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check implemented by the application dealing with the data sets and shall apply to the protection of all integrity levels of data sets as specified in subregulation (4).

(6) Geographical coordinates indicating latitude and longitude shall be determined and reported to the aeronautical information services authority in terms of the World

GeodeticSystem-1984(WGS-84) geodetic reference datum, identifying those geographical coordinates which have been transformed into WGS-84 coordinates by mathematical means and whose accuracy of original field work does not meet the requirements in Table 1, of the Fifth Schedule.

(7) The order of accuracy of the field work and determinations and calculations derived there from shall be such that the resulting operational navigation data for the phases of flight will be within the maximum deviations, with respect to an appropriate reference frame, as indicated in the tables contained in Fifth schedule.

26. Coordination between meteorological and air traffic

(1) Meteorological and air traffic services providers shall make arrangements to ensure that aircraft receive the most up-to-date between meteorological information for aircraft operations

(2) Meteorological and air traffic services authorities shall make arrangements where necessary for air traffic personnel to—

(a) report if observed by air traffic services personnel or communicated by aircraft, such other meteorological elements as may be agreed upon in addition to using indicating instruments;

(b) report as soon as possible to the associated meteorological office meteorological phenomena of operational significance, if observed by air traffic services personnel or communicated by aircraft, which have not been included in the aerodrome meteorological report; and

(c) report as soon as possible to the associated meteorological office pertinent information concerning pre-eruption volcanic activity, volcanic eruptions and information concerning volcanic ash cloud.

(3) Area Control Centers and Flight Information Centers shall report the information in subregulation (2)(c) to the associated Meteorological Watch Office and Volcanic Ash Advisory Centers.

(4) Area control centers, flight information centers and associated meteorological watch offices shall maintain close coordination to ensure that information on volcanic ash included in NOTAM and SIGMET messages is consistent.

27. Coordination between aeronautical information services and air traffic services

(1) Aeronautical information services and air traffic responsible for air traffic services shall make arrangements to ensure aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information.

(2) Arrangements shall be made between aeronautical information services and air traffic services responsible for air traffic services to report to the responsible aeronautical information services unit, with minimum delay—

(a) information on aerodrome conditions:

(b) the operational status of associated facilities, services and navigation aids within their area of responsibility:

(c) the occurrence of volcanic activity observed by air traffic services personnel or reported by aircraft; and

(d) any other information considered to be of operational significance.

(3) Before introducing changes to the air navigation system, due account shall be taken by the service responsible for such changes of the time needed by the aeronautical information service for the preparation, production and issuance of relevant material for promulgation and to ensure timely provision of the information to the aeronautical information service, close coordination between those services concerned shall be required.

(4) Changes to aeronautical information that affect charts or computer-based navigation systems which qualify to be notified by the Aeronautical Information Regulation and Control (AIRAC) system, shall be as specified in the Civil Aviation (Aeronautical Information Services) Regulations.

(5) Subject to subregulation (4) the predetermined internationally agreed AIRAC effective dates in addition to fourteen days postage time shall be observed by the responsible air traffic services when submitting the raw information or data to aeronautical information services

(6) The air traffic services responsible for the provision of raw aeronautical information or data to the aeronautical information services shall do so while taking into account accuracy and intergity requirements for aeronautical data as specified in the fifth schedule.

28. Minimum flight altitudes

(1) The Authority shall determine and promulgate minimum flight altitutdes for each Air Traffic Service route and control area.

(2) The minimum flight altitudes determined in subregulation (1) shall provide a minimum clearance above the controlling obstacle located within the areas concerned.

29. Services to aircraft in the event of an emergency

(1) An aircraft known or believed to be in a state of emergency, including being subjected to unlawful interference, shall be given maximum consideration, assistance and priority over aircrafts as may be necessitated by the circumstances.

(2) An aircraft equipped with an appropriate data link capability or an SSR transponder to indicate that the aircraft is in a state of emergency, shall operate the equipment as follows—

(a) on Mode A, Code 7700;

(b) on Mode A, Code 7500, to indicate specifically that it is being subjected to unlawful interference;

(c) activate the appropriate emergency or urgency capability of ADS-B or ADS-C; or

(d) transmit the appropriate emergency message via CPDLC.

(3) Human Factors principles shall be observed in communications between Air Traffic Services units and aircraft in the event of an emergency.

(4) The Air Traffic Services units shall attend promptly to requests by an aircraft when an occurrence of unlawful interference with the aircraft takes place or is suspected.

(5) Information pertinent to the safe conduct of the flight as referred to in subregulation (4) shall be transmitted and the necessary action shall be taken to expedite the conduct of all phases of the flight, especially the safe landing of the aircraft.

(6) The Air Traffic Services units in accordance with locally agreed procedures shall immediately inform the appropriate authority designated by the State and exchange necessary information with the operator or its designated representative when an occurrence of unlawful interference with an aircraft takes place or is suspected.

30. Strayed and unidentified aircraft

(1) An air traffic services unit shall take all necessary steps as outlined in subregulations (2) and (3) to assist strayed aircraft and to safeguard its flight as soon as the unit becomes aware of the strayed aircraft.

(2) Where the aircraft's position is not known, the air traffic services unit shall—

(a) attempt to establish two-way communication with the aircraft, unless such communication already exists;

(b) use all available means to determine its position;

(c) inform other ATS units into whose area the aircraft may have strayed or may stray, taking into account all the factors which may have affected the navigation of the aircraft in the circumstances;

(d) inform, in accordance with locally agreed procedures, appropriate military units and provide them with pertinent flight plan and other data concerning strayed aircraft;

(e) request from the units referred to in (c) and (d) and from other aircraft in flight every assistance in establishing communication with the aircraft and determining its position.

(3) When the aircraft's position is established, the air traffic services unit shall—

(a) advise the aircraft of its position and corrective action to be taken; and

(b) provide, as necessary, other ATS units and appropriate military units with relevant information concerning the strayed aircraft and any advice given to that aircraft.

(4) When an air traffic services unit becomes aware of an unidentified aircraft in its area, the air traffic services unit shall endeavour to establish the identity of the aircraft in accordance with locally agreed procedures.

(5) Subject to subregulation (4) the air traffic services unit shall take the following steps—

(a) attempt to establish two-way communication with the aircraft;

(b) inquire of other air traffic services units within the flight information region about the flight and request their assistance in establishing two-way communication with the aircraft;

(c) inquire of air traffic services units serving the adjacent flight information regions about the flight and request their assistance in establishing two-way communication with the aircraft;

(d) attempt to obtain information from other aircraft in the area.

(6) The air traffic services unit shall inform the appropriate military unit as soon as the identity of the aircraft has been established.

(7) The appropriate State agency shall immediately be informed, in accordance with locally agreed procedures when the ATS unit considers that a strayed or unidentified aircraft may be the subject of unlawful interference.

31. Interception of civil aircraft

(1) When an air traffic services unit learns that an aircraft is being intercepted in its area of responsibility, the air traffic services civil aircraft unit shall take the following steps as are appropriate in the circumstances—

(a) attempt to establish two-way communication with the intercepted aircraft via any means available, including the emergency radio frequency 121.5 MHz, unless such communication already exists;

(b) inform the pilot of the intercepted aircraft of the interception;

(c) establish contact with the intercept control unit maintaining two-way communication with the intercepting aircraft and provide it with available information concerning the aircraft;

(d) relay messages between the intercepting aircraft or the intercept control unit and the intercepted aircraft, as necessary;

(e) in close coordination with the intercept control unit take all necessary steps to ensure the safety of the intercepted aircraft;

(f) inform ATS units serving adjacent flight information regions if it appears that the aircraft has strayed from such adjacent flight information regions.

(2) When an air traffic services unit learns that an aircraft is being intercepted outside its area of responsibility, the air traffic services unit shall take the following steps as are appropriate in the circumstances—

(a) inform the ATS unit serving the airspace in which the interception is taking place, providing this unit with available information that will assist in identifying

the aircraft and requesting it to take action in accordance with subregulation (1);

(b) relay messages between the intercepted aircraft and the appropriate ATS unit, the intercept control unit or the intercepting aircraft.

32. Time in air traffic services

(1) Air traffic services units shall use Coordinated Universal Time in air traffic Time (UTC) and shall express the time in hours and minutes and, when services required, seconds of the 24-hour day beginning at midnight.

(2) Air traffic services units shall be equipped with clocks indicating the time in hours, minutes and seconds, clearly visible from each operating position in the unit concerned.

(3) Air traffic services unit clocks and other time recording devices shall be checked as necessary to ensure correct time to within plus or minus 30 seconds of UTC.

(4) Wherever data link communications are utilized by an air traffic services unit, clocks and other time-recording devices shall be checked as necessary to ensure correct time to within I second of UTC.

(5) The correct time shall be obtained from a standard time station or, if not possible, from another unit which has obtained the correct time from such station.

(6) Aerodrome control towers shall, prior to an aircraft taxiing for take-off, provide the pilot with the correct time, unless arrangements have been made for the pilot to obtain it from other sources.

(7) Air traffic services units shall provide aircraft with the correct time on request and time checks shall be given to the nearest half minute.

33. Establishment of requirements for carriage and operation of pressure-altitude reporting transponders

The Authority shall establish requirements for carriage and operation of pressure-altitude reporting transponders within defined portions of airspace.

34. Safety management

(1) An air traffic services provider shall establish a safety management system in accordance with the Civil Aviation (Safety Management) Regulations.

(2) Any significant safety-related change to the ATS system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted.

(3) The ATS provider, when appropriate, shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met.

35. Fatigue management

(1) The Authority shall establish procedures for the purpose of managing fatigue in the provision of air traffic control services.

(2) The procedures referred to in subregulation (1) above, shall be based upon scientific principles, knowledge and operational experience, with the aim of ensuring that air traffic controllers perform at an adequate level of alertness.

(2) The Authority shall prescribe—

(a) scheduling limits in accordance with the Seventh Schedule; and

(b) conditions for managing fatigue in accordance with the Eighth Schedule when authorizing air traffic services providers to use a fatigue risk management system (FRMS).

(3) The Authority shall require air traffic services provider, for the purposes of managing its fatigue-related safety risks, establish one of the following—

(a) air traffic controller schedules commensurate with the service(s) provided and in compliance with the Scheduling Limits in subregulation (3(a) above;

(b) an FRMS, in compliance with conditions established by the Authority in accordance with subregulation (3)(b) above, for the provision of all air traffic control services; or

(c) an FRMS, in compliance with conditions established by the Authority in accordance with subregulation (3)(b) above, for a defined part of its air traffic control services in conjunction with schedules in compliance with the Scheduling Limits established in accordance with sub- regulation (3) (a) for the remainder of its air traffic control services.

(5) Where the air traffic services provider complies with Scheduling Limits in the provision of part or all of its air traffic control services in subregulation (3)(a) the Authority shall—

(a) require evidence that the limitations are not exceeded and that non-duty period requirements are met;

(b) require air traffic services provider to familiarize its personnel with the principles of fatigue management and its policies with regard to fatigue management;

(c) establish a process to allow variations from the applicable Scheduling Limits to address any additional risks associated with sudden, unforeseen operational circumstances; and

(d) Where an air traffic services provider demonstrates that any associated risk is managed to a level of safety equivalent to, or better than, that achieved through the applicable Scheduling Limits, the Authority may approve variations to these limits (Part VIII of these Regulations) in order to address strategic operational needs in exceptional circumstances,

(6) Where an air traffic services provider implements an FRMS to manage fatigue-related safety risks in the provision of part or all of its air traffic control services in accordance with subregulation (3)(b), the Authority shall—

(a) require the air traffic services provider to have processes to integrate FRMS functions with its other safety management functions: and

(b) approve an FRMS, according to a documented process, that provides a level of safety acceptable to the Authority.

36. Horizontal reference system

(1) World Geodetic System -1984 shall be used as the horizontal-reference system for air navigation, reference System.

(2) Reported aeronautical geographical coordinates indicating latitude and longitude shall be expressed in terms of the World Geodetic System-1984 geodetic reference datum.

37. Vertical reference system

Mean Sea Level datum, which gives the relationship of gravity-related height or elevation to a surface known as the geoids shall be used as the vertical reference system for air navigation.

38. Temporal reference system

(1) The Gregorian calendar and Coordinated Universal Time shall be used as the temporal reference system for air navigation.

(2) When a different temporal reference system is used, the temporal reference system shall be indicated in Part 1, Section 2.1.2 of the Aeronautical Information Publication.

39. Language profeciency

(1) An air traffic services provider shall ensure that air traffic controllers speak and understand the language(s) used for radiotelephony communications as specified in Civil Aviation (Personnel Licensing) Regulations, 2018.

(2) The English language shall be used for communications between air traffic control units except when conducted in a mutually agreed language.

40. Contingency arrangements

(1) Air traffic services authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of air traffic services and related supporting services in the airspace for which they are responsible for the provision of such services.

(2) The contingency plans shall be developed with the assistance of International Civil Aviation Organization in coordination with the air traffic services authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned.

41. Identification and delienation of prohibited restricted and danger areas

(1) All prohibited, restricted or danger areas shall upon initial establishment, be given identification and full details and be delineation of promulgated by the Authority, prohibited, danger areas.

(2) The identifications assigned shall be used to identify the area in all subsequent notifications pertaining to that area.

(3) The identification shall be composed of a group of letters and figures as follows—

(a) nationality letters for location indicators assigned to the State or territory which has established the airspace;

(b) a letter P for prohibited area, R for restricted area and D for danger area as appropriate; and

(c) a number, unduplicated within the State or territory.

(4) Identification numbers shall not be reused for a period of at least one year after cancellation of the area to which they refer to avoid confusion.

(5) When a prohibited, restricted or danger area is established, the area shall be as small as practicable and be contained within simple geometrical limits, so as to permit ease of reference by all concerned.

42. Instrument flight procedure design service

The Authority shall ensure that an instrument flight procedure design service is in place in accordance with the Sixth Schedule.

PART III – AIR TRAFFIC CONTROL SERVICE

43. Application of Air traffic control service

Air traffic control service shall be provided to all—

(a) IFR flights in airspace Classes A, B, C, D and E;

(b) VFR flights in airspace Classes B, C and D;

(c) special VFR flights; and

(d) aerodrome traffic at controlled aerodromes.

44. Provision of air traffic control service

The parts of air traffic control service described in regulation 6 (1) shall be provided by the various units as follows—

(a) area control service—

(b) by an area control centre; or

(c) by the unit providing approach control service in a control zone or in a control area of limited extent which is designated primarily for the provision of approach control service and where no area control centre is established.

(b) approach control service—

(i) by an aerodrome control tower or area control centre when it is necessary or desirable to combine under the responsibility of one unit the functions of the approach control service with those of the aerodrome control service or the area control service;

(ii) by an approach control unit when it is necessary or desirable to establish a separate unit;

(c) aerodrome control service by an aerodrome control tower.

45. Operation of air traffic control service

(1) An air traffic control unit, in order to provide air traffic control service shall—

(a) be provided with information on the intended movement of each aircraft, or variations there from, and with current information on the actual progress of each aircraft;

(b) determine from the information received, the relative positions of known aircraft to each other;

(c) issue clearances and information for the purpose of preventing collision between aircraft under its control and of expediting and maintaining an orderly flow of traffic;

(d) co-ordinate clearances as necessary with other units—

(i) whenever an aircraft might otherwise conflict with traffic operated under the control of such other units;

(ii) before transferring control of an aircraft to such other units.

(2) Information on aircraft movements, together with a record of air traffic control clearances issued to such aircraft, shall be so displayed as to permit ready analysis in order to maintain an efficient flow of air traffic with adequate separation between aircraft.

(3) Clearances issued by air traffic control units shall provide—

(a) all flights in airspace Classes A and B;

(b) IFR flights in airspace Classes C, D and E;

(c) IFR flights and VFR flights in airspace Class C;

(d) IFR flights and special VFR flights;

(e) special VFR flights when so prescribed by the appropriate ATS authority.

(4) A flight may be cleared without separation being provided in respect of a specific portion of the flight conducted in visual meteorological conditions when requested by an aircraft and if so prescribed by the appropriate ATS authority for the cases listed under subregulation (3)(b) in airspace Classes D and E.

(5) Separation by an air traffic control unit shall be obtained by at least one of the following—

(a) vertical separation, obtained by assigning different levels selected from—

(i) the appropriate table of cruising levels described in the Civil Aviation (Rules of the air) Regulations, 2018; or

(ii) a modified table of cruising levels, when so prescribed in accordance with the Civil Aviation (Rules of the air) Regulations, 2018 for flight above FL4I0, except that the correlation of levels to track as prescribed therein shall not apply whenever otherwise indicated in appropriate aeronautical information publications or air traffic control clearances;

(b) horizontal separation, obtained by providing—

(i) longitudinal separation, by maintaining an interval between aircraft operating along the same, converging or reciprocal tracks, expressed in time or distance; or

(ii) lateral separation, by maintaining aircraft on different routes or in different geographical areas;

(c) composite separation, consisting of a combination of vertical separation and one of the other forms of separation contained in subregulation (6)(b) using minima for each which may be lower than, but not less than half of, those used for each of the combined elements when applied individually.

(6) Composite separation shall only be applied on the basis of regional air navigation agreements.

(7) A programme shall be instituted, on a regional basis, for monitoring the height-keeping performance of aircraft operating at a reduced vertical separation minimum of 300 m (1 000 ft.) is applied between FL 290 and FL 410 inclusive, in order to ensure that the continued application of this vertical separation minimum meets the safety objectives.

(8) The scope of regional monitoring programmes shall be adequate to conduct analyses of aircraft group performance and evaluate the stability of altimetry system error.

(9) Where RCP/RSP specifications are applied, programmes shall be instituted for monitoring the performance of the infrastructure and the participating aircraft against the appropriate RCP and/or RSP specifications, to ensure that operations in the applicable airspace continue to meet safety objectives.

(10) The scope of monitoring programmes shall be adequate to evaluate communication or surveillance performance, as applicable.

(11) The scope of monitoring programmes shall be adequate to evaluate communication or surveillance performance, as applicable.

46. Separation minima

(1) The selection of separation minima for application within a given portion of airspace shall be as follows—

(a) the separation minima shall be selected from those prescribed by the provisions of the PANS-ATM and the Regional Supplementary Procedures as applicable under the prevailing circumstances except that, where types of aids are used or circumstances prevail which are not covered by these Regulations, other separation minima shall be established, as necessary, by —

(i) the appropriate ATS authority following consultation with operators, for routes or portions of routes contained within the sovereign airspace of Kenya;

(ii) regional air navigation agreements for routes or portions of routes contained within airspace over the high seas;

(b) the selection of separation minima shall be made in consultation between the appropriate ATS authorities responsible for the provision of air traffic services in neighbouring airspaces when—

(i) traffic passes from one into the other of the neighbouring airspaces;

(ii) routes are closer to the common boundary of the neighbouring airspaces than the separation minima applicable in the circumstances.

(2) Details of the selected separation minima and of their areas of application shall be notified—

(a) to the ATS units concerned; and

(b) to pilots and operators through aeronautical information publications, where separation is based on the use by aircraft of specified navigation aids or specified navigation techniques.

47. Responsibility for control

(1) A controlled flight shall be under the control of only one air traffic control unit at any given time.

(2) Responsibility for the control of all aircraft operating within a given block of airspace shall be vested in a single air traffic control unit.

(3) The control of an aircraft or groups of aircraft may be delegated to other air traffic control units provided that coordination between all air traffic control units concerned is assured.

48. Place or time of transfer

The responsibility for the control of an aircraft shall be transferred from one air traffic control unit to another in accordance with the principles specified in the Ninth Schedule.

49. Coordination of transfer

(1) Responsibility for control of an aircraft shall not be transferred from one air traffic control unit to another without the consent of the accepting control unit.

(2) The consent of the accepting control unit shall be obtained in accordance with the principles specified in the Ninth Schedule.

50. Air traffic control clearance

Air traffic control clearances shall be based solely on the requirements for providing air traffic control service.

51. Contents of clearances

(1) An air traffic control clearance shall indicate—

(a) aircraft identification as shown in the flight plan;

(b) clearance limit;

(c) route off light;

(d) level(s) of flight for the entire route or part of the route and changes of levels if required;

(e) any necessary instructions or information on other matters such as approach or departure maneuvers, communications and the time of expiry of the clearance.

(2) Standard departure and arrival routes and associated procedures shall be established when necessary to facilitate—

(a) the safe, orderly and expeditious flow of air traffic;

(b) the description of the route and procedure in air traffic control clearances

52. Clearances for transonic flight

(1) The air traffic control clearance relating to the transonic acceleration phase of a supersonic flight shall extend at least to the end transonic flight of that phase.

(2) The air traffic control clearance relating to the deceleration and descent of an aircraft from supersonic cruise to subsonic flight shall provide for uninterrupted descent, at least during the transonic phase.

53. Read-back of clearances and safety-related information

(1) The flight crew shall read back to the air traffic controller safety-related parts of Air Traffic Control clearances and instructions which are transmitted by voice

(2) The flight crew shall read back the following items of Air Traffic Control clearances and instructions—

(a) ATC route clearances;

(b) clearances and instructions to enter, land on, takeoff from, hold short of, cross and backtrack on any runway; and

(c) Runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, whether issued by the controller or contained in ATIS broadcasts, transition levels.

(3) Other clearances or instructions, including conditional clearances, shall be read back or acknowledged in a manner to clearly indicate that they have been understood and will be complied with.

(4) The controller shall listen to the read-back to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the readback

(5) Unless specified by the appropriate Air Traffic Services Authority, voice read-back of Controller Pilot Data Link Communication messages shall not be required.

54. Coordination of clearances

(1) An air traffic control clearance shall be coordinated between air traffic control units to cover the entire route of an aircraft or a specified portion of the route.

(2) An aircraft shall be cleared for the entire route to the aerodrome of first intended landing—

(a) when it has been possible, prior to departure, to coordinate the clearance between all the units under whose control the aircraft will come; or

(b) when there is reasonable assurance that prior coordination will be effected between those units under whose control the aircraft will subsequently come.

(3) When coordination as in subregulation (2) has not been achieved or is not anticipated, the aircraft shall be cleared only to that point where coordination is reasonably assured and prior to reaching such point, or at such point, the aircraft shall receive further clearance, holding instructions being issued as appropriate.

(4) When prescribed by the appropriate Air Traffic Services authority, aircraft shall contact a downstream air traffic control unit, for the purpose of receiving a downstream clearance prior to the transfer of control point.

(5) Aircraft shall maintain the necessary two-way communication with the current air traffic control unit while obtaining a downstream clearance.

(6) A clearance issued as a downstream clearance shall be clearly identifiable as such to the pilot.

(7) Downstream clearances shall not affect the aircraft's original flight profile in any airspace, other than that of the air traffic control unit responsible for the delivery of the downstream clearance unless the downstream clearance has been coordinated.

(8) Where data link communications are used to facilitate downstream clearance delivery, two-way voice communications between the pilot and the air traffic control unit providing the downstream clearance shall be available.

(9) When an aircraft intends to depart from an aerodrome within a control area to enter another control area within a period of thirty minutes or such other specific period of time as has been agreed between the area control centers concerned, coordination with the subsequent area control centre shall be effected prior to issuance of the departure clearance.

(10) When an aircraft intends to leave a control area for flight outside controlled airspace, and re-enter the same or another control area, a clearance from point of departure to the aerodrome of first intended landing shall be issued.

(11) Clearance or revisions referred to in subregulation (10) shall apply only to those portions of the flight conducted within controlled airspace.

55. Air traffic flow management

(1) Air traffic flow management shall be implemented for airspace where air traffic demand at times exceeds, or is expected to management exceed, the declared capacity of the air traffic control services concerned.

(2) Air traffic flow management shall be implemented on the basis of regional air navigation agreements or, if appropriate, through multilateral agreements and such agreements shall make provision for common procedures and common methods of capacity determination.

(3) When it becomes apparent to an ATC unit that traffic additional to that already accepted cannot be accommodated within a given period of time at a particular location or in a particular area, or can only be accommodated at a given rate, that unit shall so advise the ATFM unit, when such is established, as well as, when appropriate, ATS units concerned.

(4) Flight crews of aircraft destined to the location or area in question and operators concerned referred to in subregulation (3) shall also be advised of the delays expected or the restrictions that will be applied.

56. Control of persons and vehicles at aerodromes

(1) The movement of persons or vehicles including towed aircraft on the maneuvering area of an aerodrome shall be controlled by persons and the aerodrome control tower to avoid hazard to them or to aircraft landing, taxiing or taking off.

(2) In conditions where low visibility procedures are in operation—

(a) persons and vehicles operating on the maneuvering area of an aerodrome shall be restricted to the essential minimum, and particular regard shall be given to the requirements to protect the Instrument Landing System or Micro Landing System sensitive areas when Category II or Category III precision instrument operations are in progress;

(b) subject to subregulation (3), the minimum separation between vehicles and taxiing aircraft shall be as prescribed by the appropriate Air Traffic Service Authority taking into account the aids available;

(c) when mixed Instrument Landing System or Micro Landing System Category II or Category III precision instrument operations are taking place to the same runway continuously, the more restrictive Instrument Landing System or Micro Landing System critical and sensitive areas shall be protected.

(3) Emergency vehicles proceeding to the assistance of an aircraft in distress shall be afforded priority over all other surface movement traffic.

(4) Subject to subregulation (3), vehicles on the maneuvering area shall be required to comply with the following rules—

(a) vehicles and vehicles towing aircraft shall give way to aircraft which are landing, taking off or taxiing;

(b) vehicles shall give way to other vehicles towing aircraft;

(c) vehicles shall give way to other vehicles in accordance with Air Traffic Services unit instructions;

(d) notwithstanding subregulations (4)(a), (b) and (c), vehicles and vehicles towing aircraft shall comply with instructions issued by the aerodrome control tower.

(5) The Air Traffic Services provider shall establish runway safety programmes to enhance runway safety using collaborative approach that involves; regulators, aircraft operators, aerodrome operators and air navigation service providers.

57. Provisions of radar and ADS-B

Radar and ADS-B ground systems shall provide for the Provision of display of safety-related alerts and warnings, including conflict alert, conflict prediction, minimum safe altitude warning and unintentionally duplicated SSR codes.

58. Use of surface movement radar

In the absence of visual observation of all or part of the maneuvering area or to supplement visual observation, Surface movement radar provided in the Civil Aviation (Aerodromes) Regulations, 2018 or other suitable surveillance equipment, shall be utilized to—

(a) monitor the movement of aircraft and vehicles on the maneuvering area;

(b) provide directional information to pilots and vehicle drivers as necessary; and

(c) provide advice and assistance for the safe and efficient movement of aircraft and vehicles on the maneuvering area.

59. Application of Flight Information Service

(1) Flight information service shall be provided to all aircraft which are likely to be affected by the information and which are—

(a) provided with air traffic control service; or

(b) otherwise known to the relevant air traffic services units.

(2) Where air traffic services units provide both flight information service and air traffic control service, the provision of air traffic control service shall have precedence over the provision of flight information service whenever the provision of air traffic control service so requires.

60. Scope of flight information service

(1) Flight information service shall include the provision of pertinent—

(a) SIGMET and AIRMET information;

(b) information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds;

(c) information concerning the release into the atmosphere of radioactive materials or toxic chemicals;

(d) information on changes in the availability of radio navigation services;

(e) information on changes in condition of aerodromes and associated facilities, including information on the state of the aerodrome movement areas when they are affected by significant depth of water;

(f) information on unmanned free balloons; and

(g) any other information likely to affect safety.

(2) Flight information service provided to flights shall include, in addition to that outlined in subregulation (1), the provision of information concerning—

(d) weather conditions reported or forecast at departure, destination and alternate aerodromes;

(e) collision hazards, to aircraft operating in airspace Classes C, D, E, F and G as specified in the First Schedule;

(f) for flight over water areas, in so far as practicable and when requested by a pilot, any available information such as radio call sign, position, true track, speed, etc., of surface vessels in the area.

(3) Air Traffic Services units shall transmit as soon as practicable, special air-reports to other aircraft concerned, to the associated meteorological office, and to other Air Traffic Services units concerned.

(4) Transmissions to air craft referred in subregulation (3) shall be continued for a period to be determined by agreement between the meteorological and air traffic services authorities concerned.

(5) Flight information service provided to VFR flights shall include, in addition to that outlined in subregulation (1), the provision of available information concerning traffic and

weather conditions along he route of flight that are likely to make operation under the visual flight rules impracticable.

PART IV – OPERATIONAL FLIGHT INFORMATION SERVICE BROADCASTS

61. Application of operational flight information service broadcasts

(1) The meteorological information and operational concerning radio navigation services and aerodromes operational flight included in the flight information service shall, whenever available, be information service provided in an operationally integrated form, broadcasts.

(2) Where integrated operational flight information messages are to be transmitted to aircraft, they shall be transmitted with the content and, where specified, in the sequence indicated, for the various phases of flight.

(3) Operational flight information service broadcasts, when provided, shall consist of messages containing integrated information regarding selected operational and meteorological elements appropriate to the various phases of flight.

(4) The broadcasts referred to in subregulation (3) are—

(i) High Frequency,

(ii) Very High Frequency; and

(iii) Automatic Terminal Information Service.

(5) Licable Operational flight information service messages shall be transmitted by the appropriate Air Traffic Services unit when requested by the pilot.

62. High Frequency operational flight information service broadcasts

(1) High Frequency operational flight information service broadcasts shall be provided when it has been determined by regional operational flight air navigation agreements that a requirement exists.

(2) Whenever such High Frequency operational flight information service broadcasts are provided—

(a) the information shall be in accordance with subregulation(s) as applicable and subject to regional air navigation agreements;

(b) the aerodromes for which reports and forecasts are to be included shall be as determined by regional air navigation agreements;

(c) the time-sequencing of stations participating in the broadcast shall be as determined by regional air navigation agreements;

(d) the High Frequency operational flight information service broadcast message shall take into consideration human performance;

(e) the broadcast message shall not exceed the length of time allocated for it by regional air navigation agreements, care being taken that the readability is not impaired by the speed of the transmission;

(f) each aerodrome message shall be identified by the name of the aerodrome to which the information applies;

(g) when information has not been received in time for a broadcast, the latest available information shall be included together with the time of that observation;

(h) the full broadcast message shall be repeated if this is feasible within the remainder of the time allotted to the broadcasting station;

(i) the broadcast information shall be updated immediately a significant change occurs; and

(j) the High Frequency operational flight information service message shall be prepared and disseminated by the most appropriate unit(s) as designated by the Authority.

(3) High Frequency operational flight information service broadcast messages shall contain the following information in the sequence indicated or as determined by regional air navigation agreements—

(a) en-route weather information—

Information on significant en-route weather phenomena shall be in the form of available Significant Meteorological Information as prescribed in the Civil Aviation (Meteorological Services for Air Navigation) Regulations, 2018;

(b) Aerodrome information including—

(i) name of aerodrome;

(ii) time of observation;

(iii) essential operational information;

(iv) surface wind direction and speed;

(v) appropriate, maximum wind speed;

(vi) visibility and, when applicable ,runway visual range (RVR);

(vii) present weather;

(viii) cloudbelow 1500m(5000ft)or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available; and aerodrome forecast.

63. VHF operational flight information service broadcasts

(1) Very High Frequency operational flight information service broadcasts shall be provided as determined by regional air flight information navigation agreements.

(2) Whenever Very High Frequency operational flight information service broadcasts are provided—

(a) the aerodromes for which reports and forecasts are to be included shall be as determined by regional air navigation agreements;

(b) each aerodrome message shall be identified by the name of the aerodrome to which the information applies;

(c) when information has not been received in time for a broadcast, the latest available information shall be included together with the time of that observation

(d) the broadcasts shall be continuous and repetitive;

(e) the Very High Frequency Operational Flight Information Service broadcast message shall take into consideration human performance;

(f) the broadcast message shall, whenever practicable, not exceed five minutes, care being taken that the readability is not impaired by the speed of the transmission;

(g) the broadcast message shall be updated on a scheduled basis as determined by regional air navigation agreements and shall be updated immediately a significant change occurs; and

(h) the Very High Frequency Operational Flight Information Service message shall be prepared and disseminated by the most appropriate unit as designated by the Authority.

(3) Very High Frequency operational flight information service broadcast messages shall contain the following information in the sequence indicated—

(a) name of aerodrome;

(b) time of observation;

(c) landing runway;

(d) significant runway surface conditions and, if appropriate, braking action;

(e) changes in the operational state of the radio navigation services, if appropriate;

(f) holding delay, if appropriate;

(g) surface wind direction and speed; if appropriate, maximum wind speed;

(h) visibility and, when applicable, runway visual range;

(i) present weather;

(j) cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility, when available;

(k) air temperature;

(l) dew point temperature;

(m) QNH altimeter setting;

(n) Supplementary information on recent weather of operational significance and, where necessary, wind shear;

(o) trend forecast, when available; and

notice of current Significant Meteorological Information messages.

64. Voice-automatic terminal information service broadcasts.

(1) Voice-automatic terminal information service broadcasts shall be provided at aerodromes where there is a requirement to reduce the communication load on the Air Traffic Service Very High Frequency air-ground communication channels, broadcasts.

(2) When provided, Voice-automatic terminal information service broadcast shall comprise—

(a) one broadcast serving arriving air craft;

(b) one broadcast serving departing aircraft;

(c) one broadcast serving both arriving and departing air craft; or

(d) two broadcasts serving arriving and departing aircraft respectively at those aerodromes where the length of a broadcast serving both arriving and departing aircraft would be excessively long.

(3) A discrete Very High Frequency shall, whenever practicable, be used for Voice-ATIS broadcasts.

(4) If a discrete frequency is not available, the transmission may be made on the voice channel of the most appropriate terminal navigation aid, preferably a Very High Frequency Omni-directional Radio Range provided the range and readability are adequate and the identification of the navigation aid is sequenced with the broadcast so that the latter is not obliterated.

(5) Voice-automatic terminal information service broadcasts shall not be transmitted on the voice channel of an Instrument Landing System.

(6) Whenever Voice-automatic terminal information service is provided, the broadcast shall be continuous and repetitive.

(7) The information contained in the current broadcast shall immediately be made known to the Air Traffic Services unit concerned with the provision to aircraft of information relating to approach, landing and take-off, whenever the message has not been prepared by that unit.

(8) Voice-automatic terminal information service broadcasts provided at designated aerodromes for use by international air services shall be available in the English language as a minimum.

(9) Where Voice-automatic terminal information service broadcasts are available in more than one language, a discrete channel shall be used for each language.

(10) The Voice-automatic terminal information service broadcast message shall, whenever practicable, not exceed thirty seconds, care being taken that the readability of the automatic terminal information service message is not impaired by the speed of the transmission or by the identification signal of a navigation aid used for transmission of automatic terminal information service and the broadcast message shall take into consideration human performance.

65. Data - link automatic terminal information service

(1) The information shall be identical in both content and format to the applicable Voice-automatic terminal information broadcast where a Data link-automatic terminal information service supplements the existing availability of Voiceautomatic terminal service.

(2) The content, for the purpose of maintaining the same designator, shall be considered identical where real-time meteorological information is included but the data remains within the parameters of the significant change criteria.

(3) Voice-automatic terminal information service and Data link-automatic terminal information service shall be updated simultaneously where a Data link-automatic terminal information service supplements the existing availability of Voice-automatic terminal information service and the automatic terminal information service requires updating.

66. Automatic terminal information service (voice or data link)

(1) Whenever Voice-automatic terminal information service or Data ink-automatic terminal information service is provided—

(a) the information communicated shall relate to a single aerodrome;

(b) the information communicated shall be updated immediately a significant change occurs;

(c) the preparation and dissemination of the automatic terminal information service message shall be the responsibility of the air traffic services;

(d) individual automatic terminal information service messages shall be identified by a designator in the form of a letter of the International Civil Aviation Organization spelling alphabet and designators assigned to consecutive automatic terminal information service message shal Ibein alphabetical order;

(e) aircraft shall acknowledge receipt of the information upon establishing communication with the Air Traffic Services unit providing approach control service or the aerodrorne control tower, as appropriate;

(f) the appropriate Air Traffic Services unit shall, when replying to the message in subregulation (e) or, in the case of arriving aircraft, at such other time as may be prescribed by the appropriate Air Traffic Services Authority, provide the aircraft with the current altimeter setting; and

(g) the meteorological information shall be extracted from the local meteorological routine or special report.

(2) The automatic terminal information service messages shall indicate that the relevant weather information will be given on initial contact with the appropriate Air Traffic Services unit when rapidly changing meteorological conditions make it inadvisable to include a weather report in the automatic terminal information service.

(3) Information contained in a current automatic terminal information service, the receipt of which has been acknowledged the aircraft concerned, need not be included in a directed transmission to the aircraft, with the exception of the altimeter setting, which shall be provided in accordance with subregulation (l)(f).

(4) If an aircraft acknowledges receipt of an automatic terminal information service that is no longer current, any element of information that needs updating shall be transmitted to the aircraft without delay.

(5) Contents of automatic terminal information service shall be kept as brief as possible and information additional to that specified in Regulations 67, 68 and 69 shall only be included when justified in exceptional circumstances.

67. Automatic terminal information service for arriving and departing aircraft

Automatic terminal information service messages containing both arrival and departure information shall contain the following elements of information in the order listed—

(i) name of aerodrome;
(ii) arrival or departure indicator;
(iii) type, if communication is via Data link-automatic terminal information service;
(iv) designator;
(v) time of observation, if appropriate;
(vi) type of approach to be expected;
(vii) the runway in use;
(viii) status of arresting system constituting a potential hazard, if any;
(ix) significant runway surface conditions and, if appropriate, braking action;
(x) holding delay, if appropriate;
(xi) transition level, if applicable;
(xii) other essential operational information;
(xiii) surface wind direction and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;
(xiv) visibility and, when applicable, Runway Visual Range;
(xiv) present weather;
(xvi) cloud below 1 500 m (5 000 ft.) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;
(xvii) air temperature
(xviii) dew point temperature;
(xix) altimeter settings;
(xx) any available information on significant meteorological phenomena in the approach and climb-out areas including wind shear, and information on recent weather of operational significance;
(xxi) trend forecast, when available; and
(xxii) specific automatic terminal information service instructions.

68. Automatic terminal information service for arriving aircraft

Automatic terminal information service messages containing arrival information only shall contain the following elements of information in the order listed—

(a) name of aerodrome;
(b) arrival indicator;
(c) contract type, if communication is via Data link-automatic terminal information service;
(d) designator;
(e) time of observation, if appropriate;
(f) type of approach to be expected;
(g) main landing runway(s); status of arresting system constituting a potential hazard, if any;
(h) significant runway surface conditions and, if appropriate, braking action;
(j) holding delay, if appropriate;
(k) transition level, if applicable;

(l) other essential operational information;

(m) surface wind direction and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

(n) visibility and, when applicable, Runway Visual Range;

(o) present weather;

(p) cloud below 1 500 m (5 000 ft.) or below the highest minimum sector altitude, whichever is greater;cumulonimbus; if the sky is obscured, vertical visibility when available;

(q) air temperature;

(r) dew point temperature;

(s) altimeter settings;

(t) any available information on significant meteorological phenomena in the approach area including wind shear, and information on recent weather of operational significance;

(u) trend forecast, when available; and

(v) specific automatic terminal information service instructions.

69. Automatic terminal information service for departing aircraft

Automatic terminal information service messages containing departure information only shall contain the following elements of information in the order listed—

(a) name of aerodrome;

(b) departure indicator;

(c) contract type, if communication is via Data link-automatic terminal information service;

(d) designator;

(e) time of observation, if appropriate;

(f) runway to be used for take-off: status of arresting system constituting a potential hazard, if any;

(g) significant surface conditions of runway to be used for take- off and, if appropriate, braking action;

(h) departure delay, if appropriate;

(i) transition level, if applicable;

(j) other essential operational information;

(k) surface wind direction and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

(l) visibility and, when applicable, Runway Visual Range;

(m) present weather;

(n) cloud below 1 500 m (5 000 ft.) or below the highest minimum sector altitude, whichever is greater;cumulonimbus; if the sky is obscured, vertical visibility when available;

(o) air temperature;

(p) dew point temperature;

(q) altimeter settings;

(r) any available information on significant meteorological phenomena in the climb-out area including wind shear;

(s) trend forecast, when available; and

(t) specific automatic terminal information service instructions.

70. VOLMET broadcasts and D-VOLMET service

(1) High Frequency or Very High Frequency VOLMET VOLMET broadcasts or D-VOLMET service shall be provided when it has been determined by regional air navigation agreements that a requirement exists.

(2) VOLMET broadcasts shall use standard radiotelephony phraseologies.

PART V – ALTERING SERVICE

71. Application of Alerting Service

(1) Air Traffic Services units shall provide alerting service—

(a) for all aircraft provided with air traffic control service;

(b) in so far as practicable. to all other aircraft having filed a flight plan or otherwise known to the air traffic services; and

(c) to any aircraft known or believed to be the subject of unlawful interference.

(2) Flight information centers or area control centers shall serve as the central point for collecting all information relevant to a state of emergency of an aircraft operating within the Nairobi flight information region or control area concerned and for forwarding such information to the rescue coordination centre

(3) In the event of a state of emergency arising to an aircraft while it is under the control of an aerodrome control tower or approach control unit, such unit shall notify immediately the flight information centre or area control centre responsible which shall in turn notify the rescue coordination centre.

(4) The notification referred in sub regulation (3) shall not be required when the nature of the emergency is such that the notification would be unnecessary.

(5) Where the urgency of the situation so requires, the aerodrome control tower or approach control unit responsible shall first alert and take other necessary steps to set in motional appropriate local rescue and emergency organizations which can give the immediate assistance required.

72. Notification of rescue coordination centres

(1) Without prejudice to any other circumstances that may of render such notification advisable, air traffic services units shall, rescue except as prescribed in regulation 75(1), notify rescue coordination coordination centers immediately an aircraft is considered to be in a state of emergency in accordance with the following—

(a) Uncertainty phase when—

(i) no communication has been received from an aircraft within a period of thirty minutes after the time a communication shall have been received, or from the time an unsuccessful attempt to establish Kein'a Subsidiary Legislation, 2018 2011 communication with such aircraft was first made, whichever is the earlier; or

(ii) an aircraft fails to arrive within thirty minutes of the estimated time of arrival last notified to or estimated by air traffic services units, whichever is the later, except when no doubt exists as to the safety of the aircraft and its occupants.

(b) alert phase when—

(i) following the uncertainty phase, subsequent attempts to establish communication with the aircraft or inquiries to other relevant sources have failed to reveal any news of the aircraft;

(ii) an aircraft has been cleared to land and fails to land within five minutes of the estimated time of landing and communication has not been re-established with the air craft;

(iii) information has been received which indicates that the operating efficiency of the aircraft has been impaired, but not to the extent that a forced landing is likely, except when evidence exists that would allay apprehension as to the safety of the aircraft and its occupants, or

(iv) an aircraft is known or believed to be the subject of unlawful interference;

(c) Distress phase when—

(i) following the alert phase, further unsuccessful attempts to establish communication with the aircraft and more widespread unsuccessful inquiries point to the probability that the aircraft is in distress, or when;

(ii) the fuel on board is considered to be exhausted, or to be insufficient to enable the aircraft to reach safety, or when

(iii) information is received which indicates that the operating efficiency of the aircraft has been impaired to the extent that a forced landing is likely, or when;

(iv) information is received or it is reasonably certain that the aircraft is about to make or has made a forced landing,

except when there is reasonable certainty that the aircraft and its occupants are not threatened by grave and imminent danger and do not require immediate assistance.

(2) The notification shall contain the following information as is available in the order listed—

(a) INCERFA, ALERFA or DETRESFA, as appropriate to the phase of the emergency;

(b) agency and person calling;

(c) nature of the emergency;

(d) significant information from the flight plan;

(e) unit which made last contact, time and means used;

(f) last position report and how determined;

(g) colour and distinctive marks of aircraft;

(h) dangerous goods carried as cargo;

(i) any action taken by reporting office; and

(j) other pertinent remarks.

(3) The information specified in subregulation(2), which is not available at the time the notification is made to a rescue coordination centre, shall be sought by an air traffic services unit prior to the declaration of a distress phase, if there is reasonable certainty that this phase will eventuate.

(4) Further to the notification in subregulation (1), the rescue coordination centre shall, without delay, be furnished with—

(a) any useful additional information, especially on the development of the state of emergency through subsequent phases; or

(b) information that the emergency situation no longer exists.

73. Use of communication facilities

Air traffic services units shall use all available of communication facilities to establish and maintain communication with an aircraft in a state of emergency, and to request news of the air craft.

74. Plotting aircraft in a state of emergency

(1) When a state of emergency is considered to exist, the flight of the aircraft involved shall be plotted on a chart in order to in a state of determine the probable future position of the aircraft and its maximum range of action from its last known position.

(2) The flights of other aircraft known to be operating in the vicinity of the aircraft involved shall also be plotted in order to determine their probable future positions and maximum endurance.

75. Information to the operator

(1) When an area control or a flight information centre decides that an aircraft is in the uncertainty or the alert phase, it shall, when practicable, advise the operator prior to notifying the rescue coordination centre.

(2) All information notified to the rescue coordination centre by an area control or flight information centre shall, whenever practicable, also be communicated, without delay, to the operator.

76. Information to aircraft operating in the vicinity of an aircraft in a state of emergency

(1) When it has been established by an air traffic services unit Information to that an aircraft is in a state of emergency, other aircraft known to be in aircraft operating the vicinity of the aircraft involved shall, except as provided in subregulation (2) be informed of the nature of the emergency as soon as an aircraft in a practicable.

(2) When an air traffic services unit knows or believes that an air craft is being subjected to unlawful interference, no reference shall be made in Air Traffic Service air-ground communications to the nature of the emergency unless the unlawful interference has first been referred to in communications from the aircraft involved and there is certainty that such reference will not aggravate the situation.

PART VI – AIR TRAFFIC SERVICES REQUIREMENTS FOR COMMUNICATIONS

77. Aeronautical mobile service (air-ground communications)

(1) Radiotelephony or data link shall be used in air-ground communications for air traffic services purposes.

(2) Where a Required Communication Performance specification has been prescribed by the Authority for performance-based communication, Air Traffic Services units shall, in addition to the requirements specified in subregulation (1), have communication equipment which will enable them to provide Air Traffic Services in accordance with the prescribed Required Communication Performance specifications.

(3) When direct pilot-controller two-way radiotelephony or data link communications are used for the provision of air traffic control service, recording facilities shall be provided on all such air-ground communication channels.

(4) Recordings of communications channels as required in subregulation (3) shall be retained for a period of at least thirty days.

(5) Air-ground communication facilities shall enable twoway communications to take place between a unit providing flight information service and appropriately equipped aircraft flying anywhere within the Nairobi Flight Information region.

(5) Air-ground communication facilities for flight information service shall permit direct, rapid, continuous and static-free two-way communications whenever practicable.

(6) Air-ground communication facilities shall enable twoway communications to take place between a unit providing area control service and appropriately equipped aircraft flying anywhere within the control areas.

(7) Air-ground communication facilities for area control service shall permit direct, rapid, continuous and static-free two-way communications whenever practicable.

(9) Where air-ground voice communication channels are used for area control service and are worked by air-ground communicators, suitable arrangements shall be made to permit direct pilot-controller voice communications, as and when required.

(10) Air-ground communication facilities shall enable direct, rapid, continuous and static-free two-way communications to take place between the unit providing approach control service and appropriately equipped aircraft under its control.

(11) Where the unit providing approach control service functions as a separate unit, air-ground communications shall be conducted over communication channels provided for its exclusive use.

(12) Air-ground communication facilities shall enable direct, rapid, continuous and static-free two-way communications to take place between an aerodrome control tower and appropriately equipped aircraft operating at any distance within 45 km (25 NM) of the aerodrome concerned.

(13) Separate communication channels shall be provided for the control of traffic operating on the maneuvering area where conditions warrant.

AERONAUTICAL FIXED SERVICE (GROUND-GROUND COMMUNICATIONS)

78. General application of Aeronautical fixed service (ground-ground communications)

Direct-speech or data link communications shall be used in General ground-ground communications for air traffic services purposes.

COMMUNICATIONS WITHIN A FLIGHT INFORMATION REGION

79. Communications between air traffic services

(1) A flight information centre shall have facilities for communications with the following units providing a service within its area of responsibility—

(a) the area control centre, unless collocated;

(b) approach control units;

(c) aerodrome control towers.

(2) An area control centre, in addition to being connected to the flight information centre as prescribed in subregulation (1), shall have facilities for communications with the following units providing a service within its area of responsibility—

(a) approach control units;

(b) aerodrome control towers;

(c) air traffic services reporting offices, when separately established.

(3) An approach control unit, in addition to being connected to the flight information centre and the area control centre as prescribed in subregulations (1) and (2) shall have facilities for communications with the associated aerodrome control tower(s) and, when separately established, the associated air traffic services reporting office.

(4) An aerodrome control tower, in addition to being connected to the flight information centre, the area control centre and the approach control unit as prescribed in subregulations (1),(2) and (3) shall have facilities for communications with the associated air traffic services reporting office, when separately established.

80. Communications between air traffic services units and other units

(1) A flight information centre and an area control centre shall have facilities for communications with the following units providing a service within their respective area of responsibility—

(a) appropriate military units;

(b) the meteorological office serving the centre;

(c) the aeronautical telecommunications station serving the centre;

(d) appropriate operator's offices;

(e) the rescue coordination centre or, in the absence of such centre, any other appropriate emergency service;

(f) the international NOTAM office serving the centre.

(2) An approach control unit and an aerodrome control tower shall have facilities for communications with the following units providing a service within their respective area of responsibility—

(a) appropriate military units;

(b) rescue and emergency services (including ambulance, fire, etc.);

(c) the meteorological office serving the unit concerned;

(d) the aeronautical telecommunications station serving the unit concerned;

(e) the unit providing apron management service, when separately established.

(3) The communication facilities required in subregulation 1(a) and (2)(a) shall include provisions for rapid and reliable communications between the air traffic services unit concerned and the military unit(s) responsible for control of interception operations within the area of responsibility of the air traffic services unit.

81. Description of communication facilities

(1) The communication facilities required under regulation Description of regulation 80(1)(a) and regulation 80(2)(a)(b) and (c) shall communication include provisions for—

(a) communications by direct speech alone, or in combination with data link communications, whereby for the purpose of transfer of control using radar or Automatic Dependent Surveillance-Broadcast, the communications can be established instantaneously and for other purposes the communications can normally be established within fifteen seconds; and

(b) printed communications, when a written record is required; the message transit time for such communications being no longer than five minutes.

(2) The communication facilities in all cases not covered by subregulation (1), shall include provisions for—

(a) communications by direct speech alone, or in combination with data link communications, whereby the communications can normally be established within fifteen seconds; and

(b) printed communications, when a written record is required; the message transit time for such communications being no longer than five minutes.

(3) Air Traffic Service units shall provide suitable facilities for automatic recording in all cases where automatic transfer of data to or from air traffic services computers is required.

(4) The communication facilities required in accordance with regulations 79 and 80 shall be supplemented, as and where necessary, by facilities for other forms of visual or audio communications.

(5) The communication facilities required under regulation 80(a), (b) and (c) shall include provisions for communications by direct speech arranged for conference communications.

(6) The communication facilities required under regulation 80(2)(d) shall include provisions for communications by direct speech arranged for conference communications, whereby the communications can normally be established within fifteen seconds.

(7) All facilities for direct-speech or data link communications between air traffic services units and between air traffic services units and other units described under regulations 80(1) and (2) shall be provided with automatic recording.

(8) Recordings of data and communications as required in subregulations (3) and (7) shall be retained for a period of at least thirty days.

82. Communications between flight information flight information regions

(1) Flight information centres and area control centres shall Communications have facilities for communications with all adjacent flight information between flight centres and area control centres.

(2) The communication facilities referred to in subregulation(I) shall in all cases include provisions for messages in a form suitable for retention as a permanent record, and delivery in accordance with transit times specified by regional air navigation agreements.

(3) Unless otherwise prescribed on the basis of regional air navigation agreements, facilities for communications between area control centres serving contiguous control areas shall include provisions for direct speech and, where applicable, data link communications, with automatic recording, whereby for the purpose of transfer of control using radar, Automatic Dependent Surveillance-Broadcast or Automatic Dependent Surveillance-Contract data, the communications can be established instantaneously and for other purposes the communications can normally be established within fifteen seconds.

(4) When so required by agreement between the Authorities concerned in order to eliminate or reduce the need for interceptions in the event of deviations from assigned track, facilities for communications between adjacent flight information centres or area control centres other than those mentioned in subregulation (3) shall include provisions for direct speech alone, or in combination with data link communications.

(5) The communication facilities referred to in subregulation (4) shall be provided with automatic recording.

(6) The communication facilities in subregulation (4) shall permit communications to be established normally within fifteen seconds.

(7) Wherever local conditions are such that it is necessary to clear aircraft into an adjacent control area prior to departure, an approach control unit or aerodrome control tower shall be connected with the area control centre serving the adjacent area.

(8) The communication facilities in subregulation (7) shall include provisions for communications by direct speech alone, or in combination with data link communications, with automatic recording, whereby for the purpose of transfer of control using radar, Automatic Dependent Surveillance -Broadcast or Automatic Dependent Surveillance-Contract data, the communications can be established instantaneously and for other purposes the communications can normally be established within fifteen seconds.

(9) Suitable facilities for automatic recording shall be provided in all cases where automatic exchange of data between air traffic services computers is required.

(10) Recordings of data and communications as required in subregulation (9) shall be retained for a period of at least thirty days.

83. Procedures for direct-speech communication

Appropriate procedures for direct speech communications for shall be developed to permit immediate connections to be made for directspeech very urgent calls concerning the safety of aircraft, and the interruption, if necessary, of less urgent calls in progress at the time.

84. Communications for the control of vehicles other than aircraft on maneuvering areas controlled aerodromes

(1) Air Traffic Services shall provide Aerodrome control service with two-way radiotelephony communication facilities for the for the control of vehicles other control of vehicles on the manoeuvring area, except where than aircraft on communication by a system of visual signals is deemed to be adequate.

(2) Separate communication channels shall be provided for the control of vehicles on the manoeuvring area where conditions warrant

(3) Automatic recording facilities shall be provided on all separate communication channels provided for the control of vehicles on the manoeuvring area.

(4) Recordings of communications as required in subregulation shall be retained for a period of at least thirty days.

85. Recording and storage of aeronautical data

(1) Surveillance data from primary and secondary radar Recording and equipment or other systems used as an aid to air traffic services, in storage of addition to other aeronautical data, shall automatically or through other appropriate means be recorded and stored for use in accident and incident investigations, search and rescue, air traffic control and surveillance systems evaluation and training.

(2) Subject to subregulation (I), stored aeronautical data and automatic surveillance recordings shall be retained for a period of at least thirty days.

(3) Aeronautical Data/Recordings pertinent to accident and incident investigations shall be retained for longer periods until it is evident that they will no longer be required.

PART VII – AIR TRAFFIC SERVICES REQUIREMENTS FOR INFORMATION

86. General meteorological information

(1) Air traffic services units shall be supplied with up-to-date General information on existing and forecast meteorological conditions as meteorological necessary for the performance of their respective functions.

(2) The information referred to in subregulation (I) shall be supplied in such a form as to require a minimum of interpretation on the part of air traffic services personnel and with a frequency which satisfies the requirements of the air traffic services units concerned.

(3) Air traffic services units shall be supplied with available detailed information on the location, vertical extent, direction and rate of movement of meteorological phenomena in the vicinity of the aerodrome, and particularly in the climb-out and approach areas, which could be hazardous to aircraft operations.

(4) When computer-processed upper air data are made available to air traffic services units in digital form for use by air traffic services computers, the contents, format and transmission arrangements shall be as agreed between the Meteorological Department and the appropriate air traffic services Authority.

87. Flight information centres and area control centres

(1) Flight information centres and area control centres shall Flight be supplied with meteorological information as described in the ninth information schedule of the Civil Aviation (Meteorology Services for Air Navigation) Regulations 2018, with emphasis being given to the occurrence or expected occurrence of weather deterioration as soon as this can be determined.

(2) The reports and forecasts referred to in subregulation (1) shall cover the flight information region or control area and such other areas as may be determined on the basis of regional air navigation agreements.

(3) Flight information centres and area control centres shall be provided, at suitable intervals, with current pressure data for setting altimeters, for locations specified by the flight information centre or area control centre concerned.

88. Unit providing Approach Control Service

(1) Units providing approach control service shall be Units providing supplied with meteorological information as described in the Ninth Approach Schedule of the Civil Aviation (Meteorology Services for Air Navigation) Regulations 2018, for the airspace and the aerodromes with which they are concerned.

(2) Special reports and amendments to forecasts shall be communicated to the units providing approach control service as soon as they are necessary in accordance with established criteria, without waiting for the next routine report or forecast.

(3) Where multiple anemometers are used, the indicators to which they are related shall be clearly marked to identify the runway and section of the runway monitored by each anemometer.

(4) Units providing approach control service shall be provided with current pressure data for setting altimeters for locations specified by the unit providing approach control service.

(5) Units providing approach control service for final approach, landing and take-off shall be equipped with surface wind display.

(6) The display referred to in subregulation (5) shall be related to the same location of observation and be fed from the same sensor as the corresponding display in the aerodrome control tower and in the meteorological station, where such a station exists.

(7) Units providing approach control service for final approach, landing and take-off at aerodromes where runway visual range values are assessed by instrumental means shall be equipped with displays permitting read-out of the current runway visual range values.

(8) The displays referred to in subregulation (7) shall be related to the same locations of observation and be fed from the same sensors as the corresponding displays in the aerodrome control tower and in the meteorological station, where such a station exists.

(9) Units providing approach control service for final approach, landing and take-off at aerodromes where the height of cloud base is assessed by instrumental means shall be equipped with displays permitting read-out of the current values of the height of cloud base.

(10) The displays referred to in subregulation (9) shall be related to the same locations of observation and be fed from the same sensors as the corresponding displays in the aerodrome control tower and in the meteorological station, where such a station exists.

(11) Units providing approach control service for final approach, landing and take-off shall be supplied with information on wind shear which could adversely affect aircraft on the approach or take-off paths or during circling approach.

89. Aerodrome control towers

(1) The meteorological service provider shall supply Aerodrome aerodrome control towers with meteorological information as described in the Ninth Schedule of the Civil Aviation (Meteorology Services for Air Navigation) Regulations 2018, for the aerodrome with which they are concerned.

(2) The meteorological service provider shall communicate special reports and amendments to forecasts to the aerodrome control towers as soon as they are necessary in accordance with established criteria, without waiting for the next routine report or forecast.

(3) The meteorological service provider shall provide aerodrome control towers with current pressure data for setting altimeters for the aerodrome concerned.

(4) Aerodrome control towers shall be equipped with surface wind displays.

(5) The surface wind display(s) shall be related to the same location(s) of observation and be fed from the same sensor(s) as the corresponding display(s) in the meteorological station, where such a station exists.

(6) Where multiple sensors are used, the surface wind displays to which they are related shall be clearly marked to identify the runway and section of the runway monitored by each sensor.

(7) Aerodrome control towers at aerodromes where runway visual range values are measured by instrumental means shall be equipped with displays permitting read-out of the current runway visual range values.

(8) The displays referred to in subregulation (7) shall be related to the same locations of observation and be fed from the same sensors as the corresponding displays in the meteorological station, where such a station exists.

(9) Aerodrome control towers at aerodromes where the height of cloud base is assessed by instrumental means shall be equipped with displays permitting read-out of the current values of the height of cloud base.

(10) The displays shall be related to the same locations of observations and be fed from the same sensors as the corresponding displays in the meteorological station, where such a station exists.

(11) Aerodrome control towers shall be supplied with information on wind shear which could adversely affect aircraft on the approach or take-off paths or during circling approach and aircraft on the runway during the landing roll or take-off run.

(12) Aerodrome control towers or other appropriate units shall be supplied with aerodrome warnings.

90. Communication stations

Current meteorological reports and forecasts shall be supplied Communication to communication stations for flight information purposes and a copy stations.

91. Information on aerodrome conditions and the operational status of associated facilities

Aerodrome control towers and units providing approach control service shall be kept currently informed of the operationally significant conditions of the movement area, including the existence of temporary hazards, and the operational status of any associated facilities at the aerodrome(s) with which they are concerned.

92. Information on the operation status of navigation services

(1) Air Traffic Services units shall be kept currently informed of the operational status of radio navigation services and visual aids essential for take-off, departure, approach and landing procedures within their area of responsibility and those radio navigation services and visual aids essential for surface movement.

(2) Information on the operational status, and any changes thereto, of radio navigation services and visual aids as referred to in subregulation (1) shall be received by the appropriate Air Traffic Services units on a timely basis consistent with the use of the services and aids involved.

93. Information on unmanned free ballons

Operators of unmanned free balloons shall keep the Information on appropriate air traffic services units informed of details of flights of unmanned free unmanned free balloons in accordance with the provisions contained in the Civil Aviation (Rules of the Air) Regulations 2018.

94. Information concerning volcanic activity

(1) Air Traffic Services units shall be informed of pre- Information eruption volcanic activity, volcanic eruptions and volcanic ash cloud concerning which could affect air space used by flights within their area of volcanic activity responsibility.

(2) Area control centres and flight information centres shall be provided with volcanic ash advisory information issued by the associated Volcanic Ash Advisory Centres.

95. Information concerning radioactive materials and toxic chemicals "clouds"

Air Traffic Services units shall be informed of the release into the atmosphere of radioactive materials or toxic chemicals which could affect airspace used by flights within their area of responsibility.

96. Requirements for application for exemption

(1) A person may apply to the Authority for an exemption from any provision of these Regulations.

(2) Unless incase of an emergency, a person requiring exemptions from these Regulations shall make an application to the Authority at least sixty days prior to the proposed effective date, giving the following information—

(a) name and contact address including electronic mail and fax, if any;

(b) telephone number;

(c) a citation of the specific requirement from which the applicant seeks exemption;

(d) justification for the exemption;

(e) a description of the type of operations to be conducted under the proposed exemption;

(f) the proposed duration of the exemption;

(g) an explanation of how the exemption would be in the public interest;

(h) a detailed description of the alternative means by which the applicant will ensure a level of safety equivalent to that established by the regulation in question;

(i) a safety risk assessment carried out in respect of the exemption applied for;

(j) if the applicant handles international operations and seeks to operate under the proposed exemption, an indication whether the exemption would contravene any provision of the Standards and Recommended Practices of the International Civil Aviatioii Organization;

(k) and any other information that the Authority may require.

(3) Where the applicant seeks emergency processing of an application for exemption, the application shall contain supporting facts and reasons for not filing the application within the time specified in sub regulation (2) and satisfactory reason for deeming the application an emergency.

(4) The Authority may, in writing, refuse an application made under sub regulation (3), where in the opinion of the Authority, the reasons given for emergency processing are not satisfactory.

(5) The application for exemption shall be accompanied by the fee prescribed by the Authority.

97. Review and publication

(1) The Authority shall review the application for exemption Review and made under regulation 96 for accuracy and compliance and if the publication.is satisfactory, publish a detailed summary of the application for comments, within the prescribed time, in either—

(a) the Kenya Gazette;

(b) aeronautical information circular; or

(c) a daily newspaper with national circulation.

(2) Where application requirements have not been fully complied with, the Authority shall request the applicant, in writing, to comply prior to publication or making a decision under regulation 96 (3).

98. Evaluation of the request for exemption

(1) Where the application requirements have been satisfied, Evaluation of the the Authority shall conduct an evaluation of the request to include—

(a) determination of whether an exemption would be in the public interest;

(b) a determination, after a technical evaluation of whether the applicant's proposal would provide a level of safety equivalent to that established by the regulation, although where the Authority decides that a technical evaluation of the request would impose a significant burden on the Authority's technical resources, the Authority may deny the exemption on that basis;

(c) a determination of whether a grant of the exemption would contravene these Regulations; and

(d) a recommendation based on the preceding elements, of whether the request should be granted or denied, and of any conditions or limitations that should be part of the exemption.

(2) The Authority shall notify the applicant in writing, the decision to grant or deny the request and publish a detailed summary of its evaluation and decision.

(3) The summary referred to in subregulation (2) shall specify the duration of the exemption and any conditions or limitations of the exemption.

(4) If the request is for emergency relief, the Authority shall publish the decision after processing the application.

(5) If the exemption affects a significant population of the aviation community of the State, the Authority shall publish the summary in aeronautical information circular.

PART IX – MISCELLANEOUS PROVISIONS

99. Contravention of Regulations

The Authority may suspend or revoke the licence, Contravention of certificate, approval, authorisation, exemption or other document of a Regulations.

100. Appeals to the Tribunal

A person aggrieved with the decision of the Authority under Appeals to the these Regulations may within twenty one days of such decision appeal Tribunal.

101. Offences

(1) A person who contravenes any provision of these Regulations shall upon conviction be liable to a fine not exceeding one million shillings or to imprisonment for a term not more than six months or to both.

(2) If it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these Regulations, orders, notices or proclamations made there under was due to any cause not avoidable by the exercise of reasonable care by that person, the act or omission shall he deemed not to be a contravention by that person of that provision.

102. Transitional provisions

(1) A license, certificate, approval or any other document Transitional issued to an operator or person prior to the commencement of these Regulations shall continue in force as if it was issued under these Regulations until it expires, varied or cancelled by the Authority.

(2) Notwithstanding any other provision of these Regulations, a person who at the commencement of these Regulations, is carrying out any act, duty or operation affected by these Regulations shall, within one year from the date of commencement, or within such longer time that the Cabinet Secretary may, by notice in the Gazette prescribe, comply with the requirements of these Regulations or cease to carry out such act, duty or operation.

FIRST SCHEDULE

AIR TRAFFIC SERVICES AIRSPACE CLASSES-
SERVICES PROVIDED AND FLIGHT REQUIREMENTS

[Regulation 10(1)]

Class	Type of Flight	Separation provided	Service provided	speed limitation	Radio Communication requirement	Subject to an ATC clearance
A	IFR only	All aircraft	Air traffic control service	Not applicable	Continuous two way	Yes

B	IFR	All aircraft	Air traffic control service	Not applicable	Continuous two way	Yes
	VFR	All aircraft	Air traffic control service	Not applicable	Continuous two way	Yes
C	IFR	VFR from IFR	1)Air traffic control service for separation from IFR	Not applicable	Continuous two way	Yes
	VFR	VRF from IFR	2) VFR/ VFR traffic information (and traffic avoidance advice on request	250 kt IAS below 3050 m (10 000ft) AMSL	Continuous two way	Yes
D	IFR	IFR from IFR	Air traffic control service, traffic information about VFR flights (and traffic avoidance on request)	250 kt IAS below 3050 m (10 000ft) AMSL	Continuous two way	Yes
	VFR	Nil	IFR/VFR and VFR/ VFR traffic Information and traffic avoidance advice on request	250 kt IAS below 3050 m (10 000ft) AMSL	Continuous two way	Yes
E	IFR	IFR from IFR	Air traffic control service and as far as practical traffic information about VFR flights	250 kt IAS below 3050 m (10 000ft) AMSL	Continuous two way	Yes
	VFR	nil	Traffic information as far as practical	250 kt IAS below 3050 m	No	No

				(10 000ft) AMSL		
F	IFR	IFR from IFR as far as practical	Air traffic advisory service, flight information service flight information service	250 kt IAS below 3050 m (10 000ft) AMSL	Continuous two way	No
	VFR	Nil	flight information service	250 kt IAS below 3050 m (10 000ft) AMSL	No	No
	IFR	Nil	flight information service	250 kt IAS below 3050 m (10 000ft) AMSL	Continuous two way	No
G	VFR	Nil	flight information service	250 kt IAS below 3050 m (10 000ft) AMSL	No	No

When the height of the transition altitude is lower than 3 050 m 10 003 It) AMSL FL 103 should be used in lieu of 100005

SECOND SCHEDULE

PRINCIPLES GOVERNING THE IDENTIFICATION OF NAVIGATION SPECIFICATIONS AND THE IDENTIFICATION OF ATS ROUTES OTHER THAN STANDARD DEPARTURE AND ARRIVAL ROUTES

[Regulation 19(5)]

1. Designators for ATS routes and navigation specifications.

1.1 The purpose of a system of route designators and navigation specifications applicable to specified ATS route segments, routes or area is to allow both pilots and ATS, taking into account automation requirements—

(a) to make unambiguous reference to anyATS route without the need to resort to the use of geographical coordinates or other means in order to describe it;

(b) to relate an ATS route to a specific vertical structure of the airspace, as applicable;

(c) to indicate a required level of navigation performance accuracy, when operating along an ATS route or within a specified area; and

(d) to indicate that a route is used primarily or exclusively by certain types of aircraft.

Note I— Specifications governing the publication of navigation specifications are given in the Civil Aviation (Aeronautical Charts) Regulations 2017, the Civil Aviation

(Aeronautical Information Services) Regulations 2017

Note 2 - In relation to this part and for flight planning purposes, a prescribed navigation specification is not considered an integral part of the ATS route designator.

1.2 In order to meet this purpose, the designation system shall—

(a) permit the identification of any ATS route in a simple and unique manner;

(b) avoid redundancy;

(c) be usable by both ground and airborne automation systems;

(d) permit utmost brevity in operational use; and

(e) provide sufficient possibility of extension to cater for any future requirements without the need for fundamental changes.

1.3 Controlled, advisory and uncontrolled ATS routes, with the exception of standard arrival and departure routes, shall therefore be identified as specified hereafter.

2. Composition of designator

2.1 The ATS route designator shall consist of a basic designator supplemented, if necessary, by—

(a) one prefix as prescribed in 2.3; and

(b) one additional letter as prescribed in2.4.

2.1.1 The number of characters required to compose the designator shall not exceed six characters.

2.12 The number of characters required to compose the designator should, possible, be kept to a maximum of five characters.

2.2 The basic designator shall consist of one letter of the alphabet followed by a number from I to 999.

2.2.1 Selection of the letter shall be made from those listed hereunder—

(a) A ,B ,G R for routes which form part of the regional networks of ATS routes and are not area navigation routes;

(b) L,M ,N ,P for area navigation routes which form part of the regional networks of ATS routes;

(c) H, J, V. W for routes which do not form part of the regional networks of ATS routes and are not area navigation routes;

(d) Q, T, Y, Z for area navigation routes which do not form part of the regional networks of ATS routes.

2.3 Where applicable, one supplementary letter shall be added as a prefix to the basic designator in accordance with the following—

(a) K to indicate a low-level route established for use primarily by helicopters;

(b) U to indicate that the route or portion thereof is established in the upper airspace;

(c) S to indicate a route established exclusively for use by supersonic aircraft during acceleration, deceleration and while in supersonic flight.

2.4 When prescribed by the appropriate ANSP or on the basis of regional a navigation agreements, a supplementary letter may be added after the basic designator air the ATS route in question in order to indicate the type of service provided in accordanc with thefollowirig—

(a) the letter F to indicate that on the route or portion thereof advisory service only is provided;

(b) the letter G to indicate that on the route or portion thereof flight information service only is provided.

Note 1. - Due to limitations in the display equipment on board aircraft, the supplementary letters "F" or "G" may not be displayed to the pilot.

Note 2. - Implementation of a route or a portion thereof as controlled route, advisory route or flight information route is indicated in aeronautical charts and aeronautical information publications in accordance with the provisions in these Regulations.

3. Assignment of basic designators

3.1 Basic ATS route designators shall be assigned in accordance with the following principles.

3.1.1 The same basic designator shall be assigned to a main trunk route throughout it entire length, irrespective of terminal control areas, States or regions traversed.

Note. - This is of particular importance where automated ATS data processing and computerized airborne navigation equipment is used.

3.1.2 Where two or more trunk routes have a common segment, the segment in question shall be assigned each of the designators of the routes concerned, except where this would present difficulties in the provision of air traffic service, in which case, by common agreement, one designator only shall be assigned.

3.1.3 A basic designator assigned to one route shall not be assigned to any other route

3.1.4 States' requirements for designators shall be notified to the Regional Offices of ICAO for coordination.

4. Use of designators in communications

4.1 In printed communications, the designator shall be expressed at all times by not less than two and not more than six characters.

4.2 In voice communications, the basic letter of a designator shall be spoken in accordance with the ICAO spelling alphabet.

4.3 Where the prefixes K,U or S specified 2 .3 are used, they shall, invoice communications, be spoken as follows—

K - KOPTER U - UPPER

S - SUPERSONIC

The word "kopter" shall be pronounced as in the word helicopter" and the words "upper" and "supersonic" as in the English language.

4.4 Where the letters "F" or "G" specified in 2.4 are used, the flight crew should not be required to use them in voice communications.

THIRD SCHEDULE

PRINCIPLES GOVERNING THE IDENTIFICATION OF STANDARD DEPARTURE AND ARRIVAL ROUTES AND ASSOCIATED PROCEDURES

[Regulation I 9(6)]

1. Designators for standard departure and arrival routes and associated procedures

Note. —In the following text the term "route" is used in the meaning of "route and associated procedures".

1.1 The system of designators shall—

(a) permit the identification of each route in a simple and unambiguous manner;

(b) make a clear distinction between—

(i) departure routes and arrival routes;

(ii) departure or arrival routes and other ATS routes;

(iii) routes requiring navigation by reference to ground based radio aids or self-contained airborne aids, and routes requiring navigation by visual reference to the ground;

(c) be compatible with ATS and aircraft data processing and display requirements;

(d) be of utmost brevity in its operational application;

(e) avoid redundancy;

(f) provide sufficient possibility for extension to cater for any future requirements without the need for fundamental changes.

1.2 Each route shall be identified by a plain language designator and a corresponding coded designator.

1.3 The designators shall, in voice communications, be easily recognizable as relating to a standard departure or arrival route and shall not create any difficulties in pronunciation for pilots and ATS personnel.

2. Composition of designators

2.1 Plain language designator

2.1.1 The plain language designator of a standard departure or arrival route shall consist of—

(a) a basic indicator; followed by

(b) a validity indicator; followed by

(c) a route indicator, where required; followed by

(d) the word "departure" or "arrival"; followed by

(e) the word "visual", if the route has been established for use by aircraft operating in accordance with the visual flight rules(VFR).

2.1.2 The basic indicator shall be the name or name-code of the significant point where a standard departure route terminates or a standard arrival route begins.

2.1.3 The validity indicator shall be a number from 1 to 9.

2.1.4 The route indicator shall be one letter of the alphabet. The letters "I" and "0" shall not be used.

2.2 Coded designator

The coded designator of a standard departure or arrival route, instrument or visual, shall consist of—

(a) the coded designator or name-code of the significant point described in (2.1.1 a) ; followed by

(b) the validity indicator in (2.1.1 b);

(c) followed by the route indicator in (2.1.1 c), where required.

Note. - Limitations in the display equipment on board aircraft may require shortening oft/ ic basic indicator, if that indicator is a five-letter name-code, e.g.

KODAP. The mnannerin which such an indicator is shortened is left to the discretion of operators.

3. Assignment of designators

3.1 Each route shall be assigned a separate designator.

3.2 To distinguish between two or more routes which relate to the same significant point (and therefore are assigned the same basic indicator), a separate route indicator as described in 2.1.4 shall be assigned to each route.

4. Assignment of validity indicators

4.1 A validity indicator shall be assigned to each route to identify the route which is currently in effect.

4.2 The first validity indicator to be assigned shall be the number "1".

4.3 Whenever a route is amended, a new validity indicator, consisting of the next higher number, shall be assigned. The number "9" shall be followed by the number "I"

5. Examples of plain language and coded designators

5.1 Example 1: Standard departure route —instrument—

(a) Plain language BRECONONEdesignator:DEPARTURE

(b) Coded designator: BCN I

5.1 .1 *Meaning*: The designator identifies a standard instrument departure route which terminates at the significant point BRECON (basic indicator). BRECON is a radio navigation

5.2 *Example 2:* Standard arrival route —instrument:

(a) Plain language: KODAPTWOALPHA designator: ARRIVAL

(b) Coded designator: KODAP 2A

5.2.1 *Meaning*: This designator identifies a standard instrument arrival route which begins at the significant point KODAP (basic indicator). KODAP is a significant point not marked by the site of a radio navigation facility and therefore assigned a five-letter name-code in accordance withAppendix 2. The validity indicator TWO (2) signifies that a change has been made from the previous version ONE (I)to the now (2).The route indicator ALPHA identifies one of several routes established with reference to KODAP and is a specific character assigned to this route.

5.3 *Example 3:* Standard departure route —visual:

(a) Plain language: ADOLAFIVEBRAVO Designator: DEPARTURE VISUAL

(b) Coded designator: ADOLA SB

5.3 .1 *Meaning*: This designator identifies a standard departure route for controlled VFR flights which terminates at ADOLA, a significant point not marked by the site of a radio navigation facility. The validity indicator FIVE (5) signifies that a change has been made from the previous version FOUR (4) to the now effective version FIVE(S).

The route indicator BRAVO

(A) identifies one of several routes established with reference to ADOLA.

6. Composition of designators for MLS/RNAV approach procedures

6.1 Plain language designator

6.1.1 The plain language designator of an MLS/RNAV approach procedure shall consist of—

(a) "MLS"; followed by

(b) a basic indicator; followed by

(c) a validity indicator; followed by

(d) a route indicator; followed by

(e) the word"approach"; followed by

(f) the designator of the runway for which the procedure is designed.

6.1.2 The basic indicator shall be the name or name-code of the significant point where the approach procedure begins.

6.1.3 The validity indicator shall be a number from I to 9.

6.1.4 The route indicator shall be one letter of the alphabet. The letters "I" and "0" shall not be used.

6.1.5 The designator of the runway shall be in accordance with the Civil Aviation (Aerodromes Designs and Operations) Regulations, as amended

6.2 Coded designator

6.2.1 The coded designator of an MLS/RNAV approach procedure shall consist of

(a) "MLS"; followed by

(b) the coded designator or name-code of the significant point described in 6.1.1 b);followed by

(c) the validity indicator in 6.1.1 c); followed by

(d) the route indicator in 6.1.1 d); followed by

(e) the runway designator in 6.1.lf).

6.3 Assignment of designators

6.3.1 The assignment of designators for MLS!RNAV approach procedures shall be in accordance with paragraph 3. Procedures having identical tracks but different flight profiles shall be assigned separate route indicators.

6.3.2 The route indicator letter for MLS/RNAV approach procedures shall be assigned uniquely to all approaches at an airport until all the letters have been used. Only then shall the route indicator letter be repeated. The use of the same route indicator for two routes usingthe same MLS ground facility shall not be permitted.

6.3.3 The assignment of validity indicator for approach procedures shall be in accordance with paragraph 4.

6.4 Example of plain language and coded designators

6.4.1 *Example:*

(a) Plain language MLS HAPPYONEALPHA designator:APPROACHRUN WAY

(b) Coded designator: MLS HAPPY 1 AI8L

Meaning: The designator identifies an MLS/RNAV approach procedure which begins at the significant point HAPPY (basic indicator). HAPPY is a significant point not marked by the site of a radio navigation facility and therefore assigned a five-letter name-code in accordance with Appendix 2. The validity indicator ONE (I) signifies that either the original version of the route is still in effect or a change has been made from the previous version NINE to the now effective version ONE (I). The route indicator ALPHA (A) identifies one of several routes established with reference to HAPPY and is a specific character assigned to this route.

7. Use of designators in communications

7.1 In voice communications, only the plain language designator shall be used.

Note— For the purpose of identification of routes, the words "departure", "arrival" and "visual" described in 2.1.1 d) and 2.1.1 e) are considered to be an integral elementof the plain language designator.

7.2 In printed or coded communications, only the coded designator shall be used.

8. Display of routes and procedures to air traffic control

8.1 A detailed description of each currently effective standard departure or arrival route or approach procedure, including the plain language designator and the coded designator, shall be displayed at the working positions at which the routes or procedures are assigned to aircraft as part of an ATC clearance, or are otherwise of relevance in the provision of air traffic control services.

8.2 Whenever possible, a graphic portrayal of the routes/ procedures shall also be displayed.

FOURTH SCHEDULE

PRINCIPLES GOVERNING THE ESTABLISHMENT
AND IDENTIFICATION OF SIGNIFICANT POINTS

[Regulation 21(3)]

1. Establishment of significant points

1.1 Significant points should, whenever possible, be established with reference to groundbased or space-based radio navigation aids, preferably VHF or higher frequency aids.

1.2 Where such ground-based or space-based radio navigation aids do not exist, significant points shall be established at locations which can be determined by self-contained airborne navigation aids, or, where navigation by visual reference to the ground is to be effected, by visual observation. Specific points may be designated as "transfer of control" points by agreement between adjacent air traffic control units or control positions concerned.

2. Designators for significant points marked by the site of a radio navigation aid

2.1 Plain language name for significant points marked by the site of a radio navigation aid.

2.1.1 Whenever practicable, significant points shall be named with reference to an identifiable and preferably prominent geographical location.

2.1.2 In selecting a name for the significant point, care shall be taken to ensure that the following conditions are met—

(a) the name shall not create difficulties in pronunciation for pilots or ATS personnel when speaking in the language used in ATS communications. Where the name of a geographical location in the national language selected for designating a significant point gives rise to difficulties in pronunciation, an abbreviated or contracted version of this name, which retains as much of its geographical significance as possible, shall be selected;

Example: FUERSTENFELDBRUCK = FURSTY

(b) the name shall be easily recognizable in voice communications and shall be free of ambiguity with those of other significant points in the same general area .Inaddition ,the name shall not create confusion with respect to other communications exchanged between air traffic services and pilots;

(c) the name should, if possible, consist of at least six letters and form two syllables and preferably not more than three;

(d) the selected name shall be the same for both the significant point and the radio navigation aid marking it.

2.2 Composition of coded designators for significant points marked by the site of a radio navigation aid.

2.2.1 The coded designator shall be the same as the radio identification of the radio navigation aid. It shall be so composed, if possible, as to facilitate association with the name of the point in plain language.

2.2.2 Coded designators shall not be duplicated within 1 100 km (600 NM) of the location of the radio navigation aid concerned, except as noted hereunder.

Note. - When two radio navigation aids operating in different bands of the frequency spectrum are situated at the same location, their radio identi:fications are normally the same.

2.3 States' requirements for coded designators shall be notified to the Regional Offices of ICAO for coordination.

3. Designators for significant points not marked by the site of a radio navigation aid

3.1 Where a significant point is required at a position not marked by the site of a radio navigation aid, and is used for ATC purposes, it shall be designated by a unique five- letter pronounceable "name-code "This name-code designator then serves as the name as well as the coded designator of the significant point.

Note. - The principles governing the use of alphanumeric name-codes in support of RNAV SIDs, STARs and instrument approach procedures are detailed in the Civil Aviation (Construction of Visual and instrument Flight Procedures) Regulations as amended

3.2 The name-code designator shall be selected so as to avoid any difficulties in pronunciation by pilots or ATS personnel when speaking in the language used in ATS communications

Examples: ADOLA, KODAP

3.3 The name-code designator shall be easily recognizable invoice communications and shall be free of ambiguity with those used for other significant points in the same general area.

3.4 The unique five-letter pronounceable name- code designator assigned to a significant point shall not be assigned to any other significant point. When there is a need to relocate a significant point, a new name-code designator shall be chosen. In cases when a State wishes to keep the allocation of specific name-codes for reuse at a different location, such name-codes shall not be used until after a period of at least six months.

3.5 States' requirements for unique five-letter pronounceable name-code designators shall be notified to the Regional Offices of ICAO for coordination.

3.6 In areas where no system of fixed routes is established or where the routes followed by aircraft vary depending on operational considerations, significant points shall be determined and reported in terms of World Geodetic System-1984(WGS-84.)geographical coordinates, except that permanently established significant points serving as exit and/or entry points into such areas shall be designated in accordance with the applicable provisions in 2 or 3.

4. Use of designators in communications

4.1 Normally the name selected in accordance with 2 or 3 shall be used to refer to the significant point in voice communications. If the plain language name for a significant point marked by the site of a radio navigation aid selected in accordance with2.1 is not used, it shall be replaced by the coded designator which, in voice communications, shall be spoken in accordance with the ICAO spelling alphabet.

4.2 In printed and coded communications, only the coded designator or the selected namecode shall be used to refer to a significant point.

5. Significant points used for reporting purposes

5.1 In order to permit ATS to obtain information regarding the progress of aircraft in flight, selected significant points may need to be designated as reporting points.

5.2 In establishing such points, consideration shall be given to the following factors—

(a) the type of air traffic services provided;

(b) the amount of traffic normally encountered;

(c) the accuracy with which aircraft are capable of adhering to the current flight plan;

(d) the speed of the aircraft;

(e) the separation minima applied;

(f) the complexity of the airspace structure;

(g) the control methods employed;

(h) the start or end of significant phases of a flight (climb, descent, change of direction, etc.);

(i) transfer of control procedures;

(j) safety and search and rescue aspects:

(k) the cockpit and air-ground communication workload.

5.3 Reporting points shall be established either as "compulsory" or as"on-request".

5.4 In establishing "compulsory" reporting points the following principles shall apply—

(a) compulsory reporting points shall be limited to the minimum necessary for the routine provision of information to air traffic services units on the progress of aircraft inflight, bearing in mind the need to keep cockpit and controller work load and air-ground communications load to a minimum;

(b) the availability of a radio navigation aid at a location should not necessarily determine its designation as a compulsory reporting point;

(c) compulsory reporting points should not necessarily be established at flight information region or control area boundaries.

5.5 "On-request" reporting points may be established in relation to the requirements of air traffic services for additional position reports when traffic conditions so demand.

5.6 The designation of compulsory and on- request reporting points shall be reviewed regularly with a view to keeping the requirements for routine position reporting to the minimum necessary to ensure efficient air traffic services.

5.7 Routine reporting over compulsory reporting points should not systematically be made mandatory for all flights in all circumstances. In applying this principle, particular attention shall be given to the following—

(a) high-speed, high- flying air craft should not be required to make routine position reports over all reporting points established as compulsory for low-speed, low-flying aircraft;

(b) aircraft transiting through a terminal control area should not be required to make routine position reports as frequently as arriving and departing aircraft.

5.8 In areas where the above principles regarding the establishment of reporting points would not be practicable, a reporting system with reference to meridians of longitude or parallels of latitude expressed in whole degrees may be established.

FIFTH SCHEDULE

AERONAUTICAL DATA QUALITY REQUIREMENTS

[Regulation 25,27(6)]

Table 1— Latitude and longitude

Note 1. -. Graphical illustrations of obstacle data collection surfaces and criteria used to identi:fy obstacles in the defined areas are illustrated in the Civil Aviation (Aeronautical Information Services) Regulations as amended.

Note 2. - in those portions of Area 2 where flight operations are prohibited due to veryhigh terrain or other local restrictions and/or regulations, obstacle data are to be collected in accordance with the Area I numerical requirements specified in the Civil Aviation (Aeronautical Information Services) Regulations as amended

Table 2. Elevation/altitude/height

Elevation Altitude height	**Accuracy Data type**	**integrity classification**
Threshold crossing height (Reference datum height) precision approach	0.5 m Calculated	critical
Obstacle clearance altitude height (OCA)H)	as specified in PANS-OPS (Doc 8168)	essential
Obstacles in Area 1 (the entire State territtory) elevations	30 m surveyed	routine
Obstacles in Area 2 (the part outside the aerodrome/heliport boundary)	3m surveyed	essential
Distance measuring equipment (DME). elevation	30 m (100 ft) surveyed	essential

Instrument approach procedures altitudes	as specified in PANS-OPS (Doc 8168)	essential
Minimum altitudes	50M claculated	routine

Table 3: Declination and magnetic variation

Decimination variation	**Accuracy Data type**	**Integrity classification**
VHF NAVAID station declination used for Technical line-up	1 degree surveyed	essential
NDB NAVAID magnetic variatION	1 degree surveyed	routine

Table 4. Bearing

Bearing	**Accuracy Data Type**	**Integrity Classification**
Airway segments	110 degree calculated	routine
Bearing used for the formation of an en-route and of a terminal fix	110 degree calculated	routine
Terminal anival departure route segments	110 degree calculated	routine
Bearing used for the formation of an instrument approach procedure fix	110 degree calculated	essential

Table 5. length/distance/dimension

Length distance dimension	**Accuracy Data type**	**Integrity classification**
Airway segments length	1 10km calculated	routine
Distance used for the formation of an en-route fix	1 10km calculated	routine
Terminal arrival departure route segments length	1 10km calculated	essential
Distance used for the formation of a terminal and instrument approach procedure fix	1 10km calculated	essential

SIXTH SCHEDULE

RESPONSIBILITIES BY THE AUTHORITY CONCERNING AN INSTRUMENT FLIGHT PROCEDURE DESIGN SERVICE

1. The Air Traffic Service provider shall—

(a) provide an instrument flight procedure design service;

(b) agree with one or more Air Traffic Service providers to provide a joint service; or

(c) delegate the provision of the service to external agencies.

2. In all cases in paragraph I above, the Authority concerned shall approve and remain responsible for all instrument flight procedures for aerodromes and airspace under its authority.

3. Instrument flight procedures shall be designed in accordance with design criteria approved by the Authority.

4. The Authority shall ensure that an instrument flight procedure design service provider intending to design an instrument flight procedure for aerodromes or airspace under its authority meets the requirements established by Authority's regulatory framework.

Note.—Guidance material for regulatory framework for the oversight of instrument flight procedure design service is contained in the JCAOManual on the Development of a Regulatory Framework for Instrument Flight Procedure Design Service

5. The Authority shall ensure that an instrument flight procedure design service provider utilizes a quality management system at each stage of the instrument flight procedure design process.

Note. - This requirement can be met by means of a qualiti' assurance methodology, such as that described in PANS-uPS (Doc 8168), Volume II, Part I, Section 2, Chapter 4

- Quality Assurance. Guidance for implementing such a methodology is contained in The Quality Assurance Manual for Flight Procedure Design (ICAO Doc 9906).//

6. The Authority shall ensure that maintenance and periodic review of instrument flight procedures for aerodromes and airspace under its authority are conducted.

7. The Authority shall establish an interval for periodic review of instrument flight procedures not exceeding five years.

Note. - Guidance on mnaintenance and periodic review is contained in the Quality Assurance 2040

SEVENTH SCHEDULE

PRESCRIPTIVE FATIGUE MANAGEMENT REGULATIONS

[Regulation 35(2)(a)]

Note. —Guidance on the development and implimentation of prescriptive fatigue management regularions is contained in the Manual for the Oversight of Fatigue Management

Approaches (ICAO Doc9966).

1. The Authority shall establish prescriptive limitation regulations that take into account acute and cumulative fatigue, circadian factors and the type of work being undertaken. These regulations shall identify—

(a) the maximum—

(i) number of hours in any duty period;

(ii) number of consecutive workdays;

(iv) number of hours worked in a defined period; and time-in-position;

(b) the minimum—

(i) duration of non-duty periods;

(ii) number of non-duty days required in a defined period and

(ii) duration of breaks between periods of time-in-position in a duty period.

2. The Authority shall require the air traffic services provider identifies a process for assigning unscheduled duties that allows air traffic controllers to avoid extended periods of being awake.

3. The processes established by the Authority in accordance with *Regulation* 35(5) c) and d) to allow variations from I a) and b) above shall include the provision of—

(a) the reason for the need to deviate;

(b) the extent of the deviation;

(c) the date and time of enactment of the deviation; and

(d) a safety case, outlining mitigations, to support the deviation.

EIGHTH SCHEDULE

[Regulation 35(2)(a)]

Note. - Guidance on the development and implementation of FRMS regulations is contained in the Manual for the Oversight of Fatigue Management Approaches (ICAO Doc 9966).

The Authority shall require that an FRMS contain, at a minimum—

2. FRMS policy and documentation

1.1 FRMS policy

1.1.1 The air traffic services provider shall define its FRMS policy, with all elements of the FRMS clearly identified.

1.1.2 The policy shall—

(a) define the scope of FRMS operations;

(b) reflect the shared responsibility of management, air traffic controllers, and other involved personnel;

(c) clearly state the safety objectives of the FRMS;

(d) be signed by the accountable executive of the organization;

(e) be communicated, with visible endorsement, to all the relevant areas and levels of the organization;

(f) declare management commitment to effective safety reporting;

(g) declare management commitment to the provision of adequate resources for the FRMS;

(h) declare management commitment to continuous improvement of the FRMS;

(i) require that clear lines of accountability for management, air traffic controllers, and all other involved personnel are identified; and

(j) require periodic reviews to ensure it remains relevant and appropriate.

Note. - Effective safert reporting is described in the Safety Management Manual (SMM) (Doc 9859).

1.2 FRMS documentation

An air traffic services provider shall develop and keep current FRMS documentation that describes and records—

(a) FRMS policy and objectives;

(b) FRMS processes and procedures;

(c) accountabilities, responsibilities and authorities for these processes and procedures;

(d) mechanisms for on going involvement of management,air traffic controllers ,an dall other involved personnel;

(e) FRMS training programmes, training requirements and attendance records;

(f) Scheduled and actual duty and non-duty periods and break periods between times in position in a duty period with significant deviations and reasons for deviations noted; and

Note.— Significant deviations are described in the Manual for the Oversight of Fatigue Management Approaches (Doc 9966).

(g) FRMS outputs including findings from collected data, recommendations, and actions taken.

3. Fatigue risk management processes

2.1 identification of fatigue-related hazards

Note.— Provisions on the protection of safety information are contained in the Civil Aviation (Safrtv Management) Regulations as amended.

An air traffic services provider shall develop and maintain three fundamental and documented processes for fatigue hazard identification:

2.1.1 *Predictive.*The predictive process shall identify fatigue hazards by examining airtraffic controller scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include but are not limited to—

(a) air traffic services or industry operational experience and data collected on similar types of operations or from other industries with shift work or 24- houroperations;

(b) evidence-based scheduling practices; and

(c) bio-mathematical models.

(d) Proactive. The proactive process shall identify fatigue hazards within current air traffic services operations. Methods of examination may include but are not limited to:

(i) self-reporting of fatigue risks;

(ii) fatigue surveys;

(iii) relevant air traffic controller performance data;

(iv) available safety databases and scientific studies;

(v) tracking and analysis of differences in planned and actual worked times; and

(vi) observations during normal operations or special evaluations.

(e) Reactive There active process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimized .At a minimum,the process may be triggered by any of the following—

(i) fatigue reports;

(ii) confidential reports;

(iii) audit reports; and

(iv) incidents.

2.2 Fatigue-related risk assessment

2.2.1 An air traffic services provider shall develop and implement risk assessment procedures that determine when the associated risks require mitigation.

2.2.2 The risk assessment procedures shall review identified fatigue hazard sand link them to—

(a) operational processes;

(b) their probability;

(c) possible consequences; and

(d) the effectiveness of existing preventive controls and recovery measures.

2.3 Risk mitigation

An air traffic services provider shall develop and implement fatigue risk mitigation procedures that—

(a) select the appropriate mitigation strategies;

(b) implement the mitigation strategies; and

(c) monitor the strategies' implementation and effectiveness.

2.3 FRMS safety assurance processes

The air traffic services provider shall develop and maintain FRMS safety assurance processes to—

(a) provide for continuous FRMS performance monitoring, analysis of trends, and measurement

(b) to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to- hazard reporting and investigations;

audits and surveys; and reviews and fatigue studies (both internal and external);

(c) provide a formal process for the management of change .This shall include but is not limited to—

(i) identification of changes in the operational environment that may affect the FRMS;

(ii) identification of changes within the organization that may affect the FRMS;and

(iii) consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and

(d) provide for the continuous improvement of the FRMS. This shall include but is not limited to—

(i) the elimination and/or modification of preventive controls and recovery measures that have had unintended consequences or that are no longer needed due to changes in the operational or organizational environment;

(ii) routine evaluations of facilities, equipment, documentation and procedures; and

(iii) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

2.4 FRMS promotion processes

FRMS promotion processes support the ongoing development of the FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the air traffic service provider as part of its FRMS—

(a) training programmes to ensure competency commensurate with the roles and responsibilities of management, air traffic controllers, and all other involved personnel under the planned FRMS; and

(b) an effective FRMS communication plan that—

(i) explains FRMS policies, procedures and responsibilities to all relevant stakeholders;and

(ii) describes communication channels used to gather and disseminate FRM S-related information.

NINTH SCHEDULE

TRANSFER OF CONTROL

[Regulation 48, 49]

1. DIVISION OF RESPONSIBILITY FOR CONTROL BETWEEN AIR TRAFFIC CONTROL UNITS

1.1 General

The appropriate ATS authority shall designate the area of responsibility for each air traffic control (ATC) unit and, when applicable, for individual control sectors within an ATC unit. Where there is more than one ATC working position within a unit or sector, the duties and responsibilities of the individual working positions shall be defined.

1.1.2 Between a unit providing aerodrome control service and a unit providing approach control service

1.1.2.1 Except for flights which are provided aerodrome control service only, the control of arriving and departing controlled flights shall be divided between units providing aerodrome control service and units providing approach control service as follows:

1.1 .2.1.1 Arriving aircraft. Control of an arriving aircraft shall be transferred from the unit providing approach control service to the unit providing aerodrome control service when the aircraft—

(a) is in the vicinity of the aerodrome, and

(i) it is considered that approach and landing will be completed in visual reference to the ground, or

(ii) has reached uninterrupted visual meteorological conditions, or

(b) is at a prescribed point or level, or

(c) has landed,

as specified in letters of agreement or ATS unit instructions.

1.1.2.1.2 Transfer of communications to the aerodrome controller should be effected at such a point, level or time that clearance to land or alternative instructions, as well as information on essential local traffic, can be issued in a timely manner.

Note - Even though there is an approach control unit, control of certain flights may be transfrrred directly from an ACC to an aerodronie control tower and vice versa, by prior arrangement between the units concerned for the relevant part of approach control service to he provided by the ACC or the aerodrome control tower, as applicable.

1 .2.1.3 *Departing aircraft* Control of a departing aircraft shall be transferred from the unit providing aerodrome control service to the unit providing approach control service:

(a) when visual meteorological conditions prevail in the vicinity of the aerodrome—

(i) prior to the time the aircraft leaves the vicinity of the aerodrome,

(ii) prior to the aircraft entering instrument meteorological conditions, or

(ii) when the aircraft is at a prescribed point or level, as specified in letters of agreement or ATS unit instructions;

(b) when instrument meteorological conditions prevail at the aerodrome:

(i) immediately after the aircraft is airborne; or

(ii) when the aircraft is at a prescribed point or level, as specified in letters of agreement or local instructions.

Note.— See Note following 1.1.2.1.2.

1 .3 Between a unit providing approach control service and a unit providing area control service

1.1.3.1 When area control service and approach control service are not provided by the same air traffic control unit, responsibility for controlled flights shall rest with the unit providing area control service except that a unit providing approach control service shall be responsible for the control of—

(a) arriving aircraft that have been released to it by the ACC;

(b) departing aircraft until such aircraft are released to the ACC.

1.1.3.2 A unit providing approach control service shall assume control of arriving aircraft, provided such aircraft have been released to it, upon arrival of the aircraft at the point, level or time agreed for transfer of control, and shall maintain control during approach to the aerodrome.

1.1.4 Between two units providing area control service

The responsibility for the control of an aircraft shall be transferred from a unit providing area control service in a control area to the unit providing area control service in an adjacent control area at the time of crossing the common control area boundary as estimated by the ACC having control of the aircraft or at such other point, level or time as has been agreed between the two units.

1.1 .5 Between control sectors/positions within the same air traffic control unit

The responsibility for the control of an aircraft shall be transferred from one control sector/ position to another control sector/position within the same ATC unit at a point, level or time, as specified in local instructions.

1.1.6 Transfer of control Where an ATS surveillance service is being provided

1.1 .6.1 Where an ATS surveillance service is being provided, transfer of control should be effected, whenever practicable, so as to enable the uninterrupted provision of the ATS surveillance service.

1.1.6.2 Where SSR and/or ADS-B and/or MLAT is used and the display of position indications with associated labels is provided for, transfer of control of aircraft between adjacent control positions or between adjacent ATC units may be effected without prior coordination, provided that —

(a) updated flight plan information on the aircraft about to be transferred, including the discrete assigned SSR code or, with respect to Mode S and ADS-B, the aircraft identification, is provided to the accepting controller prior to transfer;

(b) the ATS surveillance system coverage provided to the accepting controller is such that the aircraft concerned is presented on the situation display before the transfer is effected and is identified on, but preferably before, receipt of the initial call;

(c) when the controllers are not physically adjacent, two-way direct speech facilities, which permit communications to be established instantaneously, are available between them at all times;

Note. - "Instantaneous" refers to connnunicaticns which effective/v provide for immediate access between controllers.

(d) the transfer point or points and all other c*nditions of application, such as direction of flight, specified levels, transfer of communication points, and especially an agreed minimum separation between aircraft, including that applicable to succeeding aircraft on the same route, about to be transferred as observed on the situation display, have been made the subject of specific instructions (for intra-unit transfer) or of a specific letter of agreement between two adjacent ATC units;

(e) the instructions or letter of agreement specify explicitly that the application of this type of transfer of control may be terminated at any time by the accepting controller, normally with an agreed advance notice;

(f) the accepting controller is informed of any level, speed or vectoring instructions given to the aircraft prior to its transfer and which modify its anticipated flight progress at the point of transfer.

1.1.6.3 The minimum agreed separation between aircraft about to be transferred (1.1.6.2 d) refers) and the advance notice (1.1.6.2 e) refers) shall be determined taking into account all relevant technical, operational and other circumstances.

If circumstances arise in which these agreed conditions can no longer be satisfied, controllers shall revert to the procedure in 1.1.6.4 until the situation is resolved.

1.1.6.4 Where primary radar is being used, and where another type of ATS surveillance system is employed but the provisions of 1.1.6.2 are not applied, the transfer of control of aircraft between adjacent control positions or between two adjacent ATS units may be effected, provided that—

(a) identification has been transferred to or has been established directly by the accepting controller;

(b) when the controllers are not physically adjacent, two-way direct-speech facilities between them are at all times available which permit communications to be established instantaneously;

(c) separation from other controlled flights conforms to the minima authorized for use during transfer of control between the sectors or units concerned;

(d) the accepting controller is informed of any level, speed or vectoring instructions applicable to the aircraft at the point of transfer;

(e) radio communication with the aircraft is retained by the transferring controller until the accepting controller has agreed to assume responsibility for providing the ATS surveillance service to the aircraft. Thereafter, the aircraft should be instructed to change over to the appropriate channel and from that point is the responsibility of the accepting controller.

1.2 Co-ordination of transfer

1.2.1 Responsibility for control of an aircraft shall not be transferred from one air traffic control unit to another without the consent of the accepting control unit, which shall be obtained in accordance with 1.2.2, 1.2.2.1, 1.2.2.2 and 1.2.3.

1.2.2 The transferring control unit shall communicate to the accepting control unit the appropriate parts of the current flight plan and any control information pertinent to the transfer requested.

1.2.2.1 Where transfer of control is to be effected using radar or ADS-B data, the control information pertinent to the transfer shall include information regarding the position and, if required, the track and speed of the aircraft, as observed by radar or ADS-B immediately prior to the transfer.

1.2.2.2 Where transfer of control is to be effected using ADS-C data, the control information pertinent to the transfer shall include the four-dimensional position and other information as necessary.

1.2.3 The accepting control unit shall—

(a) indicate its ability to accept control of the aircraft on the terms specified by the transferring control unit, unless by prior agreement between the two units concerned, the absence of any such indication is understood to signify acceptance of the terms specified, or indicate any necessary changes thereto; and

(b) specify any other information or clearance for a subsequent portion of the flight, which it requires the aircraft to have at the time of transfer.

1.2.4 The accepting control unit shall notify the transferring control unit when it has established two-way voice and/or data link communications with and assumed control of the aircraft concerned, unless otherwise specified by agreement between the two control units concerned.

1.2.5 Applicable coordination procedures, including transfer of control points, shall be specified in letters of agreement and ATS unit instructions as appropriate.

THE CIVIL AVIATION (COMMUNICATION PROCEDURES) REGULATIONS

ARRANGEMENT OF REGULATIONSS

PART I – PRELIMINARY

Regulations

PART II – GENERAL REQUIREMENTS

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THE CIVIL AVIATION (COMMUNICATION PROCEDURES) REGULATIONS

[Legal Notice 135 of 2018]

PART I – PRELIMINARY

1. Citation

These Regulations may be cited as the Civil Aviation (Communication Procedures) Regulations, 2018

2. Interpretation

In these Regulations, unless the context otherwise requires—

"Act" means the Civil Aviation Act (Cap. 394);

"Aerodrome Control Radio Station" means a station providing radio communication between an aerodrome control tower and aircraft or mobile aeronautical stations;

"Aeronautical Broadcasting Service" means a broadcasting service intended for the transmission of information relating to air navigation;

"Aeronautical Fixed Circuit" means a circuit forming part of the Aeronautical Fixed Service;

"Aeronautical Fixed Service" means a telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services;

"Aeronautical Fixed Station" means a station in the aeronautical fixed service;

"Aeronautical Fixed Telecommunication Network" means a worldwide system of Aeronautical Fixed Circuits provided, as part of the aeronautical fixed service, for the exchange of messages or digital data between aeronautical fixed stations having the same or compatible communications characteristics;

"Aeronautical Fixed Telecommunication Network circuit" means a circuit forming part of the Aeronautical Fixed Telecommunication Network;

"aeronautical mobile (R)* service (RR S1.33)" means an aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes;

"aeronautical mobile service (RR S1.32)" means a mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies;

"aeronautical mobile-satellite (R)* service (RR S1.36)" means an aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes;

"aeronautical mobile-satellite service (RR S1.35)" means a mobile satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radio beacon stations may also participate in this service;

"aeronautical radio navigation service (RR S1.46)" means a radio navigation service intended for the benefit and for the safe operation of aircraft;

"aeronautical station (RR S1.81)" means a land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea;

"Aeronautical Telecommunication Agency" means an agency responsible for operating a station or stations in the aeronautical telecommunication service;

"aeronautical telecommunication log" means a record of the activities of an aeronautical telecommunication station;

"aeronautical telecommunication service" means a telecommunication service provided for any aeronautical purpose;

"aeronautical telecommunication station" means a station in the aeronautical telecommunication service;

"Aeronautical Fixed Telecommunication Network communication centre" means an Aeronautical Fixed Telecommunication Network station whose primary function is the relay or retransmission of Aeronautical Fixed Telecommunication Network traffic from (or to) a number of other Aeronautical Fixed Telecommunication Network stations connected to it;

"Aeronautical Fixed Telecommunication Network destination station" means an Aeronautical Fixed Telecommunication Network station to which messages and/or digital data are addressed for processing for delivery to the addressee;

"Aeronautical Fixed Telecommunication Network origin station" means an Aeronautical Fixed Telecommunication Network station where messages and/or digital data are accepted for transmission over the Aeronautical Fixed Telecommunication Network;

"Aeronautical Fixed Telecommunication Network station" means a station forming part of the Aeronautical Fixed Telecommunication Network (Aeronautical Fixed Telecommunication Network) and operating as such under the authority or control of a State;

"air navigation services facility" means any facility used, available for use, or designed for use in aid of navigation of aircraft, including airports, landing fields, any structures, mechanisms, lights, beacons, marks, communicating systems, or other instruments or devices used or useful as an aid to the safe taking off, navigation, and landing of aircraft and any combination of such facilities;

"air navigation services provider" means an independent entity established for the purpose of operating and managing air navigation services and empowered to manage and use the revenues it generated to cover its costs;

"aircraft operating agency" means the person, organization or enterprise engaged in, or offering to engage in, an aircraft operation

"aircraft station (RR S1.83))" means a mobile station in the aeronautical;

"air-ground communication" means a two-way communication between aircraft and stations or locations on the surface of the earth;

"air-ground control radio station" means an aeronautical telecommunication station having primary responsibility for handling communications pertaining to the operation and control of aircraft in a given area;

"air Navigation services" means air traffic services, communication, navigation and surveillance, and aeronautical information services;

"air-report" means a report from an aircraft in flight prepared in conformity with requirements for position, and operational or meteorological reporting;

"air-to-ground communication" means a one-way communication from aircraft to stations or locations on the surface of the earth;

"altitude" means the vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL);

"Air Navigation Services Provider" means Air Navigation Services Provider;

"ATS direct speech circuit" means an Aeronautical Fixed Service (AFS) telephone circuit, for direct exchange of information between air traffic services (ATS) units;

"Authority" means the Kenya Civil Aviation Authority established under the Act;

"automatic relay installation" means a teletypewriter installation where automatic equipment is used to transfer messages from incoming to outgoing circuits

"automatic telecommunication log" means a record of the activities of an aeronautical telecommunication station recorded by electrical or mechanical means

"blind transmission" means a transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission;

"broadcast" means a transmission of information relating to air navigation that is not addressed to a specific station or stations;

"communication centre" means an Aeronautical Fixed Station which relays or retransmits telecommunication traffic from (or to) a number of other aeronautical fixed stations directly connected to it;

"controller-pilot data link communications" means a means of communication between controller and pilot, using data link for ATC communications;

"current data authority" means the designated ground system through which a controller-pilot data link communications dialogue between a pilot and a controller currently responsible for the flight is permitted to take place;

"downstream data authority" means a designated ground system, different from the current data authority, through which the pilot can contact an appropriate ATC unit for the purposes of receiving a downstream clearance;

"duplex" means a method in which telecommunication between two stations can take place in both directions simultaneously;

"flight level" means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals;

"free text message element" means a message element used to convey information not conforming to any standardized message element in the controller-pilot data link communications message set;

"frequency channel" means a continuous portion of the frequency spectrum appropriate for a transmission utilizing a specified class of emission;

"fully automatic relay installation" means a teletypewriter installation where interpretation of the relaying responsibility in respect of an incoming message and the resultant setting up of the connections required to effect the appropriate retransmissions is carried out automatically, as well as all other normal operations of relay, thus obviating the need for operator intervention, except for supervisory purposes.

"ground-to-air communication" means a one-way communication from stations or locations on the surface of the earth to aircraft;

"height" means the vertical distance of a level, a point or an object considered as a point, measured from a specified datum;

"human performance" means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;

"international telecommunication service" means a telecommunication service between offices or stations of different States, or between mobile stations which are not in the same State, or are subject to different States;

"interpilot air-to-air communication" means a two-way communication on the designated air-to-air channel to enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operational problems;

"location indicator" means a four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the location of an aeronautical fixed station;

"message field" means an assigned area of a message containing specified elements of data;

"meteorological operational channel" means a channel of the Aeronautical Fixed Service (AFS), for the exchange of aeronautical meteorological information;

"meteorological operational telecommunication network" means an integrated system of meteorological operational channels, as part of the Aeronautical Fixed Service (AFS), for the exchange of aeronautical meteorological information between the aeronautical fixed stations within the network;

"mobile surface station" means a station in the aeronautical telecommunication service, other than an aircraft station, intended to be used while in motion or during halts at unspecified points;

"network station" means an aeronautical station forming part of a radiotelephony network;

"next data authority" means the ground system so designated by the current data authority through which an onward transfer of communications and control can take place;

"non-network communications" means radiotelephony communications conducted by a station of the aeronautical mobile service, other than those conducted as part of a radiotelephony network;

"Notice To Airmen" means a notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations;

"operational control communications" means communications required for the exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of a flight;

"pre-formatted free text message element" means a free text message element that is stored within the aircraft system or ground system for selection;

"pre-formatted free text message element" means a free text message element that is stored within the aircraft system or ground system for selection;

"primary frequency" means the radiotelephony frequency assigned to an aircraft as a first choice for air-ground communication in a radiotelephony network;

"radio direction finding (RR S1.12)" means radio determination using the reception of radio waves for the purpose of determining the direction of a station or object;

"radio direction-finding station (RR S1.91)" means a radio determination station using radio direction finding;

"radiotelephony network" means a group of radiotelephony aeronautical stations which operate on and guard frequencies from the same family and which support each other in a defined manner to ensure maximum dependability of air-ground communications and dissemination of air-ground traffic;

"readback" means a procedure whereby the receiving station repeats a received message or an appropriate part thereof back to the transmitting station so as to obtain confirmation of correct reception;

"regular station" means a station selected from those forming an enroute air-ground radiotelephony network to communicate with or to intercept communications from aircraft in normal conditions;

"route segment" means a route or portion of route usually flown without an intermediate stop;

"routing Directory" means a list in a communication centre indicating for each addressee the outgoing circuit to be used;

"secondary frequency" means the radiotelephony frequency assigned to an aircraft as a second choice for air-ground communication in a radiotelephony network;

"semi-automatic relay installation" means a teletypewriter installation where interpretation of the relaying responsibility in respect of an incoming message and the resultant setting up of the connections required to effect the appropriate retransmissions require the intervention of an operator but where all other normal operations of relay are carried out automatically;

"simplex" means a method in which telecommunication between two stations takes place in one direction at a time;

"SNOWTAM" means a special series Notice to Airmen notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format;

"telecommunication (RR S1.3)" means any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems;

"teletypewriter tape" means a tape on which signals are recorded in the 5-unit Start-Stop code by completely severed perforations (Chad Type) or by partially severed perforations (Chadless Type) for transmission over teletypewriter circuits;

"torn-tape" relay installation" means a teletypewriter installation where messages are received and relayed in teletypewriter tape form and where all operations of relay are performed as the result of operator intervention; and

"tributary station" means an Aeronautical Fixed Station that may *route receive or transmit messages or digital data but which does not relay except for the purpose of serving similar stations connected through it to a communication centre.

3. Application.

(1) These Regulations shall apply to a person providing Communication, Navigation and Surveillance services within designated air spaces and at aerodromes.

(2) These Regulations do not apply to a person providing Communication, Navigation and Surveillance Services to state aircraft.

PART II – GENERAL REQUIREMENTS

4. Requirements for Communication, Navigation and Surveillance (CNS) Facilities.

The minimum requirements for planning, installation, commissioning, training, operations and maintenance of the Communications, Navigation and Surveillance (CNS) facilities shall conform to these regulations.

5. Certification of CNS Provider.

A person who wishes to provide Air Navigation Services service or operate a facility to support an air traffic service shall have an Air Navigation Services Provider certificate issued in accordance with the Civil Aviation (Certification of Air Navigation Services Providers) Regulations, 2018.

6. Approval requirement.

(1) A person shall not provide ANS or operate communication, navigation and surveillance facilities or systems in the designated airspace and aerodromes unless the systems or facilities have been approved by the Authority.

(2) The Air Navigation Services Provider shall notify the Authority of its intention to procure, install, use, decommission, upgrade or relocate any communication, navigation and surveillance facility or facilities in the designated airspace and aerodromes not less than thirty (30) days prior to the date of start of the process.

(3) The Authority shall approve installation, use, decommissioning, upgrading or relocation of all the communication, navigation and surveillance facility or facilities in the designated airspace and aerodromes.

7. Inspections and audits.

(1) The Authority shall carry out safety inspections and audits on CNS facilities, documents and records of the CNS facilities to determine compliance in accordance with these Regulations.

(2) An inspector of the Authority shall have unrestricted access to the facilities, installations, records and documents of the service provider to determine compliance with these Regulations and required procedures.

8. Siting and installation.

(1) An Air Navigation Service Provider shall-

(a) establish procedures to ensure that the communication, navigation and surveillance systems-

(i) are operated, maintained, available and reliable in accordance with the requirements prescribed by the Authority;

(ii) are designed to meet the applicable operational specification for that facility;

(iii) are installed and commissioned as prescribed by the Authority; and

(iv) conform to the applicable system characteristics and specification standards prescribed by the Authority;

(b) determine the site for installation of a new facility based on operational requirements, construction aspects and maintainability.

(2) The facilities in sub-regulation (1) shall be installed by licensed ATSEPs with relevant ratings for the facilities.

9. Commissioning requirement

An Air Navigation Service Provider shall-

(a) establish procedures to ensure that each new facility-

(i) is commissioned to meet the specifications for that facility; and

(ii) is in compliance with applicable standards;

(b) ensure that the system performance of the new facility has been validated by the necessary tests, and that all parties involved with the operations and maintenance of the facility, including its maintenance contractors have accepted and are satisfied with the results of the tests;

(c) ensure that procedures include documentation of tests conducted on the facility prior to the commissioning, including those that test the compliance of the facility with the applicable standards and any flight check required.

10. Availability and reliability of CNS facilities.

(1) An Air Navigation Services Provider shall be responsible for the provision of communication, navigation and surveillance services and facilities to ensure that the

telecommunication information and data necessary for the safe, regular and efficient operation of air navigation is available.

(2) The functional specification of each of An Air Navigation Service Provider's telecommunication services shall include the following values or characteristics for each service-

(a) availability;

(b) reliability;

(c) accuracy;

(d) Integrity;

(e) mean time between failure (MTBF); and

(f) mean time to repair (MTTF).

(3) The values mentioned in sub-regulation (2) shall be derived or measured from either or both of-

(a) the configuration of each service; and

(b) the known performance of each service.

(4) An Air Navigation Service Provider shall describe in the operations manual the method used to calculate each of the values.

(5) For a radio navigation service, the integrity values or characteristics shall be given for each kind of navigation aid facility that forms part of the service.

(6) The performance of technical facilities shall be monitored, reviewed and reported against these Regulations.

(7) An Air Navigation Service Provider shall ensure that a facility is installed with main and standby power supply and adequate air conditioning to ensure continuity of operation appropriate to the service being provided.

11. Interface arrangement for support services.

An Air Navigation Service Provider shall formalize interface arrangements where applicable with external organizations in the form of service level agreements, detailing the following-

(a) interface and functional specifications of the support service;

(b) service level of the support service such as availability, accuracy, integrity and recovery time of failure of service; and

(c) monitoring and reporting of the operational status of the service to the service provider.

12. Record keeping and documentation.

(1) An Air Navigation Service Provider shall—

(a) hold copies of relevant equipment manuals, technical standards, practices, instructions, maintenance procedures, site logbooks, systems backup data, equipment and test gear inventory and any other documentation that are necessary for the provision and operation of the facility;

(b) establish a procedure for the control of the documentation required under these Regulations;

(c) keep records under the control of the relevant key personnel;

(d) control access to the records system to ensure appropriate security.

(2) An Air Navigation Service Provider shall maintain all documents and records which are necessary for the operation and maintenance of the service and make available copies of these documents to personnel where needed.

(3) These documents shall include—

(a) a copy of these regulations;

(b) an Air Navigation Service Provider's operations manual;

(c) ICAO Annex 10 Volumes I to V, ICAO Doc 8071 - Manual on Testing of Radio Navigation Aids, and other relevant ICAO documents;

(d) records of malfunction and safety incident reports;

(e) records of internal audit reports;

(f) agreements with other organizations

(g) records of investigation into serious incidents;

(h) records of staff deployment, duty and leave rosters;

(i) records of equipment spares;

(j) records of job description, training programme and plan of each staff member; and

(k) all related air navigation service technical standards and technical guidance material developed by the Authority.

(4) A document retained for this regulation shall be retained for at least three (3) years if paper based and one hundred and eighty (180) days if computer based.

(5) An Air Navigation Service Provider shall establish a process for the authorization and amendment of these documents to ensure that they are constantly updated and ensure that-

(a) the currency of the documentation can be readily determined;

(b) amendments to the documentation are controlled in accordance with established quality management principles;

(c) only current versions of documents are available; and

(d) the person authorising the creation and any revision is identified.

(6) An Air Navigation Service Provider shall ensure that where documents are held as computer based records and where paper copies of computer based records are made, they are subjected to the same control as paper documents.

(7) An Air Navigation Service Provider shall establish procedures to identify, collect, index, store, maintain, and dispose records covering -

(a) the performance and maintenance history of each facility;

(b) the establishment of the periodic test programmes for each facility;

(c) each item of test equipment required for the measurement of critical performance parameters;

(d) each reported or detected facility malfunction;

(e) each internal quality assurance review; and

(f) each person who is authorised to place facilities into operational service.

13. Operations Manual

(1) An Air Navigation Services Provider shall develop operations manual that demonstrates the Air Navigation Services Provider's compliance with these regulations.

(2) The contents of the operations manual shall contain—

(a) the information required of the Air Navigation Services Provider in accordance with these Regulations;

(b) an organization chart of the Air Navigation Services Provider and its maintenance contractors, if any, that shows the position of each personnel and the name, qualification, experience, duties and responsibilities of personnel who are responsible for ensuring the compliance of the organization with the requirements described in these Regulations;

(c) an overall operation and maintenance plan for the aeronautical telecommunication service, and for each facility, an operation and maintenance plan, as described in these regulations document;

(d) for each facility, information on the compliance of the facility with these regulations and the applicable aeronautical telecommunication standards; and

(e) the system performance target of each facility, such as its availability and reliability.

(3) The operations manual shall consist of a main manual covering the main areas that need to be addressed, as well as separate supporting documents and manuals (such as the operation and maintenance plan of each facility) that are referred to in the main manual.

(4) An Air Navigation Services Provider shall establish an operation and maintenance plan for each facility which shall include—

(a) a procedure for the periodic inspection and testing of each facility to verify that it meets the operational and performance specifications of that facility;

(b) details of flight test, if necessary, such as the standards and procedures to be used and flight test interval, which shall be in compliance with guidelines prescribed by the Authority;

(c) the interval between periodic inspection and flight test and the basis for that interval and whenever the interval is changed, the reasons for such change shall be documented;

(d) the operation and maintenance instructions for each facility;

(e) an analysis of the number of personnel required to operate and maintain each facility taking into account the workload required;

(f) the corrective plan and procedures for each facility, including whether the repair of modules and components are undertaken in-house or by equipment manufacturers and the spare support plan for each facility;

(g) the maintenance plan or the operating and maintenance instructions for each facility shall specify the test equipment requirements for all levels of operation and maintenance undertaken.

(5) An Air Navigation Service Provider shall control the distribution of the operations manual and ensure that it is amended whenever necessary to maintain the accuracy of the information in the operations manual and to keep its contents up to date.

(6) The air navigation services provider shall ensure that—

(a) CNS systems and services are protected against service attacks to a level consistent with the application service requirements;

(b) all end-systems supporting air navigation security services shall be capable of authenticating the identity of peer end-systems, authenticating the source of messages and ensuring the data integrity of the messages;

(c) strategies and best practices on the protection of critical information and communications technology systems used for civil aviation purposes are developed and implemented;

(d) policies are established to ensure that, for critical aviation systems—

(i) system architectures are secure by design;

(ii) systems are resilient;

(iii) methods for data transfer are secured, ensuring integrity and confidentiality of data;

(iv) system monitoring, and incident detection and reporting, methods are implemented; and forensic analysis of cyber incidents is carried out.

14. Periodic Inspection, Testing and Security of CNS facilities.

(1) An Air Navigation Services Provider shall establish a procedure for the periodic inspection and testing of the communication, navigation and surveillance systems to verify that each facility meets the applicable operational requirements and performance specifications for that facility.

(2) An Air Navigation Service Provider shall ensure-

(a) that appropriate inspection, measuring and test equipment are available for staff to maintain the operation of each facility;

(b) the control, calibration and maintenance of such equipment so that they have the precision and accuracy necessary for the measurements and tests to be performed.

(3) Periodic inspection shall include—

(a) security of the facility and site;

(b) adherence to the approved maintenance programme;

(c) upkeep of the equipment, building, site and site services; and

(d) adequacy of facility records and documentation.

(4) An Air Navigation Service Provider shall establish a security programme for the communication, navigation and surveillance facility.

(5) The security programme required under subregulation (4) shall specify the physical security requirements, practices, and procedures to be followed for the purposes of minimising the risk of destruction of, damage to, or interference with the operation of communication, navigation and surveillance facility.

(6) An Air Navigation Service Provider shall make a test transmission if-

(a) the transmission is necessary to test a service, facility or equipment; and

(b) within a reasonable time before commencing the transmission, the users have been informed about the transmission;

(c) at the commencement of the transmission, the service provider identifies the transmission as a test transmission;

(d) the transmission contains information identifying it as a test transmission.

15. Flight Inspection and facility check after accident or incident.

An Air Navigation Service Provider shall—

(a) ensure that radio navigation aids are available for use by aircraft engaged in air navigation and that the radio navigation aids are subjected to periodic ground and flight inspections.

(b) establish a procedure to check and accurately record the operating condition of any communication, navigation and surveillance facility that may have been used by an aircraft that is involved in an accident or incident.

16. CNS Personnel Training and other requirements

An Air Navigation Services Provider shall—

(a) ensure that it employs sufficient number of personnel who possess the skills and competencies required in the provision of the aeronautical telecommunication service;

(b) provide in the MANSOPS an analysis of the personnel required to perform the Communication Navigation and surveillance services for each facility taking into account the duties and workload required;

(c) develop job descriptions for each of its staff that depict the job purpose, key responsibilities, and outcome to be achieved of each staff;

(d) develop an overall training policy and programme for the organization that shall lay down;

(e) designate an officer in charge of training or on-job training at the operational stations;

(f) maintain individual training records for each of its staff;

(g) conduct a yearly review of the training plan for each staff at the beginning of the year to identify any gaps in competency and changes in training

requirement and prioritize the type of training required for the coming year; and

(h) ensure that the training requirements of these regulations are similarly applied to its maintenance contractors, if any.

(2) The On-Job-Training officer in sub-regulation (1)(f) above shall have satisfactorily completed the On-Job-Training instructional techniques course.

(3) A person shall not perform a function related to the installation, training, operation or maintenance of any communication, navigation and a surveillance system unless-

(a) that person has successfully completed training in the performance of that function in line with the ATSEP competency based requirements;

(b) an Air Navigation Service Provider is satisfied that the technical person is competent in performing that function; and

(c) that person has been certified in accordance with requirements of the relevant Civil Aviation Regulations.

17. Radio frequency management and reporting.

(1) An Air Navigation Service Provider shall establish procedures for the reporting, collection and notification of facility malfunction incidents and safety incidents.

(2) The procedures in sub-regulation (1) shall be documented in the MANSOPS.

(3) An Air Navigation Service Provider shall compile reports of incidents and review such reports periodically with its maintenance contractors to-

(a) determine the cause of the incidents and determine any adverse trends;

(b) implement corrective and preventive actions where necessary to prevent recurrence of the incidents; and

(c) implement any measures to improve the safety performance of the aeronautical telecommunication service.

(4) An Air Navigation Service Provider shall-

(a) report any serious service failure or safety incident to the Authority and investigate such incidents in order to establish how and why the incident happened, including possible organizational contributing factors and to recommend actions to prevent a recurrence; and

(b) ensure that information on the operational status of each communication, navigation and surveillance facility that is essential for the enroute, approach, landing, and take-off phases of flight is provided to meet the operational needs of the service being provided.

(5) An Air Navigation Service Provider shall-

(a) establish a procedure for the management and protection of aeronautical radio spectrum;

(b) designate a responsible person to control any frequency allocation within the aeronautical radio spectrum to ensure that there will be no conflict and interference to any radio stations or facility;

(c) ensure that there is no wilful transmission of unnecessary or anonymous radio signals, messages or data by any of its radio stations;

(d) establish procedures with the communication authority to address occurrence of radio frequency interference;

(e) ensure that any frequency interference occurrences are reported, investigated and follow-up actions taken to prevent recurrence;

(f) keep updated records of all allocated frequencies; and

(g) ensure that no facility providing radio signals for the purpose of aviation safety shall be allowed to continue in operation, if there is a suspicion or any cause to suspect that the information being provided by that facility is erroneous.

18. Proficiency certification program.

(1) An Air Navigation Service Provider shall develop proficiency certification program for Air traffic safety electronics personnel engaged in the installation, training, operations and maintenance of Communication, Navigation and Surveillance systems in accordance with guidelines prescribed by the Authority.

(2) The Authority shall certify Air traffic safety electronics personnel involved in the installation, training, operations and maintenance of Communication, Navigation and Surveillance systems in accordance with the relevant Civil Aviation Regulations.

19. Safety case, notification of Aeronautical facility status and interruption to service.

An Air Navigation Service Provider shall ensure that for safety critical systems, including automated air traffic control systems, communication systems and instrument landing systems, the commissioning of such systems shall include the conduct of a safety case or equivalent.

(2) An Air Navigation Service Provider shall ensure that human factors principles are observed in the design, operations and maintenance of aeronautical telecommunication facilities.

(3) An Air Navigation Service Provider shall, as soon as possible-

(a) forward to the Aeronautical Information Services -

(i) information on the operational details of any new facility for publication in the Aeronautical Information Publication; and

(ii) information concerning any change in the operational status of any existing facility, for the issue of a Notice to Airmen; and

(b) ensure that the information forwarded under sub-paragraph (a) has been accurately published.

(4) An Air Navigation Service Provider shall -

(a) establish a procedure to be used in the event of interruption to or when upgrading communication, navigation and surveillance systems;

(b) specify an acceptable recovery time for each service.

PART III – ADMINISTRATIVE PROVISiONS RELATING TO THE INTERNATIONAL AERONAUTICAL TELECOMMUNICATION SERVICE

20. Division of service.

The International Aeronautical Telecommunication Service shall be divided into four parts-

(a) aeronautical fixed service;

(b) aeronautical mobile service;

(c) aeronautical radio navigation service;

(d) aeronautical broadcasting service.

21. Telecommunication access.

All Aeronautical Telecommunication Stations, including end systems and intermediate systems of the Aeronautical Telecommunication Network, shall be protected from unauthorized direct or remote access.

22. Hours of Service.

(1) The Authority shall give notification of—

(a) the normal hours of service of stations and offices of the International Aeronautical Telecommunication Service under its control to the Aeronautical Telecommunication Agencies designated to receive this information by other Administrations concerned;

(b) any change in the normal hours of service, before such a change is effected, to the aeronautical telecommunication agencies designated to receive this information by other Administrations concerned.

(2) The changes in subregulation (2) shall also be promulgated in a Notice to Airmen.

(3) If a station of the International Aeronautical Telecommunication Service, or an aircraft operating agency, requests a change in the hours of service of another station, such change shall be requested as soon as possible after the need for change is known.

(4) The station or aircraft operating agency requesting for the change in subregulation (3) shall be informed of the result of its request as soon as possible.

23. Supervision.

(1) Kenya shall designate the Authority responsible for ensuring that the international aeronautical telecommunication service is conducted in accordance with these Regulations.

(2) Occasional infringements of the Procedures contained herein, when not serious, shall be dealt with by direct communication between the parties immediately interested either by correspondence or by personal contact.

(3) When a station commits serious or repeated infringements, representations relating to them shall be made to the Authority as specified in subregulation (1) to which the station belongs by the authority which detects them.

(4) The Authority designated in subregulation (1) shall exchange information regarding the performance of systems of communication, radio navigation, operation and maintenance or unusual transmission phenomena.

24. Superfluous transmissions.

The Authority shall ensure that there is no wilful transmission of unnecessary or anonymous signals, messages or data by any station within Kenya.

25. Interference.

An Air Navigation Service Provider shall ensure that all precautions, such as the choice of frequency and of time and the reduction or if possible, the suppression of radiation are taken to avoid any harmful interference during tests and experiments in any station and any resulting interference eliminated as soon as possible.

PART IV – GENERAL PROCEDURES FOR THE INTERNATIONAL AERONAUTICAL TELECOMMUNICATION SERVICE

26. Extensions of service and closing down of stations.

(1) Stations of the International Aeronautical Telecommunication Service shall extend their normal hours of service as required by the Authority to provide for traffic necessary for flight operation.

(2) A station shall notify its intention to all other stations with which it is in direct communication to confirm that an extension of service is not required and advise the time of re-opening if not within its normal hours of service.

(3) A Station shall notify its intention of closing down either to the control station, if any, or to all stations in the network when it is working regularly in a network on a common circuit.

(4) The station in sub-regulation (3) shall continue watch for two minutes and may then close down if the station has received no call during this period.

(5) Stations with other than continuous hours of operation, engaged in, or expected to become engaged in distress, urgency, unlawful interference, or interception traffic, shall extend their normal hours of service to provide the required support to those communications.

27. Acceptance of messages

(1) An Air Navigation Service Provider shall accept for transmission only messages coming within the categories specified in regulation 39.

(2) The responsibility for determining the acceptability of a message shall rest with the station where the message is filed for transmission.

(3) An Air Navigation Service Provider of any station through which a message is relayed, shall make representations at a later date to An Air Navigation Service Provider in control of the accepting station regarding any message which is considered unacceptable.

(4) Only messages for stations forming part of the Aeronautical Telecommunication Service shall be accepted for transmission, except where special arrangements have been made with An Air Navigation Service Provider concerned.

(5) Acceptance of a single message of a message intended for two or more addresses, whether at the same station or at different stations, shall be permitted subject to the provisions prescribed in the First Schedule 1.6.2.3.

(6) Messages handled for aircraft operating agencies shall be accepted only when handed in to the telecommunication station in the form specified in these Regulations and by an authorized representative of that agency, or when received from that agency over an authorized circuit.

28. Transmission and delivery of messages.

(1) A message accepted in regulation 28 shall be transmitted, relayed and delivered in accordance with the priority classification and of without discrimination or undue delay.

(2) A single office for each aircraft operating agency shall be designated by agreement between An Air Navigation Service Provider and the aircraft operating agency concerned for each station of An Air Navigation Service Provider from which messages are delivered to one or more aircraft operating agencies.

(3) Stations of the International Aeronautical Telecommunication Service shall be responsible for delivery of messages to addressee(s) located within the boundaries of the aerodrome(s) served by that station and beyond those boundaries only to addressee(s) as may be agreed by special arrangements with the Administrations concerned.

(4) The Authority shall prescribe a form of written record or other permanent means of delivering messages.

(5) Messages originated in the Aeronautical Mobile Service by an aircraft in flight and which require transmission over the Aeronautical Fixed Telecommunication Network to effect delivery, shall be reprocessed by the Aeronautical Telecommunication Station into the message format specified in First Schedule prior to transmission on the Aeronautical Fixed Telecommunication Network.

(6) Messages originated in the aeronautical mobile service by an aircraft in flight and which require transmission over the aeronautical fixed service, other than on Aeronautical Fixed Telecommunication Network circuits, shall be reprocessed by the aeronautical telecommunication station into the format prescribed in First Schedule except where, subject to sub-regulation (3), prior and other arrangements have been made between the Aeronautical Telecommunication Agency and the aircraft operating agency concerned for predetermined distribution of messages from aircraft.

(7) Messages without specific address containing-

(a) meteorological information received from an aircraft in flight shall be forwarded without delay to the meteorological office associated with the point of reception;

(b) air traffic services information from aircraft in flight shall be forwarded without delay to the air traffic services unit associated with the communication station receiving the message.

29. Time systems.

(1) The Universal Co-ordinated Time shall be used by all stations in the Aeronautical Telecommunication Service.

(2) The Stations in sub-regulation (1) shall designate midnight as 2400 for the end of the day and 0000 for the beginning of the day.

(3) A date-time group shall consist of six figures, the first two figures representing the date of the month and the last four figures the hours and minutes in Universal Co-ordinated Time.

30. Record of communications.

(1) A station of the Aeronautical Telecommunication shall maintain a telecommunication log except an aircraft station when using radiotelephony in direct communication with an aeronautical station.

(2) Aeronautical stations shall record messages at the time of their receipt, except that, if during an emergency the continued manual recording would result in delays in communication, the recording of messages may be temporarily interrupted and completed at the earliest opportunity.

(3) When a record is maintained in an aircraft station, either in a radiotelephone log or elsewhere, concerning distress communications, harmful interference or interruption to communications, such a record shall be associated with information concerning the time, position and altitude of the aircraft.

(4) In written logs, entries shall be made only by operators on duty except that other persons having knowledge of facts pertinent to the entries may certify in the log the accuracy of entries of the operators.

(5) Superfluous marks or notations shall not be made in the log and all entries shall be complete, clear, correct and intelligible.

(6) In written logs, any necessary correction in the log shall be-

(a) made only by the person making the initial entry;

(b) accomplished by drawing or typing a single line through the incorrect entry, initialling same, recording the time and date of correction; and

(c) made on the next line after the last entry.

(7) Telecommunication logs, written or automatic, shall be retained for a period of at least thirty days and when logs are pertinent to inquiries or investigations, the logs shall be retained for longer periods until it is evident that they will no longer be required.

(8) The following information shall be entered in written logs-

(a) the name of the agency operating the station;

(b) the identification of the station;

(c) the date;

(d) the time of opening and closing the station;

(e) the signature of each operator, with the time the operator assumes and relinquishes a watch;

(f) the frequencies being guarded and type of watch being maintained on each frequency;

(g) the text of the communication may be omitted from the log when copies of the messages handled are available and form part of the log except at intermediate mechanical relay stations where the provisions of this paragraph need not be complied with, a record of each communication, test transmission, or attempted communication showing text of communication, time communication completed, station(s) communicated with, and frequency used;

(h) all distress communications and action;

(i) a brief description of communication conditions and difficulties, including harmful interference;

(j) a brief description of interruption to communications due to equipment failure or other troubles, giving the duration of the interruption and action taken; and

(k) such additional information as may be considered by the operator to be of value as a part of the record of the operations of the station.

31. Establishment of radio-communication.

(1) All stations shall answer calls directed to them by other stations in the Aeronautical Telecommunication Service and shall exchange communications on request.

(2) All stations shall radiate the minimum power necessary to ensure a satisfactory service.

32. Use of abbreviations and codes.

(1) The International Aeronautical Telecommunication Service shall use abbreviations and codes whenever they are appropriate and codes their use shall shorten or facilitate communication.

(2) The originator shall, if required by the Aeronautical Telecommunication Station accepting the message for transmission, make available to that station a decode for the abbreviations and codes used where abbreviations and codes other than those approved by the Authority are contained in the text of messages.

33. Cancellation of messages.

The Telecommunication Station shall cancel messages when the cancellation is authorized by the message originator.

PART V – AERONAIJTICAL FIXED SERVICE (AFS)

34. Systems and applications used in the Aeronautical Fixed Service.

The Aeronautical Fixed Service shall comprise the following systems and applications in the International Aeronautical Telecommunication Service-

(a) Air Traffic Services direct speech circuits and networks;

(b) meteorological operational circuits, networks and broadcast systems;

(c) the Aeronautical Fixed Telecommunications Network;

(d) the Air Traffic Services message handling services; and

(e) the Inter-Centre Communications.

35. Material permitted in Aeronautical Fixed Services messages.

The material permitted in Aeronautical Fixed Services messages shall be as specified in the First Schedule (1.1) to these Regulations.

36. Air Traffic Services(AT5) direct speech circuits.

ATS direct speech communications shall be as specified in the Civil Aviation (Air Traffic Services) Regulations, 2018.

37. Meteorological operational channels and meteorological operational telecommunication networks.

Meteorological operational channel procedures and meteorological operational communication network procedures shall be compatible with Aeronautical Fixed Telecommunications Network procedures.

Aeronautical Fixed Telecominun ication Network

38. Categories of messages.

Subject to Regulations 28 and 29, the following categories of message shall be handled by the Aeronautical Fixed Telecommunication Network-

(a) distress messages (priority indicator SS) shall comprise those messages sent by mobile stations reporting that they are threatened by grave and imminent danger and all other messages relative to the immediate assistance required by the mobile station in distress;

(b) urgency messages(priority indicator DD) shall comprise messages concerning the safety of a ship, aircraft or other vehicles or of some person on board or within sight;

(c) flight safety messages (priority indicator FF) shall comprise -

(i) movement and control messages;

(ii) messages originated by an aircraft operating agency of immediate concern to aircraft in flight or preparing to depart; or

(iii) meteorological messages restricted to Significant Meteorological Information, special air-reports, Airmen's Meteorological Information messages, volcanic ash and tropical cyclone advisory information and amended forecasts;

(d) meteorological messages (priority indicator GG) shall comprise -

(i) messages concerning forecasts; or

(ii) messages concerning observations and reports;

(e) flight regularity messages (priority indicator GG) shall comprise -

(i) aircraft load messages required for weight and balance computation;

(ii) messages concerning changes in aircraft operating schedules;

(iii) messages concerning aircraft servicing;

(iv) messages concerning changes in collective requirements for passengers, crew and cargo covered by deviation from normal operating schedules;

(v) messages concerning non-routine landings;

(vi) messages concerning pre-flight arrangements for air navigation services and operational servicing for non-scheduled aircraft operations, e.g. overflight clearance requests;

(vii) messages originated by aircraft operating agencies reporting an aircraft arrival or departure; or

(viii) messages concerning parts and materials urgently required for the operation of aircraft;

(f) Aeronautical information services messages (priority indicator GG) shall comprises messages concerning Notices to Air Men;

(g) Aeronautical administrative messages (priority indicator KK) shall comprise-

(i) messages regarding the operation or maintenance of facilities provided for the safety or regularity of aircraft operations;

(ii) messages concerning the functioning of aeronautical telecommunication services; or

(iii) messages exchanged between civil aviation authorities relating to aeronautical services;

(h) service messages (priority indicator as appropriate) shall comprise messages originated by Aeronautical Fixed Stations to obtain information or verification concerning other messages which appear to have been transmitted

incorrectly by the Aeronautical Fixed Service, confirming channel-sequence numbers.

39. Service messages.

(1) Service messages shall be prepared in the format specified in regulation 56.

(2) In applying the provisions of First Schedule to these Regulations to service messages addressed to an Aeronautical Fixed Station identified only by a location indicator, the indicator shall be immediately followed by the ICAO three-letter designator YFY, followed by an appropriate 8th letter.

(3) Service messages shall be assigned the appropriate priority indicator.

(4) When service messages refer to messages previously transmitted, the priority indicator assigned shall be that used for the to which they refer.

(5) Service messages correcting errors in transmission shall be addressed to all the addressees that shall have received the incorrect transmission.

(6) A reply to a service message shall be addressed to the station which originated the initial service message.

(7) The text of all service messages shall be concise.

(8) A service message, other than one acknowledging receipt of SS messages, shall be further identified by the use of the abbreviation SVC as the first item in the text.

(9) When a service message refers to a message previously handled, reference to the previous message shall be made by use of the appropriate transmission identification or the filing time and originator indicator groups identifying the reference message.

40. Order of priority.

The order of priority for the transmission of messages in the Aeronautical Fixed Telecommunication Network shall be as follows-

(a) transmission Priority 1 shall comprise of message with priority indicator SS;

(b) transmission Priority 2 shall comprise of message with priority indicator DD and FF;

(c) transmission Priority 3 shall comprise of message with priority indicator GG and KK.

41. Same priority messages.

Messages having the same priority indicator shall be transmitted in the order in which they are received for transmission.

42. Routing of messages and supervision message traffic.

Where an Aeronautical Fixed Telecommunication Networks is used, the routing of messages and supervision of message traffic shall be as specified in the Second Schedule to these Regulations.

43. Failure of communications.

Where an Aeronautical Fixed Telecommunication Networks is used and there exists a communication failure, the requirements contained in the Second Schedule to these Regulations (1.3) shall be used.

44. Long term retention of Aeronautical Fixed Telecommunication Networks traffic records.

(1) Aeronautical Fixed Telecommunication Network origin station shall retain for a period of at least 30 days all copies of transmitted messages in their entirety.

(2) Aeronautical Fixed Telecommunication Networks destination stations shall retain, for a period of at least 30 days, a record containing the information necessary to identify all messages received and the action taken thereon.

(3) Aeronautical Fixed Telecommunication Networks communication centres shall retain, for a period of at least 30 days, a record containing the information necessary to identify all messages relayed or retransmitted and the action taken.

45. Short term retention of Aeronautical Fixed Telecommunication Networks traffic records.

(1) Aeronautical Fixed Telecommunication Networks communication centres shall retain, for a period of at least one hour, a copy of all messages, in their entirety, retransmitted or relayed by that communication centre, except as provided in sub-regulation (2).

(2) Where acknowledgement is made between Aeronautical Fixed Telecommunication Network communication centres, a relay centre shall be considered as having no further responsibility for retransmission or repetition of a message for which it has received positive acknowledgement, and it may be deleted from its records.

46. Test procedures on Aeronautical Fixed Telecommunication Networks channels.

Test messages transmitted on Aeronautical Fixed Telecommunication Networks channels for the purpose of testing and repairing lines shall comprise of the following—

(a) the start-of-message signal;

(b) the procedure signal QJH;

(c) the originator indicator;

(d) three page-copy lines of the sequence of characters U(5/5) *(2/10) in International Alphabet-5; and

(e) the end-of-message signal.

47. Characters of Aeronautical Fixed Telecommunication Networks messages.

Aeronautical Fixed Telecommunication Networks messages entered by the Aeronautical Fixed Telecommunication Networks origin station shall not exceed 2 100 characters in length.

48. Stripped address.

Aeronautical Fixed Telecommunication Networks communication centre shall omit from the address all the addressee indicators not required for-

(a) an onward transmission by the Aeronautical Fixed Telecommunication Networks communication centre to which the message is transmitted;

(b) local delivery to the addressee(s) by the Aeronautical Fixed Telecommunication Networks destination station; or

(c) an onward transmission or local delivery by the aggregate of stations

49. Correction of errors during message terminated with an end-of-message signal if they contain known origination.

(1) Messages flowing into the Aeronautical Fixed Telecommunication Networks during preparation shall not be terminated with an end-of-message signal if they contain uncorrected errors.

(2) The unfinished message shall be cancelled by sending the sequence ↓<≡QTA→QTA↓<≡ followed by a complete ending where an error is made in any part of the message which precedes the text.

(3) Errors made in the text and noticed immediately shall be corrected by making the error sign (→E→E→E→), transmitting the last correct word or group and then continuing with the message.

(4) The station shall comply with the provisions contained in the Second Schedule where errors are made in the text and not noticed until later in the origination process.

(5) The station shall take the action described in sub-regulation (2) where it becomes obvious, during the origination of the text, that the message is to be cancelled.

50. Predetermined distribution system of for Aeronautical Fixed Telecommunication Networks messages.

(1) The system described in sub-regulation (2) shall be used when it has been agreed between the Administrations concerned to make use a predetermined distribution system for Aeronautical Fixed Telecommunication Networks messages.

(2) The Predetermined Distribution Addressee Indicator shall be constructed as follows-

(a) the first and second letters: The first two letters of the Location Indicator of the communications centre of the State which has agreed to implement the system and which receives messages over a circuit for which it has a predetermined routing responsibility;

(b) the third and fourth letters: The letters ZZ, indicating a requirement for special distribution;

(c) the fifth, sixth and seventh letters-

(i) the fifth, sixth and seventh letters taken from the series A to Z and denoting the national and/or international distribution list(s) to be used by the receiving Aeronautical Fixed Telecommunication Networks centre;

(ii) "N" and "S", as the fifth letter, are reserved for Notice to Air Men and SNOWTAM respectively;

(iii) the eighth letter: Either the filler letter "X" or a letter taken from the series A to Z to further define the national and international distribution list(s) to be used by the receiving AERONAUTICAL FIXED TELECOMMUNICATION NETWORK centre.

(3) Predetermined Distribution Addressee Indicators shall be used whenever possible on Aeronautical Fixed Telecommunication Networks messages between States which have agreed to make use of the predetermined distribution system.

(4) Aeronautical Fixed Telecommunication Networks messages carrying Predetermined Distribution Addressee Indicators allocated by the State receiving the message shall be routed to the addressees listed on the associated list of Addressee Indicators described in subregulation (5).

(5) States shall send their list of selected Predetermined Distribution Addressee Indicators together with the associated lists of Addressee Indicators to-

(a) the States from which they receive Aeronautical Fixed Telecommunication Networks messages for predetermined distribution, to assure correct routing; and

(b) the States which originate Aeronautical Fixed Telecommunication Networks messages for predetermined distribution to facilitate the treatment of requests for retransmission and to assist originators in using the Predetermined Distribution Addressee Indicators correctly.

(6) The list of Addressee Indicators associated with a Predetermined Distribution Addressee Indicator shall include-

(a) addressee Indicators for national distribution;

(b) addressee Indicators for international distribution;

(c) predetermined Distribution Addressee Indicators for international distribution; or

(d) any combination of (a), (b) and (c).

51. Message format - International Alphabet No.5 (IA-5).

All messages of International Alphabet No. 5 (IA-5) shall comply with the format specified in the Third Schedule to these Regulations.

52. Action taken on mutilated messages in international Telegraph Alphabet No. 5 detected in computerized Aeronautical Fixed Telecommunication Network relay stations.

The action taken on mutilated messages in International Telegraph Alphabet No. 5 detected in computerized Aeronautical Fixed Telecommunication Network relay stations shall be as specified in Third Schedule to these Regulations.

53. Transfer of Aeronautical Fixed Telecommunication Networks messages over code and byte independent circuits and networks

When Aeronautical Fixed Telecommunication Network messages are transferred across code and byte independent circuits and networks of the Aeronautical Fixed Service, the following shall apply—

(a) the message shall start with an alignment function followed by the address except as provided in (c) the heading line of the message shall be omitted;

(b) the message shall end with a complete ending;

(c) entry centres shall be permitted to insert additional data preceding the first alignment function and following the ending of the message for the purposes of technical supervision;

(d) When the provisions of (c) are applied, the data added shall not include either carriage return or line feed characters or any of the combinations listed in the Third Schedule to these Regulations.

54. Air Traffic Services Message Handling Services (ATS-MHS)

The Air Traffic Services Message Handling Service application shall be used to exchange air traffic services messages between users over the Aeronautical Telecommunication Network internet in accordance to the Fourth Schedule to these Regulations.

55. The Inter-Centre Communications

The Inter-Centre Communications applications set shall be used to exchange Air Traffic Services messages between air traffic service users over the Aeronautical Telecommunication Network internet.

PART VI – AERONAUTICAL MOBILE SERVICE-VOICE COMMUNICATIONS

56. General procedures for aeronautical Mobile Service-Voice Communications

(1) In all aeronautical mobile service voice communications the highest standard of discipline shall be observed at all times.

(2) The Authority standardized phraseology shall be used in all situations for which it has been specified and when standardized phraseology cannot serve an intended transmission, plain language shall be used.

(3) The transmission of messages, other than those specified in Regulation 58 on aeronautical mobile frequencies when the aeronautical fixed services are able to serve the intended purpose, shall be avoided.

(4) In all communications, the consequences of human performance which affect the accurate reception and comprehension of messages shall be taken into consideration.

(5) Where it is necessary for an aircraft station to send signals for testing or adjustment which are liable to interfere with the working of a neighbouring Aeronautical Station, the consent of the station shall be obtained before such signals are sent and such transmissions shall be kept to a minimum.

(6) When it is necessary for a station in the aeronautical mobile service to make test signals, either for the adjustment of a transmitter before making a call or for the adjustment of a receiver, such signals shall not continue for more than 10 seconds and shall be composed of spoken numerals in radiotelephony, followed by the radio call sign of the station transmitting the test signals and such transmissions shall be kept to a minimum.

(7) The responsibility of establishing communication shall rest with the station having traffic to transmit except as otherwise provided.

(8) After a call has been made to the aeronautical station, a period of at least 10 seconds shall elapse before a second call is made.

(9) When an aeronautical station is called simultaneously by several aircraft stations, the aeronautical station shall decide the order in which aircraft shall communicate.

(10) In communications between aircraft stations, the duration of communication shall be controlled by the aircraft station which is receiving, subject to the intervention of an aeronautical station.

(11) Where the communications in sub-regulation (10) take place on an Air Traffic Service frequency, prior permission of the Aeronautical Station shall be obtained and such requests for permission are not required for brief exchanges.

57. Categories of messages

The categories of messages handled by the Aeronautical Mobile Service and the order of priority in the establishment of communications and the transmission of messages shall be in accordance with Table 1.1 in the Fifth Schedule of these Regulations.

58. Communications related to Direction Finding

Communications relating to direction finding shall be handled in accordance with these Regulations.

59. Composition of flight safety messages

Flight safety messages shall comprise the following—

(a) movement and control messages;

(b) messages originated by an aircraft operating agency or by an aircraft, of immediate concern to an aircraft in flight;

(c) meteorological advice of immediate concern to an aircraft in flight or about to depart; or

(d) other messages concerning aircraft inflight or about to depart.

60. Composition of meteorological messages

Meteorological messages shall comprise meteorological information to or from aircraft, other than those specified in regulation 61.

61. Composition of flight regularity messages

Flight regularity messages shall comprise the following—

(a) messages regarding the operation or maintenance of facilities essential for the safety or regularity of aircraft operation;

(b) messages concerning the servicing of aircraft;

(c) instructions to aircraft operating agency representatives concerning changes in requirements for passengers and crew caused by unavoidable deviations from normal operating schedules;

(d) messages concerning non-routine landings to be made by the aircraft;

(e) messages concerning aircraft parts and materials urgently required; or

(f) messages concerning changes in aircraft operating schedules.

62. Handling of same priority messages

Air Traffic Services units using direct pilot controller communication channels shall only be required to handle flight regularity messages provided this can be achieved without interference with their primary role and no other channels are available for the handling of such messages.

63. Handling of same priority messages

Messages having the same priority shall be transmitted in the order in which they are received for transmission.

64. Composition of inter-pilot air-to-air communication

(1) Inter-pilot air-to-air communication shall comprise messages related to any matter affecting safety and regularity of flight.

(2) The category and priority of these messages shall be determined on the basis of their content in accordance with regulation 59.

65. Cancellation of messages

(1) The station transmitting the message shall instruct the receiving station to disregard the incomplete transmission if a message has not been completely transmitted when instructions to cancel are received and this shall be effected in radiotelephony by use of an appropriate phrase.

(2) When a completed message transmission is being held pending correction and the receiving station is to be informed to take no forwarding action, or when delivery or onward relay cannot be accomplished, transmission shall be cancelled and this shall be effected in radiotelephony by the use of an appropriate phrase.

(3) The station cancelling a transmission shall be responsible for any further action required.

66. Radiotelephony procedures

The radiotelephony procedures for Aeronautical Mobile Service voice communication shall be as specified in the Fifth Schedule of these Regulations.

67. Distress urgency and Radiotelephony Communication procedures

Distress and urgency Radiotelephony Communication procedures for Aeronautical Mobile Service- Voice communication shall be as specified in the Fifth Schedule to these Regulations.

68. Communications related to acts of unlawful interference.

The station addressed by an aircraft being subjected to an act of unlawful interference or the first station acknowledging a call from such an aircraft, shall render all possible assistance, including notification of appropriate Air Traffic Service units and any other station, agency or person in a position to facilitate the flight.

PART VII – AERONAUTICAL RADIO NAVIGATION SERVICE

69. Composition of aeronautical radio navigation service

The aeronautical radio navigation service shall comprise all types and systems of radio navigation aids in the international aeronautical service.

(2) An aeronautical radio navigation aid which is not in continuous operation shall, if practicable, be put into operation on receipt of a request from an aircraft, any controlling authority on the ground or an authorized representative of an aircraft operating agency.

(3) The request in subregulation (2) shall be made to the aeronautical station concerned on the air-ground frequency normally in use.

(4) The local Aeronautical Information Service unit shall be furnished without delay essential information about changes in the operational status of non-visual aids as required for pre-flight briefing and dissemination in accordance with the Civil Aviation (Aeronautical Information Service) Regulations, 2018.

70. Aeronautical Radio Navigation Service Direction Finding

(1) A Direction-Finding station working alone shall give the following, as requested—

(a) true bearing of the aircraft, using the appropriate phrase;

(b) true heading to be steered by the aircraft, with no wind, to head for the Direction-Finding station using the appropriate phrase;

(c) magnetic bearing of the aircraft, using the appropriate phrase;

(d) magnetic heading to be steered by the aircraft with no wind to make for the station, using the appropriate phrase.

(2) When Direction-Finding stations work as a network to determine the position of an aircraft, the bearings taken by each station shall be sent immediately to the station controlling the Direction-Finding network to enable the position of the aircraft to be determined.

(3) The station controlling the network specified in subregulation (2) shall, on request, give the aircraft its position in—

(a) relation to a point of reference or in latitude and longitude, using the appropriate phrase;

(b) the true bearing of the aircraft in relation to the Direction Finding station or other specified point, using the appropriate phrase and its distance from the direction finding station or point, using the appropriate phrase; or

(c) the magnetic heading to steer with no wind, to make for the direction-finding station or other specified point and its distance from the direction-finding station or point, using the appropriate phrases.

(4) Aircraft stations shall normally make requests for bearings, courses or positions, to the aeronautical station responsible or to the station controlling the direction-finding network.

(5) The aircraft station specified in subregulation (4) shall call the aeronautical station or the direction-finding control station on the listening frequency and specify the type of service that is desired using the appropriate phrase.

(6) The direction-finding station originally called by the aircraft station shall where necessary—

(a) request transmission for direction-finding service; and

(b) indicate the frequency to be used by the aircraft station, the number of times the transmission shall be repeated, the duration of the transmission required or any special transmission requirement, as soon as the direction- finding station or group of stations are ready.

(7) An aircraft station which requests a bearing shall end the transmission by repeating its call sign in radiotelephony.

(8) The aircraft shall give a longer transmission for two periods of approximately ten seconds, or alternatively provide such other signals as may be requested by the direction-finding station if the transmission specified in sub-regulation (7) is too short for the direction-finding station to obtain a bearing.

(9) The direction-finding station shall request the aircraft station to repeat a transmission if not satisfied with its observation.

(10) The direction-finding station shall advise the aircraft station when a heading or bearing has been requested in the following form—

(a) the appropriate phrase;

(b) bearing or heading in degrees in relation to the Direction-Finding station, sent as three figures;

(c) class of bearing; and

(d) time of observation, if necessary.

(11) The direction finding control station, after plotting all simultaneous observations, shall determine the observed position of the aircraft and shall advise the aircraft station in the following form when a position has been requested-

(a) the appropriate phrase;

(b) the position;

(c) class of position; and

(d) time of observation.

(12) The aircraft station shall repeat back the message for confirmation or correction as soon as the aircraft station has received the bearing, heading or position.

(13) When positions are given by bearing or heading and distance from a known point other than the station making the report, the reference point shall be an aerodrome, prominent town or geographic feature.

(14) Subject to subregulation (13), an aerodrome shall be given in preference to other places.

(15) When a large city or town is used as a reference place as specified in sub-regulation (13), the bearing or heading, and the distance given shall be measured from its centre.

(16) When the position is expressed in latitude and longitude, groups of figures for degrees and minutes shall-

(a) be used followed by the letter N or S for latitude and the letter E or W for longitude, respectively; or

(b) use the words NORTH, SOUTH, EAST or WEST in radiotelephony.

(17) The direction-finding station estimates of the accuracy of observations, bearings and positions shall be classified as follows-

Bearings -

Class A - accurate within plus or minus 2 degrees;

Class B - accurate within plus or minus 5 degrees;

Class C - accurate within plus or minus 10 degrees;

Class D - accuracy less than Class C.

Positions-

Class A - accurate within 9.3 km (5 NM);

Class B - accurate within 37 km (20 NM);

Class C - accurate within 92 km (50 NM);

Class D - accuracy less than Class C.

(18) Direction finding stations shall have authority to refuse to give bearings, heading or positions when conditions are unsatisfactory or when bearings do not fall within the calibrated limits of the station, stating the reason at the time of refusal.

PART VIII – AERONAUTICAL BROADCASTING SERVICE

71. Broadcast material.

The originator shall prepare a text of broadcast material in the form desired for transmission.

72. Frequencies and schedules.

(1) The broadcast station shall make broadcasts on specified frequencies at specified times and the schedules and frequencies of all broadcasts shall be publicized in appropriate documents.

(2) Where the broadcast station makes a change in frequencies or times the change shall-

(a) be publicized by Notice to Air Men at least two weeks in advance of the change; and

(b) be announced on all regular broadcasts for 48 hours preceding the change and be transmitted once at the beginning and once at the end of each broadcast where practicable.

(3) Scheduled broadcasts other than sequential collective type broadcasts, shall be started at the scheduled time by the general call.

(4) A short notice shall be transmitted at the scheduled time advising recipients to "stand by" and stating the approximate number of minutes of delay if a broadcast is to be delayed.

(5) The broadcast shall not be started until the end of the standby period as defined in sub-regulation (4).

(6) Transmission shall be terminated by each station promptly at the end of the allotted time period whether or not transmission of all material has been completed where broadcasts are conducted on a time allotment basis.

(7) In sequential collective type broadcasts each station shall be ready to commence its broadcasts at the designated time and if for any reason a station does not commence its broadcast at the designated time, the station immediately following in sequence shall wait and then commence its broadcast at its own designated time.

73. Interruption of service.

(1) A broadcast shall be made by another station, if possible, in the event of interruption of service at the station responsible for broadcast, until normal service is resumed.

(2) Where the broadcast in sub-regulation (1) is not possible, and the broadcast is of the type intended for interception by fixed stations, the stations which are required to copy the broadcasts shall continue to listen on the specified frequencies until normal service is resumed.

74. Radiotelephone broadcast procedures.

(1) Transmissions by radiotelephone shall be as natural, short and concise as practicable consistent with clarity.

(2) Rate of speech on radiotelephone broadcasts shall not exceed 100 words per minute.

(3) The preamble of each radiotelephone broadcast shall consist of the general call, station name, and optionally the time of broadcast (UTC).

PART IX – AERONAUTICAL MOBILE SERVICE-DATA LINK COMMUNICATIONS

75. Composition of data link messages.

The composition of data link messages for Aeronautical Mobile Service - data link communication shall be as specified in the Sixth Schedule to these Regulations.

76. Display of data link messages.

(1) Ground and airborne systems shall allow for messages to be appropriately displayed, printed when required and stored in a manner that permits timely and convenient retrieval.

(2) The English language shall be displayed as a minimum whenever textual presentation is required.

77. Controller Pilot Data Link Communication procedures.

The Controller Pilot Data Link Communication procedures in aeronautical mobile service - data link communication shall be as specified in Sixth Schedule to these Regulations.

PART X – EXEMPTIONS

78. Requirements for application for exemption.

(1) A person may apply to the Authority for an exemption from any provision of these Regulations.

(2) Unless in case of emergency, a person requiring exemptions from any of these Regulations shall make an application to the Authority at least sixty days prior to the proposed effective date, giving the following information-

(a) name and contact address including electronic mail and fax if any;

(b) telephone number;

(c) a citation of the specific requirement from which the applicant seeks exemption;

(d) justification for the exemption;

(e) a description of the type of operations to be conducted under the proposed exemption;

(f) the proposed duration of the exemption;

(g) an explanation of how the exemption would be in the public interest;

(h) a detailed description of the alternative means by which the applicant will ensure a level of safety equivalent to that established by the regulation in question;

(i) A safety risk assessment carried out in respect of the exemption applied for;

(j) if the applicant handles international operations and seeks to operate under the proposed exemption, an indication whether the exemption would contravene any provision of the Standards and Recommended Practices of the International Civil Aviation Organization (ICAO); and

(k) any other information that the Authority may require.

(3) Where the applicant seeks emergency processing of an application for exemption, the application shall contain supporting facts and reasons for not filing the application within the time specified in subregulation (2) and satisfactory reason for deeming the application an emergency.

(4) The Authority may in writing, refuse an application made under subregulation (3), where in the opinion of the Authority, the reasons given for emergency processing are not satisfactory.

(5) The application for exemption shall be accompanied by fee prescribed by the Authority.

79. Review and publication.

(1) The Authority shall review the application for exemption made under regulation 79 for accuracy and compliance and if the application is satisfactory, the Authority shall publish a detailed summary of the application for comments, within a prescribed time, in either-

(a) the Kenya *Gazette*; or

(b) aeronautical information circular; or

(c) a daily newspaper with national circulation.

(2) Where application requirements have not been fully complied with, the Authority shall request the applicant in writing, to comply prior to publication or making a decision under subregulation (3).

(3) If the request is for emergency relief, the Authority shall publish the decision as soon as possible after processing the application.

80. Evaluation of the request.

(1) Where the application requirements have been satisfied, the Authority shall conduct an evaluation of the request to include-

(a) determination of whether an exemption would be in the public interest;

(b) a determination, after a technical evaluation of whether the applicant's proposal would provide a level of safety equivalent to that established by the regulation, although where the Authority decides that a technical evaluation of the request would impose a significant burden on the Authority's technical resources, the Authority may deny the exemption on that basis;

(c) a determination of whether a grant of the exemption would contravene these Regulations; and

(d) a recommendation based on the preceding elements, of whether the request shall be granted or denied, and of any conditions or limitations that shall be part of the exemption.

(2) The Authority shall notify the applicant in writing of, the decision to grant or deny the request and publish a detailed summary of its evaluation and decision.

(3) The summary referred to in sub-regulation (2) shall specify the duration of the exemption and any conditions or limitations of the exemption.

(4) If the exemption affects a significant population of the aviation community of the Kenya the Authority shall publish the summary in aeronautical information circular.

PART XI – GENERAL PROVISIONS

81. Drug and alcohol testing and reporting.

(1) Any person who performs any function prescribed by these Regulations directly or by contract under the provisions of these Regulations may be tested for drug or alcohol usage.

(2) A person who-

(a) refuses to submit to a test to indicate the percentage by weight of alcohol in the blood; or

(b) refuses to submit to a test to indicate the presence of narcotic drugs, marijuana, or depressant or stimulant drugs or substances in the body, when requested by a law enforcement officer or the Authority, or refuses to furnish or to authorise the release of the test results requested by the Authority shall-

(i) be denied any licence, certificate, rating, qualification, or authorisation issued under these Regulations for a period of up to one year from the date of that refusal; or

(ii) have their licence, certificate, rating, qualification, or authorisation issued under these Regulations suspended or revoked.

(3) Any person who is convicted for the violation of any local or national statute relating to the growing, processing, manufacture, sale, disposition, possession, Air Navigation Services Provider or exportation, or importation of narcotic drugs, marijuana, or depressant or stimulant drugs or substances, shall-

(a) be denied any license, certificate, rating, qualification, or authorisation issued under these Regulations for a period of up to one year after the date of conviction; or

(b) have their licence, certificate, rating, qualification, or authorisation issued under these Regulations suspended or revoked.

82. Change of Name.

(1) An Air Navigation Services Provider holder of a certificate issued under these Regulations may apply to the Authority for-

(a) replacement of the certificate if lost or destroyed;

(b) change of name on the certificate; or

(c) an endorsement on the certificate.

(2) When applying under paragraph (1), the holder of a certificate shall submit to the Authority-

(a) the original certificate or a copy thereof in case of loss;

(b) and a court order, or other legal document verifying the name change.

(3) The Authority shall return to the holder of a certificate, with the appropriate changes applied for, if any, the originals specified under paragraph (2) and, where necessary, retain copies thereof.

83. Change of address.

(1) A holder of an Air Navigation Services Provider certificate issued under these Regulations shall notify the Authority of the change in the physical and mailing address within fourteen days of such change.

(2) A person who does not notify the Authority of the change in the physical and mailing address within the time frame specified in sub-regulation (1) shall not exercise the privileges of the certificate.

84. Replacement of documents.

A person may apply to the Authority in the prescribed form for replacement of documents issued under these Regulations if such documents are lost or destroyed.

85. Use and retention of documents and records.

(1) A person shall not—

(a) use any certificate or exemption issued or required by or under these Regulations which has been forged, altered, cancelled, or suspended, or to which he is not entitled; or

(b) forge or alter any certificate or exemption issued or required by or under these Regulations; or

(c) lend any certificate or exemption issued or required by or under these Regulations to any other person; or

(d) make any false representation for the purpose of procuring for himself or any other person the grant, issue, renewal or variation of any such certificate or exemption;

(e) mutilate, alter, render illegible or destroy any records, or any entry made therein, required by or under these Regulations to be maintained, or knowingly make, or procure or assist in the making of, any false entry in any such record, or wilfully omit to make a material entry in such record.

(2) All records required to be maintained by or under these Regulations shall be recorded in a permanent and indelible material.

(3) A person shall not issue any certificate or exemption under these Regulations unless he is authorised to do so by the Authority.

(4) A person shall not issue any certificate referred to in sub- regulation (3) unless he has satisfied himself that all statements in the certificate are correct, and that the applicant is qualified to hold that certificate.

86. Reports of violation.

(1) Any person who knows of a violation of the Act, or any Regulations, rules, or orders issued there under, shall report it to the Authority.

(2) The Authority may determine the nature and type of investigation or enforcement action that need to be taken.

87. Failure to comply with direction.

Any person who fails to comply with any direction given to him by the Authority or by any authorised person under any provision of these Regulations shall be deemed for the purposes of these Regulations to have contravened that provision.

88. Aeronautical fees.

(1) The Authority shall notify in writing the fees to be charged in connection with the issue, renewal or variation of any certificate, test, inspection or investigation required by, or for the purpose of these Regulations any orders, notices or proclamations made there under.

(2) Upon an application being made in connection with which any fee is chargeable in accordance with the provisions of sub-regulation (1), the applicant shall be required, before the application is accepted, to pay the fee so chargeable.

(3) If, after that payment has been made, the application is withdrawn by the applicant or otherwise ceases to have effect or is refused, the Authority shall not refund the payment made.

PART XII – OFFENCES AND PENALTIES

89. Contravention of Regulations.

A person who contravenes any provision of these Regulations may have his certificate or exemption cancelled or suspended.

90. Penalties.

A person who contravenes any provision of these Regulations, orders, notices or proclamations made there under shall, upon conviction, be liable to a fine not exceeding one million shillings or to imprisonment for a term not more than six months or both, and in the case of a continuing contravention, each day of the contravention shall constitute a separate offence.

(2) If it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these Regulations, orders, notices or proclamations made there under was due to any cause not avoidable by the exercise of reasonable care by that person, the act or omission shall be deemed not to be a contravention by that person of that provision.

91. Appeal.

Where any person is aggrieved by any order made under these Regulations the person may, within twenty one days of such order being made, appeal against the order to a National Civil Aviation Administrative Review Tribunal established under the Act.

92. Transitional provisions.

(1) Any licence, certificate, permit, approvals or authorization issued or granted by the Authority before the commencement of these Regulations shall, unless rendered invalid, continue to be in force to the extent that the terms and conditions thereof are not inconsistent with the provisions of these Regulations or until expiry or are revoked, annulled or replaced.

(2) Notwithstanding any other provision of these Regulations, a person who at the commencement of these Regulations, is carrying out any acts, duties or operations affected by these Regulations shall, within one (1) year from the date of commencement, or within such longer time that the Cabinet Secretary may, by notice in the *Gazette* prescribe, comply with the requirements of these Regulations or cease to carry out such acts, duties or operations.

FIRST SCHEDULE

[rr. 28, 29, 36 and 40]

MATERIAL PERMITTED IN AFS MESSAGES

1.1. Material Permitted In AFS Messages

Note.— The provisions contained in this Schedule do not apply to ATS voice communications.

1.1.1 The following characters are allowed in text messages:

Letters: ABCDEFGHIJKLMNOPQRSTUVWXYZ

Figures: 1 2 3 4 5 6 7 8 9 0

Other signs: - (hyphen)

? (question mark)

: (colon)

((open bracket)

) (close bracket)

. (full stop, period, or decimal point)

, (comma)

' (apostrophe)

= (double hyphen or equal sign)

/ (oblique)

+ (plus sign)

Characters other than those listed above shall not be used in messages unless absolutely necessary for understanding of the text. When used, they shall be spelled out in full.

1.1.2 For the exchange of messages over the teletypewriter circuits, the following characters of International Alphabet No. 5 (1A-5) shall be permitted:

- characters 0/1 to 0/3, 0/7 - in the priority alarm, 0/10, 0/11 - in the ending sequence, 0/13;

- characters 2/0, 2/7 to 2/9, 2/11 to 2/15;

- characters 3/0 to 3/10, 3/13, 3/15;

- characters 4/1 to 4/15;

- characters 5/0 to 5/10; and

- character 7/15.

Note.— The foregoing provisions are not intended to prevent the use of the full 1A-5 after agreement between the Administrations concerned.

1.1.3 Roman numerals shall not be employed. If the originator of a message wishes the addressee to be informed that roman figures are intended, the Arabic figure or figures shall be written and preceded by the word ROMAN.

1.1.4 Messages using 1A-5 shall not contain:

(1) character 0/1 (SOH) other than the one in the heading;

(2) character 0/2 (STX) other than the one in the origin line;

(3) character 0/3 (ETX) other than the one in the ending;

(4) any uninterrupted sequence of characters 5/10, 4/3, 5/10, 4/3 in this order (ZCZC);

(5) any uninterrupted sequence of characters 2/11, 3/10, 2/11, 3/10 in this order (+:+:);

(6) any uninterrupted sequence of four times character 4/14 (NNNN); and

(7) any uninterrupted sequence of four times character 2/12 (,,,,).

1.1.5 The text of messages shall be drafted in plain language or in abbreviations and codes. The originator shall avoid the use of plain language when reduction in the length of the text by appropriate abbreviations and codes is practicable. Words and phrases which are not essential, such as expressions of politeness, shall not be used.

1.1.6 If the originator of a message wishes alignment functions [<≡] to be transmitted at specific places in the text part of such message, the sequence [<≡] shall be written on each of those places.

SECOND SCHEDULE

[rr. 43, 44 and 50]

ROUTING OF MESSAGES

1.1 Routing Of Messages

1.1.1 All communications shall be routed by the most expeditious route available to effect delivery to the addressee.

1.1.2 Predetermined diversion routing arrangements shall be made, when necessary, to expedite the movement of communication traffic. Each communication centre shall have the appropriate diversion routing lists, agreed to by the Administration(s) operating the communication centres affected and shall use them when necessary.

1.1.2.1 Diversion routing shall be initiated:

(1) in a fully automatic communication centre:

(a) immediately after detection of the circuit outage, when the traffic is to be diverted via a fully automatic communication centre;

(b) within a 10-minute period after detection of the circuit outage, when the traffic is to be diverted via anon-fully automatic communication centre;

(2) in a non-fully automatic communication centre within a 10-minute period after detection of the circuit outage.

Service message notification of the diversion requirement shall be provided where no bilateral or multilateral prearranged agreements exist.

1.1.3 As soon as it is apparent that it will be impossible to dispose of traffic over the Aeronautical Fixed Service within a reasonable period, and when the traffic is held at the station where it was filed, the originator shall be consulted regarding further action to be taken, unless:

(a) otherwise agreed between the station concerned and the originator; or

(b) arrangements exist whereby delayed traffic is automatically diverted to commercial telecommunication services without reference to the originator.

Note.— The expression "reasonable period" means a period of time such that it seems probable that the traffic will not be delivered to the addressee within any fixed transit period applicable to the category, of traffic concerned, or, alternatively, any predetermined period agreed between originators and the telecommunication station concerned.

1.2. *Supervision of message traffic*

1.2.1 *Continuity of message traffic.* The receiving station shall check the transmission identification of incoming transmissions to ensure the correct sequence of channel sequence numbers of all messages received over that channel.

1.2.1.1 When the receiving station detects that one or more channel-sequence numbers are missing, it shall send a complete service message to the previous station rejecting receipt of any message that may have been transmitted with such missing number(s). The text of this service message shall comprise the signal QTA, the

procedure signal MIS followed by one or more missing transmission.

Note. - The following examples illustrate application of the above-mentioned procedure. In example 2) the hyphen (-) separator is understood to mean "through" in plain language.

1) when one channel-sequence number is missing:

SVC→QTA→MIS→ABC↑123↓<≡

2) when several channel-sequence numbers are missing:

SVC→QTA→MIS→ABC↑123-126↓<≡

1.2.1.1.1 When the provisions of 1.2.1.1 are applied, the station notified of the missing message(s) condition by the service message shall reassume its responsibility for transmission of the message (or messages) that it had previously transmitted with the transmission identification concerned, and shall retransmit that message (or those messages) with a new (correct in sequence) transmission identification. The receiving station shall synchronize such that the next expected channel-sequence number is the last received channel-sequence number plus one.

1.2.1.2 When the receiving station detects that a message has a channel sequence number less than that expected, it shall advise the previous station using a service message with a text comprising:

(1) the abbreviation SVC;

(2) the procedure signal LR followed by the transmission identification of the received message;

(3) the procedure signal EXP followed by the transmission identification expected;

(4) the end-of-text signal.

Note.— The following example illustrates application of the above-mentioned procedure:

SVC→LR→ABC↑123→↓EXP→ABC↑135↓<≡

1.2.1.2.1 When the provisions of 1.2.1.2 are applied, the station receiving the out-of sequence message shall synchronize such that the next expected channel-sequence number is the last received channel-sequence number plus one. The previous station shall check its outgoing channel-sequence numbers and, if necessary, correct the sequence.

1.2.2 *Misrouted messages*

Note.— A message is considered to have been misrouted when it contains no relaying instructions, expressed or implied, on which the receiving station can take action.

Note.— The expression "reasonable period" means a period of time such that it seems probable that the traffic will not be delivered to the addressee within any fixed transit period applicable to the category, of traffic concerned, or, alternatively, any predetermined period agreed between originators and the telecommunication station concerned.

1.2.2.1 When the receiving station detects that a message has been misrouted to it, it shall either:

1) send a service message to the previous station rejecting receipt of the misrouted message; or

2) itself assume responsibility for transmission of the message to all addressee indicators.

Note.— The procedure of 2) may be preferred at stations using fully automatic relay methods or a semi-automatic relay technique without continuous tape.

1.2.2.2 When the provisions of 1.2.2.1 are applied, the text of the service message shall comprise the abbreviation SVC, the signal QTA, the procedure signal MSR followed by the transmission identification and of the misrouted message and the end-of-text signal.

Note.— The following example illustrates application of the above-mentioned procedure:

SVC→QTA→MSR→ABC↑123↓<≡

1.2.2.3 When, as a result of the provisions of 1.2.2.2, a sending station is notified of the misrouted message condition by service message, it shall reassume its responsibility for the message and shall retransmit as necessary on the correct outgoing channel or channels.

1.2.3 When a circuit becomes interrupted and alternative facilities exist, the last channel-sequence numbers sent and received shall be exchanged between the stations concerned. Such exchanges shall take the form of complete service messages with the text comprising the abbreviation SVC, the procedure signals LR and LS followed by the transmission identifications of the relevant messages and the end-of-text signal.

Note.— The following example illustrates application of the above-mentioned procedure:

SVC→LR→ABC↑123↓→LS→BAC↑321↓<≡

1.3 Failure of communications

1.3.1 Should communication on any fixed service circuit fail, the station concerned shall attempt to re-establish contact as soon as possible.

1.3.2 If contact cannot be re-established within a reasonable period on the normal fixed service circuit, an appropriate alternative circuit shall be used. Attempts shall be made to establish communication on any authorized fixed service circuit available.

1.3.2.1 If these attempts fail, use of any available air-ground frequency shall be permitted only as an exceptional and temporary measure when no interference to aircraft in flight is ensured.

1.3.2.2 Where a radio circuit fails due to signal fadeout or adverse propagation conditions, a receiving watch shall be maintained on the regular fixed service frequency normally in use. In order to re-establish contact on this frequency as soon as possible there shall be transmitted:

(a) the procedure signal DE;

(b) the identification of the transmitting station transmitted three times;

(c) the alignment function [<≡];

(d) the letters RY repeated without separation for three lines of page copy;

(e) the alignment function [<≡];

(f) end-of-message signal (NNNN). The foregoing sequence shall be repeated as required.

1.3.2.2 A station experiencing a circuit or equipment failure shall promptly notify other stations with which it is in direct communication if the failure will affect traffic routing by those stations. Restoration to normal shall also be notified to the same stations.

1.3.3 Where diverted traffic will not be accepted automatically or where a predetermined diversion routing has not been agreed, a temporary diversion routing shall be established by the exchange of service messages. The text of such service messages shall comprise:

(1) the abbreviation SVC;

(2) the procedure signal QSP;

(3) if required, the procedure signal RQ, NO or CNL to request, refuse or cancel a diversion;

(4) identification of the routing areas, States, territories, locations, or stations for which the diversion applies;

(5) the end-of-text signal.

Note.— The following examples illustrate application of the above-mentioned procedures:

a) to request a diversion:
SVC→QSP→RQ→C→K→BG→BI↓<≡
b) to accept a diversion:
SVC→QSP→C→K→BG→BI↓<≡
c) to refuse a diversion:
SVC→QSP→NO→C→K→BG→BI↓<≡
d) to cancel a diversion:
SVC→QSP→CNL→C→K→BG→BI↓<≡

THIRD SCHEDULE

[rr. 52, 53 and 54]

1.0 MESSAGE FORMAT - INTERNATIONAL ALPHABET NO.5 (IA-5)-

1.1. When it has been agreed between the Administrations concerned to use International Alphabet No. 5 (IA-5) the format described in 1.1 through 1.3 shall be used. All messages, other than those prescribed in regulation 47 and 1.1.5 shall comprise the components specified in 1.1.1 to 1.1.6 inclusive.

Note 1.— An illustration of the IA-5 message format is given in Figure 1-1.

Note 2.— In the subsequent standards relative to message format the following symbols have been used in making reference to the functions assigned to certain signals in IA-5. Symbol Signification

< CARRIAGE RETURN (character position 0/13)
≡ LINE FEED (character position 0/10)
→ SPACE (character position 2/0).

1.1.1 *Heading*

1.1.1.1 The heading shall comprise:

(a) start-of-heading (SOH) character 0/1;

(b) transmission identification comprising:

1) circuit or link identification;

2) channel-sequence number;

(c) additional service information (if necessary) comprising:

(1) one SPACE;

(2) no more than 10 characters.

1.1.1.1.1 On point-to-point circuits or links, the identification shall consist of three letters selected and assigned by the transmitting station; the first letter identifying the transmitting, the second letter the receiving end of the circuit, and the third letter the channel. Where only one channel exists, the letter A shall be assigned. Where more than one channel between stations is provided, the channels shall be identified as A, B, C, etc., in respective order. On multipoint channels, the identification shall consist of three letters selected and assigned by the circuit control or master station.

1.1.1.1.2 Except as provided in 1.1.1.3 three-digit channel-sequence numbers from 001 to 000 (representing 1 000) shall be assigned sequentially by telecommunication stations to all messages transmitted directly from one station to another. A separate series of these numbers shall be assigned for each channel and a new series shall be started daily at 0000 hours.

1.1.1.1.3 The expansion of the channel-sequence number to preclude duplication of the same numbers during the 24-hour period shall be permitted subject to agreement between the Authorities responsible for the operation of the circuit.

1.1.1.1.4 The transmission identification shall be sent over the circuit in the following sequence:

a) transmitting-terminal letter;

b) receiving-terminal letter;

c) channel-identification letter;

d) channel-sequence number.

1.1.1.1.5 Additional service information shall be permitted to be inserted following the transmission identification subject to agreement between the Authorities responsible for the operation of the circuit. Such additional service information shall be preceded by a SPACE (→) followed by not more than 10 characters inserted into the heading of message immediately following the last digit of the channel-sequence number and shall not contain any alignment functions. When no such additional service information is added the information in 1.11.1.4 shall be followed immediately by that of 1.1.2.

1.1.2 *Address*

1.1.2.1 The address shall comprise:

a) alignment function [<≡];
b) priority indicator;
c) addressee indicator(s);
d) alignment function [<≡].

1.2.1.1 The priority indicator shall consist of the appropriate two-letter group assigned by the originator in accordance with the following:

Message part	Component of the	Elements of the component	Teletypewriter

		message part		
		Start-of-Heading Character	One Character (0/1)	SOH
H E A D I N G	HEADING LINE	Transmission Identification	a) Transmitting-terminal letter b) Receiving-terminal letter c) Channel-identification letter d) Channel-sequence number	-
		If necessary, additional Service Indication	a) One SPACE b) No more than the remainder of the line	-->
	ADDRESS	Alignment function	One CARRIAGE RETURN, one LINE FEED	<CR>
		Priority Indicator	The relevant 2-letter group	-
		Addressee Indicator(s)	One SPACE and an 8-letter group Example: *EGLLZRX*-->*EGLLYKY*-->*EGLLACAD*	
		Alignment Function(s)	One CARRIAGE RETURN, one LINE FEED	<CR>
	ORIGIN	Filing time	6 digit date-time group specifying when the message was filed for transmission	.....
		Originator indicator	a) One SPACE b) 8-letter group identifying the message originator	----------.
		Priority Alarm (used only in teletypewriter operation for distress messages)	Five characters (0/1) (BEL)	
		Optional Heading Information	a) One SPACE	

	b) Additional data not to exceed the remainder of the line	
Alignment function	One CARRIAGE RETURN, one LINE FEED	<CR>
Start of text character	One character (0/2)	STX
Beginning of Text	Specific identification of Addressees *(if necessary)* with each followed by on CARRIAGE RETURN, one LINE FEED *(if necessary)* The English word FROM *(if necessary)* Specific identification of Originator *(if necessary)* The English word STOP followed by one CARRIAGE RETURN, one LINE FEED *(if necessary)* and/or Originator's reference (if used)	
Message Text	Message Text with one CARRIAGE RETURN, one LINE FEED at the end of each printed line of the Text except for the last one	
Confirmation *(if necessary)*	a) One CARRIAGE RETURN, one LINE FEED b) The abbreviation CFM followed by the portion of the TEXT being confirmed.	
Correction *(if necessary)*	a) One CARRIAGE RETURN, one LINE FEED b) The abbreviation COR followed by the correction of an error made in the preceding TEXT	

ENDING	Alignment function	One CARRIAGE RETURN, one LINE FEED	<CR>
	Page-feed Sequence	One character (0/11)	VT
	End-of Text Character	One character (0/3)	ETX

Figure 1-1. Message format International Alphabet No. 5 (1A-5)

Priority indicator	*Message category*
SS	distress messages
DD	urgency messages
FF	flight safety messages
GG	meteorological messages
GG	flight regularity messages
GG	aeronautical information services messages
KK	aeronautical administrative messages) as appropriate service messages

1.1.2.1.2 The order of priority shall be the same as specified in regulation 41.

1.1.2.1.3 An addressee indicator, which shall be immediately preceded by a SPACE, except when it is the first address indicator of the second or third line of addresses, shall comprise:

a) the four-letter location indicator of the place of destination;

b) the three-letter designator identifying the organization! function (aeronautical authority, service or aircraft operating agency) addressed;

c) an additional letter, which shall represent a department, division or process within the organization/function addressed. The letter X shall be used to complete the address when explicit identification is not required.

1.1.2.1.3.1 Where a message is to be addressed to an organization that has not been allocated an ICAO three-letter designator of the type prescribed in 1.1.2.1.3 the location indicator of the place of destination shall be followed by the ICAO three-letter designator YYY (or the ICAO three-letter designator YXY in the case of a military service or organization). The name of the addressee organization shall then be included in the first item in the text of the message. The eighth position letter following the ICAO three-letter designator YYY or YXY shall be the filler letter X.

1.1.2.1.3.2 Where a message is to be addressed to an aircraft in flight and, therefore, requires handling over the Aeronautical Fixed Telecommunication Network for part of its routing before retransmission over the Aeronautical Mobile Service, the location indicator of the aeronautical station which is to relay the message to the aircraft shall be followed by the ICAO three-letter designator ZZZ. The identification of the

aircraft shall then be included in the first item of the text of the message. The eighth position letter following the ICAO three-letter designator ZZZ shall be the filler letter X.

1.1.2.1.4 The complete address shall be restricted to three lines of page-printing copy, and, except as provided in 1.2 a separate addressee indicator shall be used for each addressee whether at the same or different locations.

1.1.2.1.5 The completion of the addressee indicator group(s) in the address of a message shall be immediately followed by the alignment function.

1.1.2.1.6 Where messages are offered in page-copy form for transmission and contain more addressee indicators than can be accommodated on three lines of a page copy, such messages shall be converted, before transmission, into two or more messages, each of which shall conform with the provisions of 1.1.2.1.5. During such conversion, the addressee indicators shall, in so far as practicable, be positioned in the sequence which will ensure that the minimum number of retransmissions will be required at subsequent communication centres.

1.1.2.2 *Origin*

The origin shall comprise:

a) filing time;

b) originator indicator;

c) priority alarm (when necessary);

d) optional heading information;

e) alignment function [<=];

f) start-of-text character, character 0/2 (STX).

1.1.2.2.1 The filing time shall comprise the 6-digit date-time group indicating the date and time of filing the message for transmission.

1.1.2.2.2 The originator indicator, which shall be immediately preceded by a SPACE, shall comprise:

a) the four-letter location indicator of the place at which the message is originated;

b) the three-letter designator identifying the organization/ function (aeronautical authority, service or aircraft operating agency) which originated the message;

c) an additional letter which shall represent a department, division or process within the organization/function of the originator. The letter X shall be used to complete the address when explicit identification is not required.

1.1.2.2.3 Where a message is originated by an organization that has not been allocated an ICAO three-letter designator of the type prescribed in 1.2.2.2, the location indicator of the place at which the message is originated shall be followed immediately by the ICAO three-letter designator YYY followed by the filler letter X (or the ICAO

three-letter designator YXY followed by the filler letter X in the case of a military service or organization). The name of the organization (or military service) shall then be included in the first item in the text of the message.

1.1.2.2.3.1 Messages relayed over the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK that have been originated in other networks shall use a valid AERONAUTiCAL FIXED TELECOMMUNICATION NETWORK originator indicator that has been agreed for use by the relay or gateway function linking the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK with the external network.

1.1.2.2.4 Where a message originated by an aircraft in flight requires handling on the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK for part of its routing before delivery, the originator indicator shall comprise the location indicator of the aeronautical station responsible for transferring the message to the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK , followed immediately by the ICAO three-letter designator ZZZ followed by the filler letter X. The identification of the aircraft shall then be included in the first item in the text of the message.

1.1.2.2.5 The priority alarm shall be used only for distress messages. When used it shall consist of five successive BEL (0/7) characters.

Note.— Use of the priority alarm will actuate a bell (attention) signal at the receiving teletypewriter station, other than at those fully automatic stations which may provide a similar alann on receipt of priority indicator SS, thereby alerting supervisory personnel at relay centres and operators at tributary stations, so that immediate attention may be given to the message.

1.1.2.2.6 The inclusion of optional data in the origin line shall be permitted provided a total of 69 characters is not exceeded and subject to agreement between the Administrations concerned. The presence of the optional data field shall be indicated by one occurrence of the SPACE character immediately preceding optional data.

1.1.2.2.6.1 When additional addressing information in a message needs to be exchanged between source and destination addresses, it shall be conveyed in the optional data field (ODF), using the following specific format:

a) characters one and full stop (1.) to indicate the parameter code for the additional address function;

b) three modifier characters, followed by an equal sign (=) and the assigned 8-character ICAO address; and

c) the character hyphen (-) to terminate the additional address parameter field.

1.1.2.2.6.1.1 When a separate address for service messages or inquiries is different from the originator indicator, the modifier SVC shall be used.

1.1.2.2.7 The origin line shall be concluded by an alignment function [<] and the start-of-text (STX) (0/2) character.

1.1.3 *Text*

1.1.3.1 The text of messages shall be drafted in accordance with 1.1.5 and shall consist of all data between STX and ETX.

Note.— When message texts do not require conversion to the ITA-2 code and format and do not conflict with ICAO message types or formats in PANS-ATM (ICAO Doc 4444), Administrations may make full use of the characters available in International Alphabet No. 5 (IA-5).

1.1.3.2 When an originator's reference is used, it shall appear at the beginning of the text, except as provided in 1.1.3.3 and 1.1.3.4.

1.1.3.3 When the ICAO three-letter designators YXY, YYY or ZZZ comprise the second element of the addressee indicator and it, therefore, becomes necessary to identify in the text the specific addressee of the message, such identification group shall precede the originator's reference (if used) and become the first item of the text.

1.1.3.4 When the ICAO three-letter designators YXY, YYY or ZZZ comprise the second element of the originator indicator and it thus becomes necessary to identify in the text the name of the organization (or military service) or the aircraft which originated the message, such identification shall be inserted in the first item of the text of the message.

1.1.3.5 When applying the provisions of 1.1.3.3 and 1.1.3.4 to messages where the ICAO three-letter designator(s) YXY, YYY, ZZZ refer to two or more different organizations (or military services), the sequence of further identification in the text shall correspond to the complete sequence used in the address and originator indicator of the message. In such instance, each addressee identification shall be followed immediately by an alignment function. The name of the (YXY, YYY or ZZZ) organization originating the message shall then be preceded with "FROM". "STOP" followed by an alignment function shall then be included in the text at the end of this identification and preceding the remainder of text.

1.1.3.6 An alignment function shall be transmitted at the end of each printed line of the text. When it is desired to confirm a portion of the text of a message in teletypewriter operation, such confirmation shall be separated from the last text group by an alignment function and shall be indicated by the abbreviation CFM followed by the portion being confirmed.

1.1.3.7	Where messages are prepared off-line, e.g. by preparation of a paper tape, errors in the text shall be corrected by backspacing and replacing the character in error by character DEL (7/15).
1.1.3.8	Corrections to textual errors made in on-line operations shall be corrected by inserting -->E-->E-->E--> following the error, then retyping the last correct word (or group).
1.1.3.9	When it is not discovered until later in the origination process that an error has been made in the text, the correction shall be separated from the last text group, or confirmation, if any, by an alignment function [<=]. This shall be followed by the abbreviation COR and the correction.
1.1.3.10	Stations shall make all indicated corrections on the page-copy prior to local delivery or a transfer to a manually operated circuit.
1.1.3.11	When messages are transmitted only on low-speed circuits, the text of messages entered by the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK origin station shall not exceed 1 800 characters in length. AERONAUTICAL FIXED TELECOMMUNICATION NETWORK messages exceeding 1 800 characters shall be entered by the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK origin station in the form of separate messages

Note 1.— Low-speed circuits operate at 300 bits per second or less.

Note 2.— The character count includes all printing and non-printing characters in the text from, but not including, the start-of-text signal to, but not including, the first alignment function of the ending.

1.1.3.11.1	The transmission on medium or high-speed circuits of AERONAUTICAL FIXED TELECOMMUNICATION NETWORK messages with text 1874 - exceeding 1 800 characters that have not been entered by the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK origin station in the form of separate messages shall be subject to agreement between the Administrations concerned and not diminish the performance characteristics of the network or link.

Note 1.— Medium-speed circuits operate at speeds in the range between 300 and 3 000 bits per second. High-speed circuits operate at speeds in excess of 3 000 bits per second.

Note 2.— The character count includes all printing and non-printing characters in the text from, but not including,

1.1.3.12	*Ending*
1.1.3.12.1	The ending of a message shall comprise the following in the order stated:

a) an alignment [<≡] function following the last line of text;

b) page-feed character, character 0/11 (VT);

c) end-of-text character 0/3 (ETX).

1.1.3.12.1.1 Station terminal equipment (page printers) on the International Alphabet Number 5 (IA-5) shall be provided with a capability to generate sufficient line feed functions for local station use upon the reception of a VERTICAL TAB character (0/11).

1.1.3.12.1.2 When the message does not transit ITA-2 portions of the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK, or where Administrations have made provisions to add automatically the second carriage return before transmission to an ITA-2 circuit, one carriage return in the alignment function and end-of-line function shall be permitted subject to agreement between the Administrations concerned.

1.1.3.12.1.3 Messages entered by the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK origin station shall not exceed 2 100 characters in length, when transmitted only on low-speed circuits.

Note 1.— Low-speed circuits operate at 300 bits per second or less.

Note 2.— The character count includes all printing and non-printing characters in the message from and including the start-of-heading character (SOH) to and including the end-of-text character.

1.1.3.12.1.4 The transmission on mediumor high-speed circuits of AERONAUTICAL FIXED TELECOMMUNICATION NETWORK messages exceeding 2 100 characters that have not been entered by the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK origin station in the form of separate messages shall be subject to agreement between the Administrations concerned and not diminish the performance characteristics of the network or link.

Note 1.— Medium-speed circuits operate at speeds in the range between 300 and 3 000 bits per second. High-speed circuits operate at speeds in excess of 3 000 bits per second.

Note 2.— The character count includes all printing and non-printing characters in the message from and including the start-of-heading character (SOH) to and including the end-of-text character.

1.1.4 Except as provided in 1.1.5 to 1.1.6 and 116, the procedures of Regulations 49 to 51 shall be used for messages using IA-S code.

1.1.4.1 The transmission of message texts that do not require conversion to the IA-2 code and format and with message lines containing more than 69 printable and non-printable characters shall be subject to agreement between the Administrations concerned

1.1.5 *Channel-check transmissions.* In the case where continuous control of channel condition is not provided the following periodic transmissions shall be sent on teletypewriter circuits:

1) heading line; S

2) alignment function T; X

3) the procedure signal CH; E

4) alignment function T.X

The receiving station shall then check the transmission identification of this incoming transmission to ensure its correct sequence in respect of all messages received over that incoming channel.

Note.— Application of this procedure provides some measure of assurance that channel continuity is maintained; however, a continuously controlled channel is much more preferable in that data integrity can also be improved.

1.1.5.1 Where a circuit is unoccupied and uncontrolled, the transmission identified in 1.1.5 shall be sent at H + 00, H + 20, H + 40.

1.1.6 The receipt of distress messages (priority indicator SS) shall be individually acknowledged by the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK destination station by sending a service message to the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK origin station. Such acknowledgement of receipt shall take the format of a complete message addressed to the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK origin station, shall be assigned priority indicator SS and the associated priority alarm, and shall have a text comprising:

1) the procedure signal R;

2) the origin line without priority alarm, or optional heading information of the message being acknowledged;

3) the ending.

Note.— The following example illustrates the application of the 1.6 procedures:

Heading

<≡ SS → LECBZRZX <≡

121322 → EGLLYFYX (Priority Alarm) <≡ S
TR → 121319 → LECBZRZX <≡ X

Ending.

1.2. Action taken on mutilated messages in IA-5 detected in computerized AERONAUTICAL FIXED TELECOMMUNICATION NETWORK relay stations

1.2.1 On channels employing continuous control the mutilation detection and subsequent recovery shall be a function of the link control procedures and shall not require the subsequent sending of service or CHECK TEXT NEW ENDING ADDED messages.

1.2.2 On channels not employing continuous control the relay station shall employ the following procedures:

1.2.2.1 If, during the reception of a message a relay station detects that the message has been mutilated at some point ahead of the end-of-text character, it shall:

1) cancel the onward routing responsibility for the message;

2) send a service message to the transmitting station requesting a retransmission.

Note. - The following example illustrates a typical text of a service message in which the foregoing procedure has been applied in respect of a mutilated message:

SVC→QTA→RPT→ABC 123 (ending — *see* 1.1.3.12.1)

1.2.2.2 When the provisions of 1.2.2.1 are applied, the station receiving the service message shall

reassume responsibility for the referenced message with a new (i.e. correct in sequence) transmission identification. If that station is not in possession of an unmutilated copy of the original message, it shall send a message to the originator as identified by the originator indicator in the origin of the mutilated message, requesting repetition of the incorrectly received message.

Note.— The following example illustrates a typical text of a service message in which the foregoing procedure has been applied in respect of a mutilated message having as its origin "141335 CYULACAX":

SVC→QTA→RPT→141335→CYULACAX (ending)

1.2.3 If, after transmission of the text material of a message, a relay station can detect that there is no complete end-of-text character, but has no practical means of discovering whether the irregularity has affected only the end-of-text character, or whether it has also caused part of the original text to have been lost, it shall insert into the channel the following:

1) <≡CHECK≡TEXT≡ NEW→ENDING→ADDED

2) its own station identification;

3) (ending).

1.3. Transfer of AERONAUTICAL FIXED TELECOMMUNICATION NETWORK messages over code and byte independent circuits and networks. When AERONAUTICAL FIXED TELECOMMUNICATION NETWORK messages are transferred across code and byte independent circuits and networks of the AFS, the following shall apply.

1.3.1 Except as provided in 1.3.3 the heading line of the message shall be omitted. The message shall start with an alignment function followed by the address.

1.3.2 The message shall end with a complete ending.

1.3.3 For the purposes of technical supervision, entry centres shall be permitted to insert additional data preceding the first alignment function and/or following the ending of the message.

1.3.3.1 When the provisions of 1.3.3 are applied, the data added shall not include either carriage return or line feed characters or any of the combinations listed in 1.1.3 of the First Schedule.

FOURTH SCHEDULE

[r. 55]

ATS MESSAGE HANDLING SERVICES (ATSMHS) AND INTER-CENTRE COMMUNICATIONS (ICC)

1.1. ATS MESSAGE HANDLING SERVICES (ATSMHS)

The ATS message service of the ATS (air traffic services) message handling service (ATSMHS) application shall be used to exchange ATS messages between users over the aeronautical telecommunication network (ATN) internet.

Note 1.— The ATS message service comprised in the ATS message handling service application aims at providing generic message services over the ATN internet communication service (ICS). It may, in turn, be used as a communication system by user-applications communicating over the ATN. This may be achieved, for example, by means of application programme interfaces to the ATS message service.

Note 2.— The detailed specification of the ATS message handling service application is included in the Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN) (ICAO Doc 9705), Sub-volume III.

Note 3.— The ATS message service is provided by the implementation over the ATN internet communication service of the message handling systems specified in ISOIIEC (International Organization for Standardization/International Electrotechnical Commission) 10021 and ITU-T (International Telecommunication Union - Telecommunication Standardization Sector) X.400 and complemented by the additional requirements specified in the Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN) (ICAO Doc 9705). The two sets of documents, the ISO/IECMOTIS (Message-Oriented Text Interchange System) International Standards and the ITU-T X.400 Series of Recommendations (1988 or later) are, in principle, aligned with each other. However, there are a small number of differences. In the above-mentioned document, reference is made to the relevant ISO International Standards and International Standardized Profiles (ISP), where applicable. Where necessary, e.g. for reasons of interworking or to point our differences, reference is also made to the relevant X.400 Recomnmnendations.

Note 4.— The following types of ATN end systems performing ATS message handling services are defined in the Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN) (ICAO Doc 9705), Sub-volume III:

1) *an ATS message server;*

2) *an ATS message user agent;*

3) *an AERONAUTICAL FIXED TELECOMMUNICATION NETWORK /AMHS gateway (aeronautical fixed telecommnunication network/ATS message handling system); and Connections may be established over the internet comnmnunications service between any pair constituted of these ATN end systems (see Table 1-]).*

1.2. Inter-Centre Communications (ICC)

The inter-centre communications (ICC) applications set shall be used to exchange ATS messages between air traffic service users over the ATN internet.

Note I - The ICC applications set enables the exchange of information in support of the following operational services:

(a) *flight notification;*

(b) *flight coordination;*

(c) *transfer of control and communications;*

Table 1-1: Communications between ATN end systems implementing ATS message handling services

ATN End System 1	ATN End System 2
ATS Message Server	ATS Message Server
ATS Message Server	AERONAUTICAL FIXED TELECOMMUNICATION NETWORK / AMHS Gateway
ATS Message Server	ATS Message User Agent
AERONAUTICAL FIXED TELECOMMUNICATION NETWORK / AMHS Gateway	AERONAUTICAL FIXED TELECOMMUNICATION NETWORK / AMHS Gateway

(d) flight planning;

(e) airspace management, and

(f) air traffic flow management.

Note 2.— The first of the applications developed for the ICC set is the ATS interfacility data communication (AIDC).

Note 3.— The AIDC application exchanges information between ATS units (ATSUs) for support of critical air traffic control (ATC) functions, such as notification of flights approaching a flight information region (FIR) boundary, coordination of boundary conditions and transfer of control and communications authority.

Note 4.— The detailed specfication of the AIDC application is included in the Manual of Technical Provisions for the Aeronautical Telecommunication Network (ATN) (ICAO Doc 9705), Sub-volume III.

Note 5.— The AIDC application is strictly an ATC application for exchanging tactical control information between ATS units. It does not support the exchange of information with other offices or facilities.

Note 6.— The AIDC application supports the following operational services:

a) flight notification;

b) flight coordination;

c) transfer of executive control;

d) transfer of communications; and

f) transfer of general information (flight-related data or free text messages, i.e. unstructured).

FIFTH SCHEDULE

[rr. 58, 67 and 68]

AERONAUTICAL MOBILE SERVICE-VOICE COMMUNICATIONS

1. Categories of Messages In Aeronautical Mobile Service - Voice Communications

Table 1.1: Categories of Messages

	Message Category and order of priority	Radio telephony signal
a).	Distress call, distress messages and distress traffic	MAYDAY
b).	Urgency messages, including messages preceded by the medical trAir Navigation Services Providerorts signals	PAN, PAN or PAN, PAN MEDICAL
c).	Communications relating to - direction finding	-
d).	Flight safety messages	-
e).	Meteorological messages	-
f).	Flight regulatory messages	-

2.1. Radiotelephony procedures

2.1.1 General

2.1.1.1 When a controller or pilot communicates via voice, the response shall be via voice. Except when a controller or pilot communicates via controller-

pilot data link communications, the response shall be via controller-pilot data link communications.

2.1.1.2 Language to be used

2.1.1.2.1 The air-ground radiotelephony communications shall be conducted in the language normally used by the station on the ground or in the English language.

2.1.1.2.2 The English language shall be available, on request from any aircraft station, at all stations on the ground serving designated airports and routes used by international air services.

2.1.1.2.3 The languages available at a given station on the ground shall form part of the Aeronautical Information Publications and other published aeronautical information concerning such facilities.

2.1.1.3 *Word spelling in radiotelephony.* When proper names, service abbreviations and words of which the spelling is doubtful are spelled out in radiotelephony the alphabet in Figure 2-1 shall be used.

2.1.1.4 *Transmission of numbers in radiotelephony*

2.1.1.4.1 Transmission of numbers

2.1.1.4.1.1 All numbers, except as prescribed in 2.1.1.4.1.2, shall be transmitted by pronouncing each digit separately.

The following examples illustrate the application of this procedure

Aircraft Call Signs	Transmitted As
CCA 238	Air China two three eight
OAL 242	Olympic two four two
Flight Levels	Transmitted As
FL 180	flight level one eight zero
FL 200	flight level two zero zero
Headings	Transmitted As
100 degrees	heading one zero zero
080 degrees	heading zero eight zero
Wind Direction And Speed	Transmitted As
200 degrees 70 knots	wind one six zero degrees one
160 degrees 18 knots	wind one six zero degrees one gusting 30 knots eight knots gusting three zero knots
TrAir Navigation Services Provideronder Codes	Transmitted As
2 400	squawk two four zero zero
4 203	squawk four two zero three
Runway	Transmitted As
27	runway two seven
30	runway three zero
Altimeter Setting	Transmitted As
1010	QNH one zero zero zero
1000	QNH one zero zero zero

2.1.1.4.1.2 All numbers used in the transmission of altitude, cloud height, visibility and runway visual range (RVR) information, which contain whole hundreds and whole thousands, shall be transmitted by pronouncing each digit in the number of hundreds or thousands followed by the word HUNDRED or THOUSAND as appropriate. Combinations of thousands and whole hundreds shall be transmitted by pronouncing each digit in the

number of thousands followed by the word THOUSAND followed by the number of hundreds followed by the word HUNDRED.

The following examples illustrate the application of this procedure

Letter	*Word*	*Approximate pronunciation*	
		International Phonetic Convention	*Latin alphabet representation*
A	Alfa	'aelfa'	AL FAH
B	Bravo	'bra:vo'	BRAHVOH
C	Charlie	'tfo:li or 'fo:li	CHAR LEE or SHAR LEE
D	Delta	'delta'	DELL TAH
E	Echo	'eko'	ECK OH
F	Foxtrot	'fokstrot'	FOKS TROT
G	Golf	g^lf	GOLF
H	Hotel	ho:tel	HO TELL
I	India	"indi-o	IN DEE AH
J	Juliett	'dzu:li-et	JEW LEE EIT
K	Kilo	'ki:lo	KEY LOH
L	Lima	'li:mo'	LEE MAH
M	Mike	moik	MIKE
N	November	no'vembe	NO VEM BER
O	Oscar	'osko	OSS CAH
P	Papa	pe'pa	PAH PAH
Q	Quebec	ke'bek	KEH BECK
R	Romeo	'ro:mi.o	ROW ME OH
S	Sierra	si'ero	SEE AIR RAH
T	Tango	'taengo'	TANG GO
U	Uniform	'ju:niform or 'uniform	YOU NEE FORM or OO NEE FORM
V	Victor	'vikto'	VIK TAH
W	Whiskey	'wiski'	WISS KEY
X	X-ray	'eks'rei	ECKS RAY
Y	Yankee	jaenki	YANG KEY
Z	Zulu	'zu:lu	ZOO LOO

Note.-In the approximate representation using the Latin alphabet, syllables to be emphasized are underlined.

Note.— In the approximate representation using the Latin alphabet, syllables to be emphasized are underlined.

Note 1.— The pronunciation of the alphabet may vary according to the language habit of the speaker. In order to eliminate wide variations in pronunciation, posters illustrating the desired pronunciation are available from ICAO.

Figure 2-1

altitude	*transmitted as*
800	eight hundred
3400	three thousand four hundred
12000	one two thousand
cloud height	*transmitted as*
2200	two thousand two hundred
4300	four thousand three hundred

visibility	*transmitted as*
1000	visibility one thousand
700	visibility seven hundred
runway visual range	*transmitted as*
600	RVR six hundred
1700	RVR one thousand seven hundred

2.1.1.4.1.3 Numbers containing a decimal point shall be transmitted as prescribed in 2.1.1.4.1.1 with the decimal point in appropriate sequence being indicated by the word DECIMAL.

Note 1.— The following examples illustrate the application of this procedure:

Number	*Transmitted as*
100.3	ONE ZERO ZERO DECIMAL THREE,
38143.9	THREE EIGHT ONE FOUR THREE DECIMAL NINE

Note 2.— For identfication of VHF frequencies the number of digits used after the decimal point are determined on the basis of the channel spacing (2.1.1.7.3.4.3 refers to frequencies separated by 25 kHz, 2.1.1.7.3.4.4 refers to frequencies separated by 8.33 kHz).

Note 3.— The channelling/frequency pairing relationship for 8.33 kHz and 25 kHz is found in Table 4-1 (bis), (CNS Technical Standards Volume V).

2.1.1.4.1.4 When transmitting time, only the minutes of the hour shall normally be required. Each digit shall be pronounced separately. However, the hour shall be included when any possibility of confusion is likely to result.

Note.— The following example illustrates the application of this procedure when applying the provisions of 2.1.1.4.1.4:

Time	*Statement*
0920 (9:20 A.M.)	TOO ZE-RO or ZE-RO NIN - er TOO ZE-RO
1643 (4.43 P.M.)	FOW-er TREE or WUN SIX FOW -er TREE

2.1.1.4.2 *Verification of numbers*

2.1.1.4.2.1 When it is desired to verify the accurate reception of numbers the person transmitting the message shall request the person receiving the message to read back the numbers.

2.1.1.4.3 *Pronunciation of numbers*

2.1.1.4.3.1 When the language used for communication is English, numbers shall be transmitted using the following pronunciation:

Numeral or numeral element	*Pronunciation*
0	ZE-RO
1	WUN
2	TOO
3	TREE
4	FOW-er
5	FIFE
6	SIX
7	SEV-en
8	AIT
9	NIN-er

Decimal	DAY-SEE-MAL
Hundred	HUN-dred
Thousand	TOU-SAND

Note.— The syllables printed in capital letters in the above list are to be stressed; for example, the two syllables in ZE-RO are given equal emphasis, whereas the first syllable of FOW-er is given primary emphasis.

2.1.1.5 Transmitting technique

2.1.1.5.1 Each written message shall be read prior to commencement of transmission in order to eliminate unnecessary delays in communications.

2.1.1.5.2 Transmissions shall be conducted concisely in a normal conversational tone.

2.1.1.5.3 Speech transmitting technique shall be such that the highest possible intelligibility is incorporated in each transmission. Fulfilment of this aim requires that air crew and ground personnel shall:

a) enunciate each word clearly and distinctly;

b) maintain an even rate of speech not exceeding 100 words per minute. When a message is transmitted to an aircraft and its contents need to be recorded the speaking rate shall be at a slower rate to allow for the writing process. A slight pause preceding and following numerals makes them easier to understand;

c) maintain the speaking volume at a constant level;

d) be familiar with the microphone operating techniques particularly in relation to the maintenance of a constant distance from the microphone if a modulator with a constant level is not used;

e) suspend speech temporarily if it becomes necessary to turn the head away from the microphone.

2.1.1.5.4 Speech transmitting technique shall be adapted to the prevailing communications conditions.

2.1.1.5.5 Messages accepted for transmission shall be transmitted in plain language or ICAO phraseologies without altering the sense of the message in any way. Approved ICAO abbreviations contained in the text of the message to be transmitted to aircraft shall normally be converted into the unabbreviated words or phrases which these abbreviations represent in the language used, except for those which, owing to frequent and common practice, are generally understood by aeronautical personnel.

2.1.1.5.6 To expedite communication, the use of phonetic spelling shall be dispensed with, if there is no risk of this affecting correct reception and intelligibility of the message.

2.1.1.5.7 The transmission of long messages shall be interrupted momentarily from time to time to permit the transmitting operator to confirm that the frequency in use is clear and, if necessary, to permit the receiving operator to request repetition of parts not received.

2.1.1.5.8 The following words and phrases shall be used in radiotelephony communications as appropriate and shall have the meaning ascribed hereunder:

Phrase	*Meaning*
ACKNOWLEDGE	"Let me know that you have received and understood this message."
AFFIRM	"Yes."
APPROVED	"Permission for proposed action granted."
BREAK	"I hereby indicate the separation between portions of the message." (To be used where there is no clear distinction between the text and other portions of the message.)
BREAK	"I hereby indicate the separation between messages transmitted to different aircraft in a very busy environment."
CANCEL	"Annul the previously transmitted clearance."
CHECK	"Examine a system or procedure." (Not to used in any other context. No answer is normally expected.)
CLEARED	"Authorized to proceed under the conditions specified."
CONFIRM	"1 request verification of: (clearance, instruction, action, information)."
CONTACT	"Establish communications with..."
CORRECT	"True" or "Accurate".
CORRECTION	"An error has been made in this transmission (or message indicated). The correct version is..."
DISREGARD	"Ignore."
HOW DO YOU READ	"What is the readability of my transmission?"
I SAY AGAIN	"I repeat for clarity or emphasis."
MAINTAIN	"Continue in accordance with the condition(s) specified" or in its literal sense, e.g. "Maintain VFR".
MONITOR	"Listen out on (frequency)."
NEGATIVE	"No" or "Permission not granted" or "That is not correct" or "Not capable".
OVER	"My transmission is ended, and I expect a response from you."

Note.- Not normally used in VHF or satellite voice communications.

OUT	"This exchange of transmissions is ended and no response is expected."

Note.-Not normally used in VHF or satelitte voice communications.

READ BACK	"Repeat all, or the specified part, of this message back to me exactly as received."
RECLEARED	"A change has been made to your last clearance and this new clearance supersedes your previous clearance or part thereof."
REPORT	"Pass me the following information..."
REQUEST	"I should like to know..." or "I wish to obtain..."
ROGER	"I have received all of your last transmission."

Note.— Under no circumstances to be used in reply to a question requiring "READ BACK" or a direct answer in the affirmative (AFFIRM) or negative (NEGATIVE).

SAY AGAIN	"Repeat all, or the following part, of your last transmission."
SPEAK SLOWER	"Reduce your rate of speech."

Note.- For normal rate of speech.

STANDBY	"Wait and I will call you."

Note. - The caller would normally re-establish contact if the delay is lengthy. STANDBY is not an approval or denial.

UNABLE	"I cannot comply with your request, instruction, or clearance."

Note.— UNABLE is normally followed by a reason.

WILCO	(Abbreviation for "will comply".) "I understand your message and will comply with it."
WORDS TWICE	(a) As a request: "Communication is difficult. Please send every word, or group of words, twice." (b) As information: "Since communication is difficult, every word, or group of words, in this message will be sent twice."

2.1.1.6 *Composition of messages*

2.1.1.6.1 Messages handled entirely by the aeronautical mobile service shall comprise the following parts in the order stated:

(a) call indicating the addressee and the originator;

(b) text.

Note.— The following examples illustrate the application of this procedure:

(call) NEW YORK RADIO SWISSAIR ONE ONE ZERO

(text) REQUEST SELCAL CHECK or

(call) SWISSAIR ONE ONE ZERO NEW YORK RADIO

(text) CONTACT SAN JUAN ON FIVE SIX

2.1.1.6.2 Messages requiring handling by the AERONAUTICAL FIXED

TELECOMMUNICATION NETWORK for part of their routing and similarly messages which are not handled in accordance with predetermined distribution arrangements shall be composed as follows:

2.1.1.6.2.1 *When originated in an aircraft:*

(1) call;

(2) the word FOR;

(3) the name of the organization addressed;

(4) the name of the station of destination;

(5) the text.

2.1.1.6.2.1.1 The text shall be as short as practicable to convey the necessary information; full use shall be made of ICAO phraseologies.

Note. - The following example illustrates the application of this procedure: (call)

BOSTON RADIO SWISSAIR

ONE TWO EIGHT *(address)* FOR SWISSAIR BOSTON (text) NUMBER ONE ENGINE CHANGE REQUIRED

2.1.1.6.2.2 *When addressed to an aircraft.* When a message is retransmitted by an aeronautical station to an aircraft in flight, the heading and address of the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK message format shall be omitted during the retransmission on the aeronautical mobile service.

2.1.1.6.2.2.1 When the provisions of 2.1.1.6.2.2 are applied, the aeronautical mobile service message transmission shall comprise:

a) the text [incorporating any corrections (COR) contained in the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK message];

b) the word FROM;

c) the name of the originating organization and its location (taken from the origin section of the AERONAUTICAL FIXED TELECOMMUNICATION NETWORK message).

2.1.1.6.2.2.2 When the text of a message to be transmitted by an aeronautical station to an aircraft in flight contains approved ICAO abbreviations, these abbreviations shall normally be converted during the transmission of the message into the unabbreviated words or phrases which the abbreviations represent in the language used, except for those which, owing to frequent or common practice, are generally understood by aeronautical personnel.

2.1.1.7 *Calling*

2.1.1.7.1 *Radiotelephony call signs for aeronautical stations*

2.1.1.7.1.1 Aeronautical stations in the aeronautical mobile service shall be identified by:

a) the name of the location; and

b) the unit or service available.

2.1.1.7.1.2 The unit or service shall be identified in accordance with the table below except that the name of the location or the unit/service may be omitted provided satisfactory communication has been established.

Unit/service available	***Call sign suffix***
area control centre	**CONTROL**
approach control	**APPROACH**
approach control radar arrivals	**ARRIVAL**
approach control radar departures	**DEPARTURE**
aerodrome control	**TOWER**
surface movement control	**GROUND**
radar (in general)	**RADAR**
precision approach radar	**PRECISION**
direction-finding station	**HOMER**
flight information service	**INFORMATION**
clearance delivery	**DELIVERY**
apron control	**APRON**
company dispatch	**DISPATCH**
aeronautical station	**RADIO**

2.1.1.7.2 *Radiotelephony call signs for aircraft*

2.1.1.7.2.1 *Full call signs*

2.1.1.7.2.1.1 An aircraft radiotelephony call sign shall be one of the following types:

Type a) - the characters corresponding to the registration marking of the aircraft; or

Type b) - the telephony designator of the aircraft operating agency, followed by the last four characters of the registration marking of the aircraft;

Type c) - the telephony designator of the aircraft operating agency, followed by the flight identification.

2.1.1.7.2.2 *Abbreviated call signs*

2.1.1.7.2.2.1 The aircraft radiotelephony call signs shown in 2.1.1.7.2.1.1, with the exception of Type c), may be abbreviated in the circumstances prescribed in 2.1.1.7.3.3.1. Abbreviated call signs shall be in the following form:

Type a) - the first character of the registration and at least the last two characters of the call sign;

Type b) - the telephony designator of the aircraft operating agency, followed by at least the last two characters of the call sign;

Type c) - no abbreviated form.

Table 2-1: Examples of full call signs and abbreviated call signs

		Type a)	*Type b)*	*Type c)*
Full call sign	N57826	*CESSNA FABCD	*CITATION FABCD	VARIG PVMA	SCANDINAVIAN 937
Abbreviated call sign	or N26	CESSNA CD	CITATION CD	VATIG MA	(no abbreviated form)
	or N826	or CESSNA BCD	or CITATION BCD	or VARIG VMA	

Note.— Either the name of the aircraft manufacturer or of the aircraft model may be used in place of the first character in Type a).

2.1.1 .7.3 *Radiotelephony procedures*

2.1.1 .7.3.1 An aircraft shall not change the type of its radiotelephony call sign during flight, except temporarily on the instruction of an air traffic control unit in the interests of safety.

2.1.1.7.3.1.1 Except for reasons of safety no transmission shall be directed to an aircraft during take-off, during the last part of the final approach or during the landing roll.

2.1.1.7.3.2 *Establishment of radiotelephony communications*

2.1.1.7.3.2.1 Full radiotelephony call signs shall always be used when establishing communication. The calling procedure of an aircraft establishing communication shall be in accordance with Table 2-2.

Table 2-2 Radiotelephony calling procedure

	Type a)	*Type b)*	*Type c)*
Designation of the station called	NEW YORK RADIO	NEW YORK RADIO	NEW YORK RADIO
Designation of the answering station	GABCD*	SPEEDBIRD ABCD**	AEROFLOT 321**

** In certain cases where the call is initiated by the aeronautical station, the call may be effected by transmission of coded tone signals.*

*** With the exception of the telephony designators and the type of aircraft, each character in the call sign shall be spoken separately. When individual letters are spelled out, the radiotelephony spelling alphabet prescribed in 2.1.1.3 shall be used. Numbers are to be spoken in accordance with 2.1.1.4.*

2.1.1.7.3.2.2 Stations having a requirement to transmit information to all stations likely to intercept shall preface such transmission by the general call ALL STATIONS, followed by the identification of the calling station.

Note.— No reply is expected to such general calls unless individual stations are subsequently called to acknowledge receipt.

2.1.1.7.3.2.3 The reply to the above calls shall be in accordance with Table 2-3. The use of the calling aeronautical station's call sign followed by the answering aeronautical station's call sign shall be considered the invitation to proceed with transmission by the station calling.

Table 2-3. Radiotelephony reply procedure

	Type a)	*Type b)*	*Type c)*
Designation of the station called	GABCD*	SPEEDBIRD ABCD*	AEROFLOT 321*
Designation of the answering station	NEW YORK RADIO	NEW YORK RADIO	NEW YORK RADIO

** With the exception of the telephony designators and the type of aircraft, each character in the call sign shall be spoken separately. When individual letters are spelled out, the*

radiotelephony spelling alphabet prescribed in 2.11.3 shall be used. Numbers are to be spoken in accordance with 2.1.1.4.

2.1.1.7.3.2.4 When a station is called but is uncertain of the identification of the calling station, it shall reply by transmitting the following:

STATION CALLING . . . (*station called*) SAY AGAIN YOUR CALL SIGN

Note. - The following example illustrates the application of this procedure: (CAIRO station replying) STATION CALLING CAIRO (pause) SAY AGAIN YOUR CALL SIGN

2.1.1.7.3.2.5 Communications shall commence with a call and a reply when it is desired to establish contact, except that, when it is certain that the station called will receive the call, the calling station may transmit the message, without waiting for a reply from the station called.

2.1.1.7.3.2.6 Interpilot air-to-air communication shall be established on the air-to-air channel 123.45 MHz by either a directed call to a specific aircraft station or a general call, taking into account conditions pertaining to use of this channel.

Note.— For conditions on use of air-to-air channels see ANS Technical Standards, Part II Volume V, 4.1.3.2.1, also 2.1.2.1.1.4 in this Schedule.

2.1.1.7.3.2.6.1 As the aircraft may be guarding more than one frequency, the initial call shall include the distinctive channel identification "INTERPILOT".

Note.— The following examples illustrate the application of this calling procedure.

CLIPPER 123 - SABENA 901 - INTERPILOT - DO YOU READ *or* ANY AIRCRAFT VICINITY OF 30 NORTH 160 EAST - JAPANAIR 401 - INTERPILOT - OVER

2.1.1.7.3.3 *Subsequent radiotelephony communications*

2.1.1.7.3.3.1 Abbreviated radiotelephony call signs shall be used only after satisfactory communication has been established and provided that no confusion is likely to arise. An aircraft station shall use its abbreviated call sign only after it has been addressed in this manner by the aeronautical station.

2.1.1.7.3.3.2 After contact has been established, continuous two-way communication shall be permitted without further identification or call until termination of the contact.

2.1.1.7.3.3.3 In order to avoid any possible confusion, when issuing ATC clearances and reading back such clearances, controllers and pilots shall always add the call sign of the aircraft to which the clearance applies.

2.1.1.7.3.4 *Indication of transtnitting channel*

2.1.1.7.3.4.1 As the aeronautical station operator generally guards more than one frequency, the call shall be followed by an indication of the frequency used, unless other suitable means of identifying the frequency are known to exist.

2.1.1.7.3.4.2 When no confusion is likely to arise, only the first two digits of the High Frequency (in kHz) shall be used to identify the transmitting channel.

Note. - The following example illustrates the application of this procedure:

(PAA 325 calling Kingston on 8 871 kHz)

KINGSTON CLIPPER THREE TWO FIVE - ON EIGHT EIGHT

2.1.1.7.3.4.3 Except as specified in 2.1.1.7.3.4.4 all six digits of the numerical designator shall be used to identify the transmitting channel in VHF

radiotelephony communications, except in the case of both the fifth and sixth digits being zeros, in which case only the first four digits shall be used.

Note 1.— The following examples illustrate the application of the procedure in 2.1.1.7.3.4.3:

Channel	*Transmitted as*
118.000	***ONE ONE EIGHT DECIMAL ZERO***
118.005	***ONE ONE EIGHT DECIMAL ZERO ZERO FIVE***
118.010	***ONE ONE EIGHT DECIMAL ZERO ONE ZERO***
118.025	***ONE ONE EIGHT DECIMAL ZERO TWO FIVE***
118.050	***ONE ONE EIGHT DECIMAL ZERO FIVE ZERO***
118.100	***ONE ONE EIGHT DECIMAL ONE***

Note 2.— Caution must be exercised with respect to the indication of transmitting channels in VHF radiotelephony communications when all six digits of the numerical designator are used in airspace where communication channels are separated by 25 kHz, because on aircraft installations with a channel separation capabiliryof 25 kHz or more, it is only possible to select the first five digits of the numerical designator on the radio management panel.

Note 3.— The numerical designator corresponds to the channel identification in ANS Technical Standards Part 11, Volume V, Table 4-1 (bis).

2.1.1.7.3.4.4 In airspace where all VHF voice communications channels are separated by 25 kHz or more and the use of six digits as in 2.1.1.7.3.4.3 is not substantiated by the operational requirement determined by the appropriate authorities, the first five digits of the numerical designator shall be used, except in the case of both the fifth and sixth digits being zeros, in which case only the first four digits shall be used.

Note 1.- The following examples illustrate the application of the procedure in 2.1.1.7.3.4.4 and the associated settings of the aircraft radio management panel for communication equipment with channel separation capabilities of 25 kHz and 8.33/25 kHz:

Channel	*Transmitted as*	*Radio management panel setting for communication equipment with*	
		25 kHz (5 digits)	*8.33/25 kHz (6 digits)*
118.000	*ONE ONE EIGHT DECIMAL ZERO*	*118.00*	*118.000*
118.025	*ONE ONE EIGHT DECIMAL ZERO TWO*	*118.02*	*118.025*

118.050	*ONE ONE EIGHT DECIMAL ZERO FIVE*	*118.05*	*118.050*
118.075	*ONE ONE EIGHT DECIMAL ZERO SEVEN*	*118.07*	*118.075*
118.100	*ONE ONE EIGHT DECIMAL ONE*	*118.10*	*118.100*

Note 2.— Caution must be exercised with respect to the indication of transmitting channels in VHF radio telephony communications when five digits of the numerical designator are used in airspace where aircraft are also operated with channel separation capabilities of 8.33125 kHz. On aircraft installations with a channel separation capability of 8.33 kHz and more, it is possible to select six digits on the radio management panel. It should therefore be ensured that the fifth and sixth digits are set to 25 kHz channels (see Note 1).

Note 3.—The numerical designator corresponds to the channel identification in ANS Technical Standards, Part II, Volume V, Table 4-1 (bis).

2.1.1.8 *Test procedures*

2.1.1.8.1 The form of test transmissions shall be as follows:

(a) the identification of the station being called;

(b) the aircraft identification;

(c) the words "RADIO CHECK";

(d) the frequency being used.

2.1.1.8.2 The reply to a test transmission shall be as follows:

a) the identification of the aircraft;

b) the identification of the aeronautical station replying;

c) information regarding the readability of the aircraft transmission

2.1.1.8.3 The test transmission and reply thereto shall be recorded at the aeronautical station.

2.1.1.8.4 When the tests are made, the following readability scale shall be used:

*Readability Scale*6

1 Unreadable

2 Readable now and then

3 Readable but with difficulty

4 Readable

5 Perfectly readable

2.1.1.9 *Exchange of communications*

2.1.1.9.1 Communications shall be concise and unambiguous, using standard phraseology whenever available.

2.1.1.9.1.1 Abbreviated procedures shall only be used after initial contact has been established and where no confusion is likely to arise. Channel

Transmitted as Radio management panel setting for communication equipment with

2.1.1.9.2 Acknowledgement of receipt. The receiving operator shall make certain that the message has been received correctly before acknowledging receipt.

Note.— Acknowledgement of receipt is not to be confused with acknowledgement of intercept in radiotelephony network operations.

2.1.1.9.2.1 When transmitted by an aircraft station, the acknowledgement of receipt of a message shall comprise the call sign of that aircraft.

2.1.1.9.2.2 An aircraft station shall acknowledge receipt of important air traffic control messages or parts thereof by reading them back and terminating the readback by its radio call sign.

Note 1.— Air traffic control clearances, instructions and information requiring readback are specified in Civil Aviation ATS Regulations 2016.

Note 2.— The following example illustrates the application of this procedure:

(ATC clearance by network station to an aircraft)

(ATC clearance by network station to an aircraft)

Station: TWA NINE SIX THREE MADRID

Aircraft: MADRID TWA NINE SIX THREE

Station: TWA NINE SIX THREE MADRID - ATC CLEARS TWA NINE SIX THREE TO DESCEND TO NINE THOUSAND FEET

Aircraft (acknowledging): CLEARED TO DESCEND TO NINE THOUSAND FEET - TWA NINE SIX THREE

Station (denoting accuracy of readback): MADRID

2.1.1.9.2.3 When acknowledgement of receipt is transmitted by an aeronautical station:

(1) *to an aircraft station:* it shall comprise the call sign of the aircraft, followed if considered necessary by the call sign of the aeronautical station;

(2) *to another aeronautical station:* it shall comprise the call sign of the aeronautical station that is acknowledging receipt.

2.1.1.9.2.3.1 An aeronautical station shall acknowledge position reports and other flight progress reports by reading back the report and terminating the readback by its call sign, except that the readback procedure may be suspended temporarily whenever it will alleviate congestion on the communication channel.

2.1.1.9.2.4 It is permissible for verification for the receiving station to read back the message as an additional acknowledgement of receipt. In such instances, the station to which the information is read back shall acknowledge the correctness of readback by transmitting its call sign.

2.1.1.9.2.5 If both position report and other information - such as weather reports - are received in the same message, the information shall be acknowledged with the words such as "WEATHER RECEIVED" after the position report has been read back, except when intercept of the information is required by other network stations. Other messages shall be acknowledged, the aeronautical station transmitting its call sign only.

2.1.1.9.3 End of conversation. A radiotelephone conversation shall be terminated by the receiving station using its own call sign.

2.1.1.9.4 *Corrections and repetitions*

2.1.1.9.4.1 When an error has been made in transmission, the word "CORRECTION" shall be spoken, the last correct group or phrase repeated, and then the correct version transmitted.

2.1.1.9.4.2 If a correction can best be made by repeating the entire message, the operator shall use the phrase "CORRECTION, I SAY AGAIN" before transmitting the message a second time.

2.1.1.9.4.3 When an operator transmitting a message considers that reception is likely to be difficult, he shall transmit the important elements of the message twice.

2.1.1.9.4.4 If the receiving operator is in doubt as to the correctness of the message received, he shall request repetition either in full or in part

2.1.1.9.4.5 If repetition of an entire message is required, the words "SAY AGAIN" shall be spoken. If repetition of a portion of a message is required, the operator shall state: "SAY AGAIN ALL BEFORE ... (first word satisfactorily received)"; or "SAY AGAIN.... (word before missing portion) TO ... (word after missing portion)"; or "SAY AGAIN ALL AFTER. (last word satisfactorily received)".

2.1.1.9.4.6 *Specific items shall be requested, as appropriate, such as "SAY AGAIN ALTIMETER", "SAY AGAIN WIND".*

2.1.1.9.4.7 If, in checking the correctness of a readback, an operator notices incorrect items, he shall transmit the words "NEGATIVE I SAY AGAIN" at the conclusion of the readback followed by the correct version of the items concerned.

2.1.1.9.5 *"Operations normal" reports*

When "operations normal" reports are transmitted by aircraft, they shall consist of the prescribed call followed by the words "OPERATIONS NORMAL".

2.1.2 Establishment and assurance of communications

2.1.2.1 *Communications watch/Hours of service*

2.1.2.1.1 During flight, aircraft stations shall maintain watch as required by the appropriate Authority and shall

not cease watch, except for reasons of safety, without informing the aeronautical station(s) concerned.

2.1.2.1.1.1 Aircraft on long over-water flights, or on flights over designated areas over which the carriage of an emergency locator transmitter (ELT) is required, shall continuously guard the VHF emergency frequency 121.5 MHz, except for those periods when aircraft are carrying out communications on other VHF channels or when airborne equipment limitations or cockpit duties do not permit simultaneous guarding of two channels.

2.1.2.1.1.2 Aircraft shall continuously guard the VHF emergency frequency 121.5 MHz in areas or over routes where the possibility of interception of aircraft or other hazardous situations exist, and a requirement has been established by the appropriate authority.

2.1.2.1.1.3 *Aircraft on flights other than those specified in 2.1.2.1.1.1 and 2.12.1.1.2 shall guard the emergency frequency 121.5 MHz to the extent possible.*

2.1.2.1.1.4 The user of the air-to-air VHF communications channel shall ensure that adequate watch is maintained on designated ATS frequencies, the frequency of the aeronautical emergency channel, and any other mandatory watch frequencies.

2.1.2.1.2 Aeronautical stations shall maintain watch as required by the appropriate Authority.

2.1.2.1.3 Aeronautical stations shall maintain a continuous listening watch on VHF emergency channel 121.5 MHz during the hours of service of the units at which it is installed.

2.1.2.1.4 When it is necessary for an aircraft station or aeronautical station to suspend operation for any reason, it shall, if possible, so inform other stations concerned, giving the time at which it is expected that operation will be resumed. When operation is resumed, other stations concerned shall be so informed.

2.1.2.1.4.1 When it is necessary to suspend operation beyond the time specified in the original notice, a revised time of resumption of operation shall, if possible, be transmitted at or near the time first specified.

2.1.2.1.4.2 When two or more ATS frequencies are being used by a controller, consideration shall be given to providing facilities to allow ATS and aircraft transmissions on any of the frequencies to be simultaneously retransmitted on the other frequencies in use thus permitting aircraft stations within range to hear all transmissions to and from the controller.

2.1.2.2 Principles of network operation (HF communications)

2.1.2.2.1 The aeronautical stations of a radiotelephony network shall assist each other in accordance with the following network principles, in order to provide the air-ground communication service required of the network by aircraft flying on the air routes for which the network is responsible.

2.1.2.2.2 When the network comprises a large number of stations, network communications for flights on any individual route segment shall be provided by selected stations, termed "regular stations" for that segment.

Note 1.— The selection of stations to act as regular stations for a particular route segment will, where necessary, be undertaken by regional or local agreement, after consultation, if necessary, between the States responsible for the network.

Note 2.— In principle, the regular stations will be those serving the locations immediately concerned with flights on that route segment, i.e. points of take-off and landing, appropriate flight information centres or area control centres and, in some cases, additional suitably located stations required to complete the conimunication coverage or for intercept purposes.

Note 3.— In selecting the regular stations, account will be taken of the propagation characteristicsof the frequencies used.

2.1.2.2.3 In areas or on routes where radio conditions, length of flights or distance between aeronautical stations require additional measures to ensure continuity of air-ground communication throughout the route segment, the regular stations shall share between them a responsibility of primary guard whereby each station will provide the primary guard for that portion of the flight during which the messages from the aircraft can be handled most effectively by that station.

2.1.2.2.4 During its tenure of primary guard, each regular station shall, among other things:

(a) be responsible for designating suitable primary and secondary frequencies for its communications with the aircraft;

(b) receive all position reports and handle other messages from and to the aircraft essential to the safe conduct of he flight;

(c) be responsible for the action required in case of failure of communications (see 2.1.2.7.2).

2.1.2.2.4.1 The transfer of primary guard from one station to the next will normally take place at the time of the traversing of flight information region or control area boundaries, this guard being provided at any time, as far as possible, by the station serving the flight information centre or area control centre in whose area the aircraft is flying. However, where communication conditions so demand, a station shall be required to retain primary guard beyond such geographical boundaries or release its guard before the aircraft reaches the boundary, if appreciable

improvement in air-ground communication can be effected thereby.

2.1.2.3 *Frequencies to be used*

2.1.2.3.1 Aircraft stations shall operate on the appropriate radio frequencies.

2.1.2.3.1.1 The air-ground control radio station shall designate the frequency(ies) to be used under normal conditions by aircraft stations operating under its control.

2.1.2.3.1.2 In network operation, the initial designation of primary and secondary frequencies shall be made by the network station with which the aircraft makes pre-flight check or its initial contact after take-off. This station shall also ensure that other network stations are advised, as required, of the frequency (ies) designated.

2.1.2.3.2 An aeronautical station, when designating frequencies in accordance with 2.1.2.3.1.1 or 2.1.2.3.1.2, shall take into account the appropriate propagation data and distance over which communications are required.

2.1.2.3.3 If a frequency designated by an aeronautical station proves to be unsuitable, the aircraft station shall suggest an alternative frequency.

2.1.2.3.4 When, notwithstanding the provisions of Regulations 57-63, air-ground frequencies are used for the exchange between network stations of messages essential for coordination and cooperation between the stations, such communication shall, so far as possible, be effected over network frequencies not being used at that time for the bulk of the air-ground traffic.

In all cases, the communication with aircraft stations shall take priority over the inter-ground station communications.

2.1.2.4 *Establishment of communications*

2.1.2.4.1 Aircraft stations shall, if possible, communicate directly with the air-ground control radio station appropriate to the area in which the aircraft are flying. If unable to do so, aircraft stations shall use any relay means available and appropriate to transmit messages to the air-ground control radio station.

2.1.2.4.2 When normal communications from an aeronautical station to an aircraft station cannot be established, the aeronautical station shall use any relay means available and appropriate to transmit messages to the aircraft station. If these efforts fail, the originator shall be advised in accordance with procedures prescribed by the appropriate Authority.

2.1.2.4.3 When, in network operation, communication between an aircraft station and a regular station has not been established after calls on the primary and secondary frequencies, aid shall be rendered by one of the other regular stations for that flight, either by calling the attention of the station first called or, in the case of a call made by an aircraft station, by answering the call and taking the traffic.

2.1.2.4.3.1 Other stations of the network shall render assistance by taking similar action only if attempts to establish communications by the regular stations have proved unsuccessful.

2.1.2.4.4 The provisions of 2.1.2.4.3 and 2.1.2.4.3.1 shall also be applied:

(a) on request of the air traffic services unit concerned;

(b) when an expected communication from an aircraft has not been received within a time period such that the occurrence of a communication failure is suspected.

Note.— A specific time period may be prescribed by the appropriate ATS Authority.

2.2. *Transfer of HF communications*

2.2.1.1.1 An aircraft station shall be advised by the appropriate aeronautical station to transfer from one radio frequency or network to another. In the absence of such advice, the aircraft station shall notify the appropriate aeronautical station before such transfer takes place.

2.2.1.1.2 In the case of transfer from one network to another, the transfer shall preferably take place while the aircraft is in communication with a station operating in both networks to ensure continuity of communications. If, however, the change of network must take place concurrently with the transfer of communication to another network station, the transfer shall be coordinated by the two network stations prior to advising or authorizing the frequency change. The aircraft shall also be advised of the primary and secondary frequencies to be used after the transfer.

2.2.1.1.2.1 An aircraft station which has transferred communications watch from one radio frequency to another shall, when so required by the appropriate ATS Authority, inform the aeronautical station concerned that communications watch has been established on the new frequency.

2.2.1.1.2.2 When entering a network after take-off, an aircraft station shall transmit its take-off time or time over the last check-point, to the appropriate regular station.

2.2.1.1.2.3 When entering a new network, an aircraft station shall transmit the time over the last checkpoint, or of its last reported position, to the appropriate regular station.

2.2.1.1.3 Before leaving the network, an aircraft station shall in all cases advise the appropriate regular station of its intention to do so by transmitting one of the following phrases, as appropriate:

(a) *when transferring to a pilot-to-controller channel. Aircraft: CHANGING TO . . . (air traffic services unit concerned)*

(b) *after landing. Aircraft: LANDED . . . (location) . . . (time)*

2.2.1.2 *Transfer of VHF communications*

2.2.1.2.1 An aircraft shall be advised by the appropriate aeronautical station to transfer from one radio frequency to another in accordance with agreed procedures. In the absence of such advice, the aircraft station shall notify the appropriate aeronautical station before such a transfer takes place.

2.2.1.2.2 When establishing initial contact on, or when leaving, a VHF frequency, an aircraft station shall transmit such information as may be prescribed by the appropriate Authority.

2.2.1.3 *Voice communications failure*

2.2.12.1 *Air-ground*

2.2.1.3.1.1 When an aircraft station fails to establish contact with the appropriate aeronautical station on the designated channel, it shall attempt to establish contact on the previous channel used and, if not successful, on another channel appropriate to the route. If these attempts fail, the aircraft station shall attempt to establish communication with the appropriate aeronautical station, other aeronautical stations or other aircraft using all available means and advise the aeronautical station that contact on the assigned channel could not be established. In addition, an aircraft operating within a network shall monitor the appropriate VHF channel for calls from nearby aircraft.

2.2.1.3.1.2 If the attempts specified under 2.2.1.3.1.1 fail, the aircraft station shall transmit its message twice on the designated channel(s), preceded by the phrase "TRANSMITTING BLIND" and, if necessary, include the addressee(s) for which the message is intended.

2.2.1.3.1.2.1 In network operation, a message which is transmitted blind shall be transmitted twice on both primary and secondary channels. Before changing channel, the aircraft station shall announce the channel to which it is changing.

2.2.1.3.1.3 *Receiver failure*

2.2.1.3.1.3.1 When an aircraft station is unable to establish communication due to receiver failure, it shall transmit reports at the scheduled times, or positions, on the channel in use, preceded by the phrase "TRANSMITTING BLIND DUE TO RECEIVER FAILURE". The aircraft station shall transmit the intended message, following this by a complete repetition. During this procedure, the aircraft shall also advise the time of its next intended transmission.

2.2.1.3.1.3.2 An aircraft which is provided with air traffic control or advisory service shall, in addition to complying with 2.2.1.3.1.3.1, transmit information regarding the intention of the pilot-in-command with respect to the continuation of the flight of the aircraft.

2.2.1.3.1.3.3 When an aircraft is unable to establish communication due to airborne equipment failure it shall, when so equipped, select the appropriate SSR code to indicate radio failure.

Note.— General rules which are applicable in the event of communications failure are contained in Civil Aviation (Rules of the Air) Regulations 2017.

2.2.13.2 *Ground-to-air*

2.2.1.3.2.1 When an aeronautical station has been unable to establish contact with an aircraft station after calls on the frequencies on which the aircraft is believed to be listening, it shall:

(a) request other aeronautical stations to render assistance by calling the aircraft and relaying traffic, if necessary;

(b) request aircraft on the route to attempt to establish communication with the aircraft and relay traffic, if necessary.

2.2.1.3.2.2 The provisions of 2.2.1.3.2.1 shall also be applied:

(a) on request of the air traffic services unit concerned;

(b) when an expected communication from an aircraft has not been received within a time period such that the occurrence of a communication failure is suspected.

Note.— A specific time period may be prescribed by the appropriate ATS Authority.

2.2.1.3.2.3 If the attempts specified in 2.2.1.3.2.1 fail, the aeronautical station shall transmit messages addressed to the aircraft, other than messages containing air traffic control clearances, by blind transmission on the frequency (ies) on which the aircraft is believed to be listening.

2.2.1.3.2.4 Blind transmission of air traffic control clearances shall not be made to aircraft, except at the specific request of the originator.

2.2.1.3.2.5 *Notification of communications failure.* The air-ground control radio station shall notify the appropriate air traffic services unit and the aircraft operating agency, as soon as possible, of any failure in air-ground communication.

2.2.2 HF message handling

22.2.1 *General*

2.2.2.1.1.1 When operating within a network, an aircraft station shall, in principle, whenever communications conditions so permit, transmit its messages to the stations of the network from which they can be most readily delivered to their ultimate destinations. In particular, aircraft reports required by air traffic services shall be transmitted to the network station serving the flight information centre or area control centre in whose area the aircraft is flying. Conversely, messages to aircraft in flight shall, whenever possible, be transmitted directly to the aircraft by the network station serving the location of the originator.

Note.— Exceptionally, an aircraft may need to comn,nunicate with an aeronautical station outside the network appropriate to its particular route segment. This is permissible, provided it can be done without interrupting the continuous watch with the communication network appropriate to the route segment, when such watch is required by the appropriate ATS Authority, and provided it does not cause undue interference with the operation of other aeronautical stations.

2.2.2.1.2 Messages passed from an aircraft to a network station shall, whenever possible, be intercepted and acknowledged by other stations of the network, which serve locations where the information is also required.

Note 1.— Determination of the arrangements for dissemination of air-ground messages without address will be a matter for multilateral or local agreement.

Note 2.— In principle, the number of stations required to intercept are to be kept to a mninimunl consistent with the operational requirement.

2.2.2.1.2.1 Acknowledgement of intercept shall be made immediately after the acknowledgement of receipt by the station to which the message was passed.

2.2.2.1.2.2 Acknowledgement of an intercept message shall be made by transmitting the radio call sign of the station having intercepted the message, followed by the word ROGER, if desired, and the call sign of the station having transmitted the message.

2.2.2.1.2.3 In the absence of acknowledgement of intercept within one minute, the station accepting the message from the aircraft shall forward it, normally over the aeronautical fixed service, to the station(s) which have failed to acknowledge intercept.

2.2.2.1.2.3.1 If, in abnormal circumstances, forwarding is necessary using the air-ground channels, the provisions of 2.1.2.3.4 shall be observed.

2.2.2.1.2.4 When such forwarding is done over the aeronautical fixed telecommunication network, the messages shall be addressed to the network station(s) concerned.

2.2.2.1.2.5 The station(s) to which the messages have been forwarded shall carry out local distribution of them in the same way as if they had been received directly from the aircraft over the air-ground channel.

2.2.2.1.2.6 The aeronautical station receiving an air report or a message containing meteorological information transmitted by an aircraft in flight shall forward the message without delay:

(1) to the air traffic services unit and meteorological offices associated with the station;

(2) to the aircraft operating agency concerned or its representative when that agency has made a specific request to receive such messages.

2.2.2.1.2.7 The provisions of 2.1.2.3.4 shall also be applied, if practicable, in non- network operation.

2.2.2.1.3 When a message addressed to an aircraft in flight is received by the aeronautical station included in the address, and when that station is not able to establish communication with the aircraft to which the message is addressed, the message shall be forwarded to those aeronautical stations on the route which may be able to establish communication with the aircraft.

Note.— This does not preclude the transmission by, the forwarding aeronautical station, of the original message to the aircraft addressed, if the forwarding station is later able to communicate with that aircraft.

2.2.2.1.3.1 If the aeronautical station to which the message is addressed is unable to dispose of the message

	in accordance with 2.2.2.1.4, the station of origin shall be advised.
2.2.2.1.3.2	The aeronautical station forwarding the message shall amend the address thereof, by substituting for its own location indicator the location indicator of the aeronautical station to which the message is being forwarded.
2.2.2.2	Transmission of ATS messages to aircraft
2.2.2.2.1	If it is not possible to deliver an ATS message to the aircraft within the time specified by ATS, the aeronautical station shall notify the originator. Thereafter, it shall take no further action with respect to this message unless specifically instructed by ATS.
2.2.2.2.1.1	If delivery of an ATS message is uncertain because of inability to secure an acknowledgement, the aeronautical station shall assume that the message has not been received by the aircraft and shall advise the originator immediately that, although the message has been transmitted, it has not been acknowledged.
2.2.2.2.1.2	The aeronautical station, having received the message from ATS, shall not delegate to another station the responsibility for delivery of the message to the aircraft. However, in case of communication difficulties, other stations shall assist, when requested, in relaying the message to the aircraft. In this case, the station having received the message from ATS shall obtain without delay definite assurance that the aircraft has correctly acknowledged the message.
2.2.2.3	Recording of air-ground communications on teletypewriter

2.2.3 SELCAL procedures

Note.— The procedures contained in 2.2.4 are applicable when SELCAL is used and replace certain of the procedures related to calling contained in 2.1.1

2.2.3.1	*General*
2.2.3.1.1.1	With the selective calling system known as SELCAL, the voice calling is replaced by the transmission of coded tones to the aircraft over the radiotelephony channels. A single selective call consists of a combination of four pre-selected audio tones whose transmission requires approximately 2 seconds. The tones are generated in the aeronautical station coder and are received by a decoder connected to the audio output of the airborne receiver. Receipt of the assigned tone code (SELCAL code) activates a cockpit call system in the form of light and/or chime signals.

Note.— Due to the limited number of SELCAL codes, similar code assignments to multiple aircraft may, be expected. Therefore, the use of correct radiotelephony (RTF)

procedures contained in this chapter is emphasized when establishing communications via SELCAL.

2.2.3.1.2 SELCAL shall be utilized by suitably equipped stations for ground-to-air selective calling on the en-route HF and VHF radio channels.

2.2.3.1.3 On aircraft equipped with SELCAL, the pilot is still able to keep a conventional listening watch if required.

2.2.3.2 *Notification to aeronautical stations of aircraft SELCAL codes*

2.2.3.2.1 It shall be the responsibility of the aircraft operating agency and the aircraft to ensure that all aeronautical stations, with which the aircraft would normally communicate during a particular flight, know the SELCAL code associated with its radiotelephony call sign.

2.2.3.2.1.1 When practicable, the aircraft operating agency shall disseminate to all aeronautical stations concerned, at regular intervals, a list of SELCAL codes assigned to its aircraft or flights.

2.2.3.2.1.2 The aircraft shall:

(a) include the SELCAL code in the flight plan submitted to the appropriate air traffic services unit; and

(b) ensure that the HF aeronautical station has the correct SELCAL code information by establishing communications temporarily with the HF aeronautical station while still within VHF coverage.

Note.— Provisions regarding completion of the flight plan are set forth in the Civil Aviation (Air Traffic Services) Regulations 2017

2.2.3.3 *Pre-flight check*

2.2.3.3.1.1 The aircraft station shall contact the appropriate aeronautical station and request a pre-flight SELCAL check and, if necessary, give its SELCAL code.

2.2.3.3.1.2 When primary and secondary frequencies are assigned, a SELCAL check shall normally be made first on the secondary frequency and then on the primary frequency. The aircraft station shall then be ready for continued communication on the primary frequency.

2.2.3.3.2 If the pre-flight check reveal that either the ground or airborne SELCAL installation is inoperative, the aircraft shall maintain a continuous listening watch on its subsequent flight until SELCAL again becomes available.

2.2.3.4 *Establishment of communications*

2.2.3.4.1.1 When an aeronautical station initiates a call by SELCAL, the aircraft shall reply with its radio call sign, followed by the phrase "GO AHEAD".

2.2.3.5 *En-route procedures*

2.2.3.5.1.1 Aircraft stations shall ensure that the appropriate aeronautical station(s) are aware that SELCAL watch is being established or maintained.

2.2.3.5.1.2	When so prescribed on the basis of regional air navigation agreements, calls for scheduled reports from aircraft shall be initiated by an aeronautical station by means of SELCAL.
2.2.3.5.1.3	Once SELCAL watch has been established by a particular aircraft station, aeronautical stations shall employ SELCAL whenever they require to call aircraft.
2.2.3.5.2	In the event the SELCAL signal remains unanswered after two calls on the primary frequency and two calls on the secondary frequency, the aeronautical station shall revert to voice calling.
2.2.3.5.2.1	Stations in a network shall keep each other immediately advised when malfunctioning occurs in a SELCAL installation on the ground or in the air.

Likewise, the aircraft shall ensure that the aeronautical stations concerned with its flight are immediately made aware of any malfunctioning of its SELCAL installation, and that voice calling is necessary.

2.2.3.5.2.2	All stations shall be advised when the SELCAL installation is again functioning normally.
2.2.3.6	*SELCAL code assignment to aircraft*
2.2.3.6.1.1	In principle, the SELCAL code in the aircraft shall be associated with the radiotelephony call sign, i.e. where the flight number (service number) is employed in the radio call sign, the SELCAL code in the aircraft shall be listed against the flight number. In all other cases, the SELCAL code in the aircraft shall be listed against the aircraft registration.

Note.— The use of aircraft radio call signs, consisting of the airline abbreviation followed by the flight service number, is increasing among aircraft operators throughout the world. The SELCAL equipment in aircraft should, therefore, be of a type which permits a particular code being associated with a particular flight number, i.e. equipment which is capable of adjustment in code combinations. At this stage, however, main aircraft still carry SELCAL equipment of the single code type, and it will not be possible for aircraft with such equipment to satisfy the principle set out above. This should not militate against use of the flight number type of radio call sign by an aircraft so equipped if it wishes to apply this type of call sign, but it is essential when a single code airborne equipment is used in conjunction with a flight number type radio call sign that the ground stations be advised in connection with each flight of the SELCAL code available in the aircraft.

3.1. Distress and urgency radiotelephony communication procedures

3.1.1 General

Note.— The distress and urgency procedures contained in 3.1 relate to the use of radiotelephony. The provisions of Article S30 and Appendix S13 of the ITU Radio Regulations are generally applicable, except that S30.9 permits other procedures to be employed where special arrangements between governments exist, and are also applicable to radiotelephony communications between aircraft stations and stations in the maritime mobile service.

3.1.1.1	Distress and urgency traffic shall comprise all radiotelephony messages relative to the distress

and urgency conditions respectively. Distress and urgency conditions are defined as:

(a) Distress: a condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

(b) Urgency: a condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but which does not require immediate assistance.

3.1.1.2 The radiotelephony distress signal MAYDAY and the radiotelephony urgency signal PAN PAN shall be used at the commencement of the first distress and urgency communication respectively.

3.1.1.2.1 At the commencement of any subsequent communication in distress and urgency traffic, it shall be permissible to use the radiotelephony distress and urgency signals.

3.1.1.3 The originator of messages addressed to an aircraft in distress or urgency condition shall restrict to the minimum the number and volume and content of such messages as required by the condition.

3.1.1.4 If no acknowledgement of the distress or urgency message is made by the station addressed by the aircraft, other stations shall render assistance, as prescribed in 3.2.2 and 3.3.2 respectively.

Note.— "Other stations" is intended to refer to any other station which has received the distress or urgency message and has become aware that it has not been acknowledged by the station addressed.

3.1.1.5 Distress and urgency traffic shall normally be maintained on the frequency on which such traffic was initiated until it is considered that better assistance can be provided by transferring that traffic to another frequency.

Note.— 121.5 MHz or alternative available VHF or HF frequencies /may be used as appropriate.

3.1.1.6 In cases of distress and urgency communications, in general, the transmissions by radiotelephony shall be made slowly and distinctly, each word being clearly pronounced to facilitate transcription.

3.2. Radiotelephony distress communications

3.2.1 *Action by the aircraft in distress*

3.2.1.1.1 In addition to being preceded by the radiotelephony distress signal MAYDAY, preferably spoken three times, the distress message to be sent by an aircraft in distress shall:

(a) be on the air-ground frequency in use at the time;

(b) consist of as many as possible of the following elements spoken distinctly and, if possible, in the following order:

(i) name of the station addressed (time and circumstances permitting);

(ii) the identification of the aircraft;

(iii) the nature of the distress condition;

(iv) intention of the person in command;

(v) present position, level (i.e. flight level, altitude, etc., as appropriate) and heading.

Note 1.— The foregoing provisions may be supplemented by the following measures:

(a) *the distress message of an aircraft in distress being made on the emergency frequency 121.5 MHz or another aeronautical mobile frequency, if considered necessary or desirable. Not all aeronautical stations maintain a continuous guard on the emergency frequency;*

(b) *the distress message of an aircraft in distress being broadcast, if time and circumstances make this course preferable;*

(c) *the aircraft trans/flitting on the maritime mobile service radiotelephony calling frequencies;*

(d) *the aircraft using any means at its disposal to attract attention and make known its conditions (including the activation of the appropriate SSR mode and code);*

(e) *any station taking any means at its disposal to assist an aircraft in distress;*

(f) *any variation on the elements listed under 3.2.1.1 b), when the trans/flitting station is not itself in distress, provided that such circumstance is clearly stated in the distress mnessage.*

Note 2.— The station addressed will normally be that station communicating with the aircraft or in whose area of responsibility the aircraft is operating.

3.2.1.2 Action by the station addressed or first station acknowledging the distress mnessage

3.2.1.2.1 The station addressed by aircraft in distress, or first station acknowledging the distress message, shall:

(a) immediately acknowledge the distress message;

(b) take control of the communications or specifically and clearly transfer that responsibility, advising the aircraft if a transfer is made;

(c) take immediate action to ensure that all necessary information is made available, as soon as possible, to:

(1) the ATS unit concerned;

(2) the aircraft operating agency concerned, or its representative, in accordance with pre-established arrangements;

Note.— The requirement to inform the aircraft operating agency concerned does not have priority, over any other action which involves the safety of the flight in distress, or of any other flight in the area, or which might affect the progress of expected flights in the area.

(d) warn other stations, as appropriate, in order to prevent the transfer of traffic to the frequency of the distress communication.

3.2.1.3 *Imposition of silence*

3.2.1.3.1 The station in distress, or the station in control of distress traffic, shall be permitted to impose silence, either on all stations of the mobile service in the area or on any station which interferes with the distress traffic. It shall address these instructions "to all stations", or to one station only, according to circumstances. In either case, it shall use: - STOP TRANSMITTING; - the radiotelephony distress signal MAYDAY.

3.2.1.3.2 The use of the signals specified in 3.2.3.1 shall be reserved for the aircraft station in distress and for the station controlling the distress traffic.

3.2.1.4 Action by all other stations

3.2.1.4.1 The distress communications have absolute priority over all other communications, and a station aware of them shall not transmit on the frequency concerned, unless:

(a) the distress is cancelled or the distress traffic is terminated;

(b) all distress traffic has been transferred to other frequencies;

(c) the station controlling communications gives permission;

(d) it has itself to render assistance.

3.2.1.4.2 Any station which has knowledge of distress traffic, and which cannot itself assist the station in distress, shall nevertheless continue listening to such traffic until it is evident that assistance is being provided.

3.2.2 *Termination of distress communications and of silence*

3.2.2.1 When an aircraft is no longer in distress, it shall transmit a message cancelling the distress condition.

3.2.2.1.1 When the station which has controlled the distress communication traffic becomes aware that the distress condition is ended, it shall take immediate action to ensure that this information is made available, as soon as possible, to:

(1) the ATS unit concerned;

(2) the aircraft operating agency concerned, or its representative, in accordance with pre-established arrangements.

3.2.2.1.2 The distress communication and silence conditions shall be terminated by transmitting a message, including the words "DISTRESS TRAFFIC ENDED", on the frequency or frequencies being used for the distress traffic. This message shall be originated only by the station controlling the communications when, after the reception of the message prescribed in 3.2.2.1, it is authorized to do so by the appropriate authority.

3.2.3 *Radiotelephony urgency communications*

3.2.3.1 Action by the aircraft reporting an urgency condition except as indicated in 3.2.3.4

3.2.3.1.1 In addition to being preceded by the radiotelephony urgency signal PAN PAN preferably spoken three times and each word of the group pronounced as the French word "panne", the urgency message to be sent by an aircraft reporting an urgency condition shall:

(a) be on the air-ground frequency in use at the time;

(b) consist of as many as required of the following elements spoken distinctly and, if possible, in the following order:

(i) the name of the station addressed;

(ii) the identification of the aircraft;

(iii) the nature of the urgency condition;

(iv) the intention of the person in command;

(v) present position, level (i.e. flight level, altitude, etc., as appropriate) and heading;

(vi) any other useful information.

Note 1.— The foregoing provisions of 3.2.3.1.1 are not intended to prevent an aircraft broadcasting an urgency message, if time and circumstances make this course preferable.

Note 2.— The station addressed will normally be that station communicating with the aircraft or in whose area of responsibility the aircraft is operating.

3.2.3.2 Action by the station addressed or first station acknowledging the urgency message

3.2.3.2.1 The station addressed by an aircraft reporting an urgency condition, or first station acknowledging the urgency message, shall:

(a) acknowledge the urgency message;

(b) take immediate action to ensure that all necessary information is made available, as soon as possible, to:

(i) the ATS unit concerned;

(ii) the aircraft operating agency concerned, or its representative, in accordance with pre-established arrangements;

Note.— The requirement to inform the aircraft operating agency concerned does not have priority over any other action which involves the safely of the flight in distress, or of any other flight in the area, or which might affect the progress of expected flights in the area.

(c) if necessary, exercise control of communications.

3.2.3.3 *Action by all other stations*

3.2.3.3.1 The urgency communications have priority over all other communications, except distress, and all stations shall take care not to interfere with the transmission of urgency traffic.

3.2.3.4 *Action by an aircraft used for medical trAir Navigation Services Providerorts*

3.2.3.4.1 The use of the signal described in 3.2.3.4.2 shall indicate that the message which follows concerns a protected medical trAir Navigation Services Providerort pursuant to the 1949 Geneva Conventions and Additional Protocols.

3.2.3.4.2 For the purpose of announcing and identifying aircraft used for medical trAir Navigation Services Providerorts, a transmission of the radiotelephony urgency signal PAN PAN, preferably spoken three times, and each word of the group pronounced as the French word "panne", shall be followed by the radiotelephony signal for medical trAir Navigation Services Providerorts MAY-DEE-CAL, pronounced as in the French "medical". The use of the signals described above indicates that the message which follows concerns a protected medical trAir Navigation Services Providerort. The message shall convey the following data:

(a) the call sign or other recognized means of identification of the medical trAir Navigation Services Providerorts;

(b) position of the medical trAir Navigation Services Providerorts;

(c) number and type of medical trAir Navigation Services Providerorts;

(d) intended route;

(e) estimated time en-route and of departure and arrival, as appropriate;

(f) and any other information such as flight altitude, radio frequencies guarded, languages used, and secondary surveillance radar modes and codes.

3.2.3.5 Action by the station addressed or by other stations receiving a medical trAir Navigation Services Providerorts message.

The provisions of 3.2.3.2 and 3.2.3.3 shall apply as appropriate to stations receiving a medical trAir Navigation Services Providerorts message

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SIXTH SCHEDULE

[rr. 76 and 78]

AERONAUTICAL MOBILE SERVICE - DATA LINK COMMUNICATIONS

1.1. General

Note -1 While the provisions of this Schedule are based primarily on the use of controller-pilot data link communications, the provisions of 1.1.1 would apply to other data link applications, where applicable, including Data link—flight information services (e.g. D-ATIS, DVOLMET, etc.).

Note.-2 For the purposes of these provisions, the communication procedures applicable to the aeronautical mobile service, as appropriate, also apply to the aeronautical mobile satellite service.

1.1.1 Data link initiation capability (DLIC)

1.1.1.1 General

1.1.1.1.1 Before entering an airspace where data link applications are used by the ATS unit, data link communications shall be initiated between the aircraft and the ATS unit in order to register the aircraft and, when necessary, allow the start of a data link application. This shall be initiated by the aircraft, either automatically or by the pilot, or by the ATS unit on address forwarding.

1.1.1.1.2 The logon address associated with an ATS unit shall be published in Aeronautical Information Publications in accordance with Civil Aviation (Aeronautical Information Services) Regulations 2017

Note.— A given FIR may have multiple logon addresses; and more than one FIR may share the same logon address.

1.1.1.2 Aircraft initiation

On receipt of a valid data link initiation request from an aircraft approaching or within a data link service area, the ATS unit shall accept the request and, if able to correlate it with a flight plan, shall establish a connection with the aircraft.

1.1.1.3 ATS unit forwarding

The ground system initially contacted by the aircraft shall provide to the next ATS unit any relevant updated aircraft information in sufficient time to permit the establishment of data link communications.

1.1.1.4 Failure

1.1.1.4.1 In the case of a data link initiation failure, the data link system shall provide an indication of the failure to the appropriate ATS unit(s). The data link system shall also provide an indication of the failure to the flight crew when a data link initiation failure results from a logon initiated by the flight crew.

Note.— When the aircraft's logon request results from responding to a contact request by a tranferring ATS unit, then both ATS units will receive the indication.

1.1.1.4.2 The ATS unit shall establish procedures to resolve, as soon as practicable, data link initiation failures. Procedures shall include, as a minimum,

verifying that the aircraft is initiating a data link request with the appropriate ATS unit (i.e. the aircraft is approaching or within the ATS unit's control area); and if so:

(a) when a flight plan is available, verify that the aircraft identification, aircraft registration, or aircraft address and other details contained in the data link initiation request correspond with details in the flight plan, and where differences are detected verify the correct information and then make the necessary changes; or

(b) when a flight plan is not available, create a flight plan with sufficient information in the flight data processing system, to achieve a successful data link initiation; then

(c) arrange for the re-initiation of the data link.

1.1.1.4.3 The aircraft operator shall establish procedures to resolve, as soon as practicable, data link initiation failures. Procedures shall include, as a minimum, that the pilot:

(a) verify the correctness and consistency of the flight plan information available in the FMS or equipment from which data link is initiated, and where differences are detected make the necessary changes; and

(b) verify the correct address of the ATS unit; then

(c) re-initiate data link.

1.1.2 Composition of data link messages

1.1.2.1 The text of messages shall be composed in standard message format (e.g. controller-pilot data link communications message set), in plain language or in abbreviations and codes. Plain language shall be avoided when the length of the text can be reduced by using appropriate abbreviations and codes. Nonessential words and phrases, such as expressions of politeness, shall not be used.

1.1.2.2 The following characters are allowed in the composition of messages:

Letters: ABCDEFGHIJKLMNOPQRSTUVWXYZ (upper case only)

Figures: 1 2 3 4 5 6 7 8 9 0

Other signs:

- (hyphen)

? (question mark)

: (colon)

((open bracket)

) (close bracket)

• (full stop, period, or decimal point)

, (comma)

' (apostrophe)

= (double hyphen or equal sign)

/ (oblique)

+ (plus sign) and the space character.

Characters other than those listed above shall not be used in messages.

1.1.2.3 Roman numerals shall not be employed. If the originator of a message wishes the addressee to be informed that Roman figures are intended,

the Arabic figure or figures shall be written and preceded by the word ROMAN.

1.1.3 Display of data link messages

1.1.3.1 Ground and airborne systems shall allow for messages to be appropriately displayed, printed when required, and stored in a manner that permits timely and convenient retrieval should such action be necessary.

1.1.3.2 Whenever textual presentation is required, the English language shall be displayed as a minimum.

1.2. Controller-Pilot Data Link Communications procedures

1.2.1 In all communications the highest standard of discipline shall be observed at all times.

1.2.1.1 Consequences of human performance, which could affect the accurate reception and comprehension of messages, shall be taken into consideration when composing a message.

1.2.2 Ground and airborne systems shall provide controllers and pilots with the capability to review and validate any operational messages they send.

1.2.3 Ground and airborne systems shall provide controllers and pilots with the capability to review, validate and when applicable, acknowledge any operational messages they receive.

1.2.4 The controller shall be provided with the capability to respond to messages, including emergencies, to issue clearances, instructions and advisories, and to request and provide information, as appropriate.

1.2.5 The pilot shall be provided with the capability to respond to messages, to request clearances and information, to report information, and to declare or cancel an emergency.

1.2.6 The pilot and the controller shall be provided with the capability to exchange messages which include standard message elements, free text message elements or a combination of both.

1.2.7 Unless specified by the appropriate ATS authority, voice read-back of controller-pilot data link communications messages shall not be required.

1.2.8 Establishment of controller-pilot data link communications

1.2.8.1 The controller and the pilot shall be informed when controller-pilot data link communications has been successfully established.

1.2.8.2 Controller-pilot data link communications shall be established in sufficient time to ensure that the aircraft is communicating with the appropriate ATC unit.

1.2.8.3 The controller and pilot shall be informed when controller-pilot data link communications is available for operational use, at initial establishment, as well as on resumption of controller-pilot data link communications after a failure.

1.2.8.4 The pilot shall be able to identify the air traffic unit providing the air traffic control service at any time while the service is being provided.

1.2.8.5	When the airborne system detects that controller-pilot data link communications is available for operational use, it shall send the controller-pilot data link communications downlink message element CURRENT DATA AUTHORITY.
1.2.8.6	*Airborne-initiated controller-pilot data link communications*
1.2.8.6.1	When an ATC unit receives an unexpected request for controller-pilot data link communications from an aircraft, the circumstances leading to the request shall be obtained from the aircraft to determine further action.
1.2.8.6.2	When the ATC unit rejects a request for controller-pilot data link communications, it shall provide the pilot with the reason for the rejection using an appropriate controller-pilot data link communications message.
1.2.8.7	*ATC unit-initiated controller-pilot data link communications*
1.2.8.7.1	An ATC unit shall only establish controller-pilot data link communications with an aircraft if the aircraft has no controller-pilot data link communications link established, or when authorized by the ATC unit currently having controller-pilot data link communications established with the aircraft.
1.2.8.7.2	When a request for controller-pilot data link communications is controller-pilot data link communications rejected by an aircraft, the reason for the rejection shall be provided using controller-pilot data link communications downlink message element NOT CURRENT DATA AUTHORITY or message element NOT AUTHORIZED NEXT DATA AUTHORITY, as appropriate. Local procedures shall dictate whether the reason for rejection is presented to the controller. No other reasons for airborne rejection of ATC unit initiation of controller-pilot data link communications shall be permitted.

1.2.9 Exchange of operational controller-pilot data link communications messages

1.2.9.1	Controllers and pilots shall construct controller-pilot data link communications messages using standard message elements, free text message elements or a combination of both.
1.2.9.1.1	When controller-pilot data link communications is being used, and the intent of the message is included in the controller-pilot data link communications message set contained in the PANS-ATM, the associated standard message elements shall be used.
1.2.9.1.2	Except as provided by 1.2.12.1, when a controller or pilot communicates via controller-pilot data

link communications, the response shall be via controller-pilot data link communications. When a controller or pilot communicates via voice, the response shall be via voice.

1.2.9.1.3 Whenever a correction to a message sent via controller-pilot data link communications is deemed necessary or the contents of a message needs to be clarified, the controller or pilot shall use the most appropriate means available for issuing the correct details or for providing clarification.

Note.— The following procedures may be applied by the controller, in terms of correcting clearances, instructions or information, or by a pilot, in terms of correcting a reply to an uplink message or correcting previously advised requests or information.

1.2.9.1.3.1 When voice communications are used to correct a controller-pilot data link communications message for which no operational response has yet been received, the controller's or pilot's transmission shall be prefaced by the phrase: "DISREGARD controller-pilot data link communications (message type) MESSAGE, BREAK" - followed by the correct clearance, instruction, information or request.

Note.— It is possible that, at the time the voice communicated clarification is transmitted, the controller-pilot data link communications message being referred to has not yet reached the recipient, or has reached the recipient but has not been acted upon, or has reached the recipient and has been acted upon.

1.2.9.1.3.2 When referring to and identifying the controller-pilot data link communications message to be disregarded, caution shall be exercised in its phrasing so as to avoid any ambiguity with the issuance of the accompanying corrected clearance, instruction, information or request.

Note.— For example, if 5AS445, maintaining FL290, had been instructed via controller-pilot data link comnmnunications to climb to FL350, and the controller needs to correct the clearance utilizing voice comrnnunications, the following phrase might be used:

SAS445 DISREGARD CONTROLLER-PILOT DATA LINK COMMUNICATIONS CLIMB CLEARANCE MESSAGE, BREAK, CLIMB TO FL3 10.

1.2.9.1.3.3 If a controller-pilot data link communications message that requires an operational response is subsequently negotiated via voice, an appropriate controller-pilot data link communications message closure response shall be sent to ensure proper synchronization of the controller-pilot data link communications dialogue. This could be achieved either by explicitly instructing the recipient of the message via voice to close the dialogue or by allowing the system to automatically close the dialogue.

1.2.9.2 The composition of a controller-pilot data link communications message shall not exceed five message elements, only two of which may contain the route clearance variable.

1.2.9.2.1 The use of long messages or messages with multiple clearance elements, multiple clearance request elements or messages with a combination of clearances and information shall be avoided where possible.

1.2.9.3 controller-pilot data link communications ground systems and airborne systems shall be capable of using the controller-pilot data link communications message alert attributes in order to draw attention to higher priority messages.

Note.— Message attributes dictate certain message handling requirements for the controller-pilot data link communications user receiving a message. Each controller-pilot data link communications message has two attributes: alert and response attributes. When a message contains multiple message elements, the highest precedence message element attribute type becomes the attribute type for the entire message.

1.2.9.3.1 The alert attribute shall delineate the type of alerting required upon message receipt. Alert types are presented in Table 1-1.

1.2.9.3.2 The response attribute shall delineate valid responses for a given message element. Response types are presented in Table 1-2 for uplink messages and Table 1-3 for downlink messages.

1.2.9.3.3.1 When a multi-element message requires a response, the response shall apply to all message elements.

Note.— For example, a multi-element message containing CLIMB TO FL3 10 MAINTAIN MACH.84, a WILCO *response applies to, and indicates compliance with, both elements of the message.*

1.2.9.3.3.2 When a single message element clearance or any part of a multi-element clearance message cannot be complied with, the pilot shall send an UNABLE response for the whole message.

1.2.9.3.3.3 The controller shall respond with an UNABLE message that applies to all elements of the request when no element(s) of a single or multi-element clearance request can be approved. The current clearance(s) shall not be restated.

1.2.9.3.3.4 When a multi-element clearance request can only be partially accommodated, the controller shall respond with an UNABLE message applying to all the message elements of the request and, if appropriate, include a reason and/or information on when a clearance may be expected.

Table 1-1 Alert Attribute (Uplink and Downlink)

Type	*Description*	*Precedence*
H	High	1
M	Medium	2
L	Low	3
N	No alerting required	4

Table 1-2. Response Attribute (Uplink)

Type	*Response required*	*Valid responses*	*Precedence*

W/U	Yes	WILCO, UNABLE, STANDBY, NOT CURRENT DATA AUTHORITY, NOT AUTHORIZED NEXT DATA AUTHORITY, LOGICAL ACKNOWLEDGEMENT (only if required), ERROR	1
A/N	Yes	AFFIRM, NEGATIVE, STANDBY, NOT CURRENT DATA AUTHORITY,NOT AUTHORIZED NEXT DATA AUTHORITY, LOGICAL ACKNOWLEDGEMENT (only if required), ERROR	2
R	Yes	ROGER, UNABLE, STANDBY, NOT CURRENT DATA AUTHORITY, NOT AUTHORIZED NEXT DATA AUTHORITY, LOGICAL ACKNOWLEDGEMENT (only if required), ERROR	3
Y	Yes	Any CPDLC downlink message, LOGICAL ACKNOWLEDGEMENT (only if required)	4
N	No, unless logical acknowledgement required	LOGICAL ACKNOWLEDGEMENT (only if required). NOT CURRENT DATA AUTHORITY, NOT AUTHORIZED NEXT DATA AUTHORITY, ERROR	5

Table 1-3 Response Attribute (Downlink)

Type	Response required	Valid responses	Precedence

Y	Yes	Any controller-pilot data link communications uplink message, LOGICAL ACKNOWLEDGEMENT (only if required)	1
N	No, unless logical acknowledgement required	LOGICAL ACKNOWLEDGEMENT (Only if required), MESSAGE NOT SUPPORTED BY THIS ATC UNIT, ERROR	2

Note.— A separate controller-pilot data link communications message (or messages) may subsequently be transmitted to respond to those elements that can be accommodated.

1.2.9.3.3.5 When all elements of a single or multi-element clearance request can be accommodated, the controller shall respond with clearances corresponding to each element of the request. This response shall be a single uplink message.

Note.— For example, while messages containing multi-element clearance requests are to be avoided, a multi-element down link message containing the indicated message elements:

REQUEST CLEARANCE YQM YYG YYT YQX

TRACK X EINN EDDF

REQUEST CLIMB TO FL350

REQUEST MACH 0.84

could be responded to with

CLEARED YQM YYG YYT YQX TRACK X EINN

EDDF CLIMB TO FL350

REPORT MAINTAINING

CROSS YYG AT OR AFTER 1150

NO SPEED RESTRICTION.

1.2.9.3.3.6 When a controller-pilot data link communications message contains more than one message element and the response attribute for the message is Y, when utilized, the single response message shall contain the corresponding number of replies in the same order.

Note.— For example, a multi-element uplink message containing

CONFIRM SQUAWK

WHEN CAN YOU ACCEPT FL4I0

could be responded to with

SQUAWKING 5525

WE CAN ACCEPT FL410 AT 1636Z

1.2.9.4 When a ground or airborne system generates the controller-pilot data link communications message ERROR, the reason for the error shall be included in the message.

1.2.9.5 The appropriate ATS authority shall select those message elements contained in PANS-ATM that support operations in their airspace. Should an ATS authority choose to select a subset of the message elements, and a received message does not belong to this subset, the ATC unit shall respond by up- linking the message element MESSAGE NOT SUPPORTED BY THIS ATC UNIT.

Note.— Further processing of the received message is not required.

1.2.9.5.1 Only the uplink messages appropriate to a particular control sector's operations shall be provided to the controller.

Note.— The controller-pilot data link connnunications message set contained in PANS-ATM was developed to encompass different air traffic management environments.

1.2.9.5.2 Information concerning controller-pilot data link communications message element subsets, shall be published in the Aeronautical Information Publications (AIPs).

1.2.9.6 *Transfer of controller-pilot data link communications*

1.2.9.6.1 When controller-pilot data link communications is transferred, the transfer of voice communications and controller-pilot data link communications shall commence concurrently.

1.2.9.6.2 When an aircraft is transferred from an ATC unit where controller-pilot data link communications is available to an ATC unit where controller-pilot data link communications is not available, controller-pilot data link communications termination shall commence concurrent with the transfer of voice communications.

1.2.9.6.3 When a transfer of controller-pilot data link communications results in a change of data authority, and there are still messages for which the closure response has not been received (i.e. messages outstanding), the controller transferring the controller-pilot data link communications shall be informed.

1.2.9.6.3.1 If the controller needs to transfer the aircraft without replying to any downlink message(s) outstanding, the system shall have the capability to automatically send the appropriate closure response message(s). In such cases, the contents of any automatically sent closure response message(s) shall be promulgated in local instructions.

1.2.9.6.3.2	When the controller decides to transfer the aircraft without receiving pilot responses to any uplink message(s) outstanding, the ground system shall have the capability to automatically end the dialogue for each message prior to the transfer.
1.2.9.6.3.2.1	The controller shall revert to voice communications to clarify any ambiguity associated with the message(s) outstanding.
1.2.9.6.4	When a transfer of controller-pilot data link communications does not result in a change of data authority, and there are still messages outstanding, these messages shall either be forwarded to the appropriate controller or shall be closed in accordance with local instructions and, if necessary, letters of agreement.
1.2.10	Display of controller-pilot data link communications messages ATC units utilizing a controller-pilot data link communications message contained in the PANS-ATM shall display the associated text pertaining to that message as presented in the PANS-ATM.
1.2.11	Free text messages-elements.

1.2.11.1 The use of free text messages by controllers or pilots, shall be avoided.

Note.— Whilst it is recognized that non-routine and emergency situations may necessitate the use of free text, particularly when voice communication has failed, the avoidance of utilizing free text messages is intended to reduce the possibility of misinterpretation and ambiguity.

1.2.11.2	When the controller-pilot data link communications message set contained in the Civil Aviation (Air Traffic Services) Regulations 2017 does not provide for specific circumstances, the appropriate ATS authority may determine that it is acceptable to use free text message elements. In such cases, the appropriate ATS authority, in consultation with operators and other ATS authorities that may be concerned, shall define display format, intended use and attributes for each free text message element and publish them with relevant procedures in the Aeronautical Information Publications.
1.2.11.3	Free text message elements shall be stored for selection within the aircraft or ground system to facilitate their use.
1.2.12	Emergencies, hazards and equipment failure procedures
1.2.12.1	When a controller-pilot data link communications emergency message is received, the controller shall acknowledge receipt of the message by the most efficient means available.
1.2.12.2	When responding via controller-pilot data link communications to all other emergency or

urgency messages, uplink message ROGER shall be used.

1.2.12.3 When a controller-pilot data link communications message requires a logical acknowledgement and/or an operational response, and such a response is not received, the pilot or controller, as appropriate, shall be alerted.

1.2.12.4 Failure of controller-pilot data link communications

Note 1.— Action to be taken in the event of a data link initiation failure is covered in 1.1.1.4.

Note 1 2.— Action to be taken in the event of the failure of a single controller-pilot data link communications message is covered in 1.2.12.7

1.2.12.4.1 A controller-pilot data link communications failure shall be detected in a timely manner.

1.2.12.4.2 The controller and pilot shall be alerted to a failure of controller-pilot data link communications as soon as a failure has been detected.

1.2.12.4.3 When a controller or pilot is alerted that controller-pilot data link communications has failed, and the controller or pilot needs to communicate prior to controller-pilot data link communications being restored, the controller or pilot shall revert to voice, if possible, and preface the information with the phrase:

CPDLC FAILURE.

1.2.12.4.4 Controllers having a requirement to transmit information concerning a complete controller-pilot data link communications ground system failure to all stations likely to intercept shall preface such a transmission by the general call ALL STATIONS CPDLC FAILURE, followed by the identification of the calling station.

Note.— No reply is expected to such general calls unless individual stations are subsequently called to acknowledge receipt.

1.2.12.4.5 When controller-pilot data link communications fails and communications revert to voice, all controller-pilot data link communications messages outstanding shall be considered not delivered and the entire dialogue involving the messages outstanding shall be recommenced by voice.

1.2.12.4.6 When controller-pilot data link communications fails but is restored prior to a need to revert to voice communications, all messages outstanding shall be considered not delivered and the entire dialogue involving the messages outstanding shall be recommenced via controller-pilot data link communications.

1.2.12.5 INTENTIONAL SHUTDOWN OF CONTROLLER-PILOT DATA LINK COMMUNICATIONS

1.2.12.5.1 When a system shutdown of the communications network or the controller-pilot data link communications ground system is planned, a Notice to Airmen shall be published to inform all affected parties of the shutdown period and if necessary, the details of the voice communication frequencies to be used.

1.2.12.5.2 Aircraft currently in communication with the ATC unit shall be informed by voice or controller-pilot data link communications of any imminent loss of controller-pilot data link communications service.

1.2.12.5.3 The controller and pilot shall be provided with the capability to abort controller-pilot data link communications.

1.2.12.6 FAILURE OF A SINGLE CONTROLLER-PILOT DATA LINK COMMUNICATIONS MESSAGE

When a controller or pilot is alerted that a single controller-pilot data link communications message has failed, the controller or pilot shall take one of the following actions, as appropriate:

a) via voice, confirm the actions that will be undertaken with respect to the related dialogue, prefacing the information with the phrase:

CONTROLLER-PILOT DATA LINK COMMUNICATIONS MESSAGE FAILURE;

b) via controller-pilot data link communications, reissue the controller-pilot data link communications message that failed

1.2.12.7 DISCONTINUATION OF THE USE OF CONTROLLER-PILOT DATA LINK COMMUNICATIONS PILOT REQUESTS

1.2.12.7.1 When a controller requires all stations or a specific flight to avoid sending controller-pilot data link communications requests for a limited period of time, the folloiving phrase shall he used:

((call sign) or ALL STATIONS) STOP SENDING CPDLC REQUESTS [UNTIL ADVISED] [(reason)]

Note.— Under these circumstances, controller-pilot data link communications remains available for the pilot to, if necessary, respond to messages, report information, and declare and cancel an emergency.

1.2.12.7.2 *The resumption of the normal use of controller-pilot data link communications shall be advised by using the following phrase:*

((call sign) or ALL STATIONS) RESUME NORMAL CPDLC OPERATIONS

1.2.13 Where the testing of CP controller-pilot data link communications DLC with an aircraft could affect the air traffic services being provided to the aircraft, coordination shall be effected prior to such testing.

1.2.14 *Downstream clearance deliver)) service*

1.2.14.1 The appropriate ATS authority shall determine whether an ATC unit supports downstream clearance delivery service.

1.2.14.2 *Establishment of downstream clearance delivery service*

1.2.14.2.1 Downstream clearance delivery service shall only be initiated by the airborne system. The initiation shall indicate that this communication is only to receive a downstream clearance.

1.2.14.2.2 When an ATC unit rejects a request for downstream clearance delivery service, it shall provide the pilot with the reason for the rejection using the controller-pilot data link communications message SERVICE UNAVAILABLE.

1.2.14.3 *Operation of downstream clearance delivery service*

1.2.14.3.1 The controller and pilot shall be informed when downstream clearance delivery service is available for operational communication.

1.2.14.3.2 The controller and pilot shall be informed of the failure of downstream clearance delivery service.

1.2.14.3.3 The controller-pilot data link communications message elements that are permitted for downstream clearance delivery service shall be established by regional air navigation agreement.

1.2.14.3.4 A clearance request issued as a downstream clearance request shall be clearly identifiable as such to the controller.

1.2.14.3.5 A clearance issued as a downstream clearance shall be clearly identifiable as such to the pilot.

1.2.14.4 *Termination of downstream clearance delivery service*

1.2.14.4.1 Termination of downstream clearance delivery service shall only be initiated by the airborne system.

1.2.14.4.2 Downstream clearance delivery service with an ATC unit shall be terminated whenever the downstream data authority becomes the current data authority.

THE CIVIL AVIATION (OPERATION OF AIRCRAFT-GENERAL AVIATION AEROPLANES) REGULATIONS, 2018

ARRANGEMENT OF REGULATIONS

PART I – PRELIMINARY PROVISIONS

Regulation

THE CIVIL AVIATION (OPERATION OF AIRCRAFT-GENERAL AVIATION AEROPLANES) REGULATIONS, 2018

[Legal Notice 165 of 2018]

PART I – PRELIMINARY PROVISIONS

1. Citation.

These Regulations may be cited as the Civil Aviation (Operation of Aircraft—General Aviation—Aeroplanes) Regulations.

2. Interpretation.

In these Regulations, unless the context otherwise requires—

"Accelerate-Stop Distance Available (ASDA)" means the length of the take-off run available plus the length of stopway, if provided;

"Act" means the Civil Aviation Act, 2013;

"acts of unlawful interference" means acts or attempted acts such as to jeopardize the safety of civil aviation and air transport, including—

(a) unlawful seizure of aircraft in flight;

(b) unlawful seizure of aircraft on the ground;

(c) hostage-taking on board an aircraft or on aerodromes;

(d) forcible intrusion on board an aircraft, at an airport or on the premises of an aeronautical facility;

(e) introduction on board an aircraft or at an airport of a weapon or hazardous device or material intended for criminal purposes; and

(f) communication of false information as to jeopardize the safety of an aircraft in flight or on the ground, of passengers, crew, ground personnel or the general public, at an airport or on the premises of a civil aviation facility;

"aerial work" means an aircraft operation in which an aircraft is used for specialised services including, but not limited to agriculture, construction, photography, surveying, observation and patrol, search and rescue and aerial advertisement;

"aerodrome" means a defined area on land or water, including any buildings, installations and equipment, used or intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

"aerodrome operating minima" means the limits of usability of anaerodrome for—

(a) take-off, expressed in terms of runway visual range and visibility and, if necessary, cloud conditions;

(b) landing in 2D instrument approach operations, expressed in terms of visibility or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions; and

(c) landing in 3D instrument approach operations, expressed in terms of visibility or runway visual range and decision altitude or height (DA/H) as appropriate to the type or category of the operation;

"aeronautical product" means any aircraft, aircraft engine, propeller, or subassembly, appliance, material, part, or component to be installed;

"aeroplane" means a power-driven heavier-than-air aircraft, deriving its lift inflight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight;

"aircraft" means any machine that can derive support in the atmosphere from the reactions of the air, other than the reactions of the air against the earth's surface"aircraft

component" means any component part of an aircraft up to and including a complete power plant or any operational or emergency equipment;

"aircraft operating manual" means a manual, acceptable to the Authority, containing normal, abnormal and emergency procedures, checklists, limitations, performance information, details of the aircraft systems and other material relevant to the operation of the aircraft;

"airframe" means the fuselage, booms, nacelles, cowlings, fairings, airfoil surfaces, including rotors (but excluding propellers and rotating airfoils of a powerplant) and landing gear of an aircraft and their accessories and controls;

"air operator certificate (AOC)" means a certificate authorizing an operator to carry out specified commercial air transport operations;

"air traffic control service" means a service provided for the purpose of—

(a) preventing collisions—

(i) between aircraft; and

(ii) on manoeuvring area between aircraft and obstructions; and

(b) expediting and maintaining an orderly flow of air traffic;

"air traffic service" is a generic term meaning variously flight information service, alerting service, air traffic advisory service, or air traffic control service; (area control service, approach control service or aerodrome control service);

"aircraft type" means all aircraft of the same basic design;

"airworthy" means the status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation;

"alternate aerodrome" means an aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing including the following—

(a) take-off alternate- an alternate aerodrome at which an aircraft can land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure;

(b) en-route alternate- an alternate aerodrome at which an aircraft would be able to land after experiencing an abnormal or emergency condition while en route;

(c) destination alternate- an alternate aerodrome to which an aircraft may proceed should it become either impossible or inadvisable to land at the aerodrome of intended landing;

"altimetry system error (ASE)" means the difference between the altitude indicated by the altimeter display, assuming a correct altimeter barometric setting, and the pressure altitude corresponding to the undisturbed ambient pressure;

"appliance" means any instrument, mechanism, equipment, part, apparatus, appurtenance, or accessory, including communications equipment, that is used or intended to be used in operating or controlling an aircraft in flight, is installed in or attached to the aircraft, and is not part of an airframe, power plant, or propeller;

"Approach Procedure with Vertical guidance (APV)" is a performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A;

"approach and landing operations using instrument approach procedures" means instrument approach and landing operations classified as follows—

(a) non-precision approach and landing operations- an instrument approach and landing which utilizes lateral guidance but does not utilize vertical guidance;

(b) approach and landing operations with vertical guidance- an instrument approach and landing which utilizes lateral and vertical guidance but does

not meet the requirements established for precision approach and landing operations; and

(c) precision approach and landing operations- an instrument approach and landing using precision lateral and vertical guidance with minima as determined by the category of operation;

"appropriate authority" means—

(a) regarding flight over the high seas, the relevant authority of the state of registry;

(b) regarding flight other than over the high seas, the relevant authority of the state having sovereignty over the territory being overflown;

"Automatic Deployable Flight Recorder (ADFR)". A combination flight recorder installed on the aircraft which is capable of automatically deploying from the aircraft;

"authorised instructor" means a person who—

(a) holds a valid ground instructor licence issued under the Civil Aviation (Personnel Licensing) Regulations when conducting ground training;

(b) holds a current flight instructor rating issued under the Civil Aviation (Personnel Licensing) Regulations when conducting ground training or flight training; or

(c) is authorised by the Authority to provide ground training or flight training under the Civil Aviation (Personnel Licensing) and the Civil Aviation (Approved Training Organisations) Regulations;

"authorised person" means any person authorized by the Authority either generally or in relation to a particular case or class of cases, and references to an authorized person includes references to a holder for the time being of any office designated by the Authority;

"Authority" means the Kenya Civil Aviation Authority;

"cabin crew member" means a crew member who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member;

"Category II (CAT II) operations" means, a precision instrument approach and landing with a decision height lower than 60 m (200 ft) , but not lower than 30 m (100 ft), and a runway visual range not less than 350 m;

"Category IIIA (CAT IIIA) operations" means, a precision instrument approach and landing with—

(a) a decision height lower than 30 m (100 ft) or no decision; and

(b) a runway visual range not less than 200 m;

"Category IIIB (CAT IIIB) operations" means, a precision instrument approach and landing with—

(a) a decision height lower than 15 m (50ft) or no decision height; and

(b) a runway visual range less than 200 m but not less than 50 m;

"Category IIIC (CAT IIIC) operations" means a precision instrument approach and landing with no decision height and no runway visual range limitations;

"check pilot" means a pilot approved by the Authority who has the appropriate training, experience, and demonstrated ability to evaluate and certify the knowledge and skills of other pilots;

"COMAT". Operator material carried on an operator's aircraft for the operator's own purposes;

"Combined Vision System (CVS)" means a system to display images from a combination of an enhanced vision system (EVS) and a synthetic vision system (SVS);

"commercial air transport" means an aircraft operation involving the transport of passengers, cargo, or mail for remuneration or hire;

"continuing airworthiness" means the set of processes by which an aircraft, engine, propeller or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life;

"Contracting States" means all States that are parties to the Convention on International Civil Aviation (Chicago Convention);

"Continuous descent final approach (CDFA)". A technique, consistent with stabilized approach procedures, for flying the final approach segment of a non-precision instrument approach procedure as a continuous descent, without level-off, from an altitude/height at or above the final approach fix altitude/height to a point approximately 15 m (50 ft) above the landing runway threshold or the point where the flare manoeuvre should begin for the type of aircraft flown;

"corporate aviation operation" means the non-commercial operation or use of aircraft by a company for the carriage of passengers or goods as an aid to the conduct of company business, flown by a professional pilot(s) employed to fly the aircraft;

"co-pilot" means a licensed pilot serving in any piloting capacity other than as PIC, but excluding a pilot who is on board the aircraft for the sole purpose of receiving flight instruction;

"crew member" means a person assigned by an operator to duty on an aircraft during a flight duty period;

"crew resource management (CRM)" means a program designed to improve the safety of flight operations by optimizing the safe, efficient, and effective use of human resources, hardware, and information through improved crew communication and co-ordination;

"critical engine" means the engine whose failure would most adversely affect the performance or handling qualities of an aircraft;

"critical phases of flight" means those portions of operationsinvolving taxing, take-off and landing, and all flight operations below 10,000 feet, except cruise flight;

"dangerous goods" means articles or substances which are capable of posing a risk to health, safety, property or the environmentand which are shown in the list of dangerous goods in the Technical Instructions or which are classified according to those Instructions;

"Decision Altitude (DA) or Decision Height (DH)" means a specified altitude or height in the precision approach or approach with vertical guidance at which a missed approach must be initiated if the required visual reference to continue the approach has not been established;

"duty" means any task that flight or cabin crew members are required by the operator to perform, including, for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue;

"duty period" means a period which starts when a flight or cabin crew member is required by an operator to report for or to commence a duty and ends when that person is free from all duties.

"Extended Diversion Time Operations (EDTO)" means any operation by an aeroplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the Authority;

"EDTO critical fuel." means the fuel quantity necessary to fly to an en-route alternate aerodrome considering, at the most critical point on the route, the most limiting system failure.;

"EDTO significant system" means an aeroplane system whose failure or degradation could adversely affect the safety particular to an EDTO flight, or whose continued functioning

is specifically important to the safe flight and landing of an aeroplane during an EDTO diversion;

"Electronic Flight Bag (EFB)" means an electronic information system, comprised of equipment and applications for flight crew, which allows for the storing, updating, displaying and processing of EFB functions to support flight operations or duties;

"Emergency Locator Transmitter (ELT)" means a generic term describing equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated and an ELT may be any of the following—

(a) Automatic fixed ELT (ELT(AF)) means an automatically activated ELT which is permanently attached to an aircraft;

(b) Automatic portable ELT (ELT(AP)) means an automatically activated (b) ELT which is rigidly attached to an aircraft but readily removable from the aircraft;

(c) Automatic deployable ELT (ELT(AD)) means an ELT which is rigidly attached to an aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided;

(d) Survival ELT (ELT(S)) means an ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an emergency, and manually activated by survivors;

"engine" means a unit used or intended to be used for aircraft propulsion and it consists of at least those components and equipment necessary for functioning and control, but excludes the propeller/rotors (if applicable);

"Enhanced Vision system (EVS)" means a system to display electronic real-time images of the external scene achieved through the use of image sensors;

"extended flight over water" means a flight operated over water at a distance of more than 93 km (50 NM), or 30 minutes at normal cruising speed, whichever is the lesser, away from land suitable for making an emergency landing;

"estimated time of arrival" means for IFR flights, the time at which it is estimated that the aircraft will arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the aerodrome, the time at which the aircraft will arrive over the aerodrome and for VFR flights, the time at which it is estimated that the aircraft will arrive over the aerodrome;

"evaluator" means a person employed by an Approved TrainingOrganisation who performs tests for licensing, added ratings, authorisations, and proficiency checks that are authorised by the certificate holder's training specification, and who is authorised by the Authority to administer such checks and tests;

"examiner" means any person authorised by the Authority to conduct a proficiency test, a practical test for a licence or rating, or a knowledge test under these Regulations;

"fatigue" means a physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness and/or physical activity that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety related duties;

"Fatigue Risk Management System (FRMS)" means a datadriven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness;

"Final approach segment (FAS)" means that segment of an instrument approach procedure in which alignment and descent for landing are accomplished;

"flight crew member" means a licensed crew member charged with duties essential to the operation of an aircraft during flight time;

"flight data analysis" means a process of analysing recorded flight data in order to improve the safety of flight operations;

"flight duty period" means a period which commences when a flight or cabin crew member is required to report for duty that includes a flight or a series of flights and which finishes when the aeroplane finally comes to rest and the engines are shut down at the end of the last flight on which he or she is a crew member;

"flight manual" means a manual, associated with the certificate of airworthiness, containing limitations within which the aircraft is to be considered airworthy, and instructions and information necessary to the flight crew members for the safe operation of the aircraft;

"flight operations officer or flight dispatcher" means a person designated by the operator to engage in the control and supervision of flight operations, whether licensed or not, suitably qualified in accordance with Civil Aviation (Personnel Licensing) Regulations, who supports, briefs or assists the pilot-in-command in the safe conduct of the flight;

"flight plan" means specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft;

"flight recorder" means any type of recorder installed in theaircraft for the purpose of complementing accident or incident investigation;

"flight safety documents system" means a set of interrelated documentation established by the operator, compiling and organizing information necessary for flight and ground operations, and comprising, as a minimum, the operations manual and the operator's maintenance control manual;

"flight simulation training device" means any one of the following three types of apparatus in which flight conditions are simulated on the ground—

(a) a flight simulator, which provides an accurate representation of the flight deck of a particular aircraft type to the extent that the mechanical, electrical, electronic, etc. aircraft systems control functions, the normal environment of flight crew members, and the performance and flight characteristics of that type of aircraft are realistically simulated;

(b) a flight procedures trainer, which provides a realistic flight deck environment, and which simulates instrument responses, simple control functions of mechanical, electrical, electronic, etc. aircraft systems, and the performance and flight characteristics of aircraft of a particular class;

(c) a basic instrument flight trainer, which is equipped with appropriate instruments, and which simulates the flight deck environment of an aircraft in flight in instrument flight conditions;

"flight time" means—

(a) for aeroplanes and gliders the total time from the moment an aeroplane or a glider moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight and it is synonymous with the term "block to block" or "chock to chock" time in general usage which is measured from the time an aeroplane first moves for the purpose of taking off until it finally stops at the end of the flight;

(b) for helicopter the total time from the moment a helicopter rotor blades start turning until the moment a helicopter comes to rest at the end of the flight and the rotor blades are stopped; and

(c) for airships or free balloon the total time from the moment an airship or free balloon first becomes detached from the surface until the moment when it next becomes attached thereto or comes to rest thereon;

"general aviation operation" means an aircraft operation other than a commercial air transport operation or an aerial work operation;

"ground handling services" means services necessary for an aircraft's arrival at, and departure from, an airport, other than air traffic services;

"handling agent" means an agency which performs on behalf of the operator some or all of the latter's functions including receiving, loading, unloading, transferring or other processing of passengers or cargo;

"Head-Up Display (HUD)" means a display system that presents flight information into the pilot's forward external field of view;

"heavier-than-air aircraft" means any aircraft deriving its lift in flight chiefly from aerodynamic forces;

"human factors principles" means principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance;

"human performance" means human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations;

"inspection" means the examination of an aircraft or aeronautical product to establish conformity with a standard approved by the Authority;

manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows—

(a) non-precision approach (NPA) procedure;

(b) approach procedure with vertical guidance (APV); and

(c) precision approach (PA) procedure.

"instrument approach operations" means an approach and landing using instruments for navigation guidance based on an instrument approach procedure, there are two methods for executing instrument approach operations—

(a) a two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and 4

(b) a three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance;

"Instrument Approach Procedure (IAP)" means a series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures shall be classified as follows—

(a) Non-Precision Approach (NPA) procedure. An instrument approach procedure designed for 2D instrument approach operations Type A;

(b) Approach Procedure with Vertical guidance (APV). A performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A; and

(c) Precision Approach (PA) procedure. An instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS CAT I) designed for 3D instrument approach operations Type A or B;

"instrument meteorological conditions (IMC)" means Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions;

"isolated aerodrome" means a destination aerodrome for which there is no destination alternate aerodrome suitable for a given aeroplane type;

"journey log" means a form signed by the PIC of each flight that records the aircraft's registration, crew member names and duty assignments, the type of flight, and the date, place, and time of arrival and departure;

"landing decision point" means the point used in determining landing performance from which, an engine failure occurring at this point, the landing may be safely continued or a balked landing initiated;

"landing distance available (LDA)" means the length of runway which is declared available and suitable for the ground run of an aeroplane landing;

"large aeroplane" means an aeroplane having a maximum certified take-off mass of over 5,700 kg (12,500 lbs);

"lighter-than-air aircraft" means any aircraft supported chiefly by its buoyancy in the air;

"maintenance" means the performance of tasks required to ensure the continuing airworthiness of an aircraft, including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair;

"maintenance organization's procedures manual" means a document endorsed by the head of the maintenance organization which details the maintenance organization's structure and management responsibilities, scope of work, description of facilities, maintenance procedures and quality assurance or inspection systems;

"maintenance programme" means a document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies;

"certificate of release to service" means a document which contains a certification confirming that the maintenance work to whichit relates has been completed in a satisfactory manner, either inaccordance with the approved data and the procedures described in the maintenance organization's procedures manual or under an equivalent system;

"major modification" means a type design change not listed in the aircraft, aircraft engine, or propeller specifications that might appreciably affect the mass and balance limits, structural strength, performance, power-plant operation, flight characteristics, or other qualities affecting airworthiness or environmental characteristics, or that will be embodied in the product according to non-standard practices;

"Master Minimum Equipment List (MMEL)" means a list established for a particular aircraft type by the organisation responsible for the type design with the approval of the State of design containing items, one or more of which is permitted to be unserviceable on the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures;

"maximum diversion time" means maximum allowable range, expressed in time, from a point on a route to an en-route alternate aerodrome;

"maximum mass" means maximum certificated take-off mass;

"meteorological Information" means meteorological report, analysis, forecast, and any other statement relating to existing or expected meteorological conditions;

"Minimum Descent Altitude (MDA) or Minimum Descent Height (MDH)" means a specified altitude or height in a non-precision approach or circling approach below which descent must not be made without the required visual reference;

"Minimum Equipment List (MEL)" means a list approved by the Authority which provides for the operation of the aircraft, subject to specific conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for a particular aircraft type;

"missed approach point" means that point in an instrument approach procedure at or before which the prescribed missed approach procedure must be initiated in order to ensure that the minimum obstacle clearance is not infringed;

"missed approach procedure" means the procedure to be followed if the approach cannot be continued;

"modification" means a change to the type design of an aircraft or aeronautical product which is not a repair;

"navigation specification" means a set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace which are of are two kinds—

(a) Required Navigation Performance (RNP) specification which means a navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH;

(b) Area Navigation (RNAV) specification which means a navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1;

"night" means the time between fifteen minutes after sunset and fifteen minutes before sunrise, sunrise and sunset being determined at surface level, and includes any time between sunset and sunrise when an unlighted aircraft or other unlighted prominent object cannot clearly be seen at a distance of 4,572 m;

"Non-Precision Approach (NPA) procedure" means an instrument approach procedure designed for 2D instrument approach operations Type A;

"Obstacle Clearance Altitude (OCA) or Obstacle Clearance Height (OCH)" means the lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria;

"Operator" means a person, organization or enterprise engaged in or offering to engage in an aircraft operation;

"Operating Base" means the location from which operational control is exercised;

"operational control" means the exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight;

"operational flight plan" means the operator's plan for the safe conduct of the flight based on considerations of aircraft performance, other operating limitations, and relevant expected conditions on the route to be followed and at the aerodromes or heliports concerned;

"operations manual" means a manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties;

"operator's maintenance control manual" means a document which describes the operator's procedures necessary to ensure that all scheduled and unscheduled maintenance is performed on the operator's aircraft on time and in a controlled and satisfactory manner;

"overhaul" means the restoration of an aircraft or aeronautical product using methods, techniques, and practices acceptable to the Authority, including disassembly, cleaning, and

inspection as permitted, repair as necessary, and reassembly; and tested in accordance with approved standards and technical data, or in accordance with current standards and technical data acceptable to the Authority, which have been developed and documented by the State of Design, holder of the type certificate, supplemental type certificate, or a material, part, process, or appliance approval under Parts Manufacturing Authorisation (PMA) or Technical Standard Order (TSO);

"passenger exit seats" means those seats having direct access to an exit, and those seats in a row of seats through which passengers would have to pass to gain access to an exit, from the first seat inboard of the exit to the first aisle inboard of the exit;

"performance-based communication (PBC)" means communication based on performance specifications applied to the provision of air traffic services;

"performance-based navigation (PBN)" means area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace;

"Performance-Based Surveillance (PBS)". Surveillance based on performance specifications applied to the provision of air traffic services;

"Pilot-In-Command (PIC)" means the pilot designated by the operator, or in the case of general aviation, the owner as being in command and charged with the safe conduct of a flight;

"point of no return" means the last possible geographic point at which an aircraft can proceed to the destination aerodrome as well as to an available en-route alternate aerodrome for a given flight;

"psychoactive substances" means alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded;

"power-plant" means an engine that is used or intended to be used for propelling aircraft and includes turbo superchargers, appurtenances, and accessories necessary for its functioning, but does not include propellers;

"practical test" means a competency test on the areas of operations for a licence, certificate, rating, or authorisation that is conducted by having the applicant respond to questions and demonstrate manoeuvres in flight or in an approved synthetic flight trainer;

"Precision Approach (PA) procedure" means an instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS CAT I) designed for 3D instrument approach operations Type A or B;

"pressure-altitude" means an atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere;

"problematic use of substances" means the use of one or more psychoactive substances by aviation personnel in a way that—

(a) constitutes a direct hazard to the user or endangers the lives, health or welfare of others; and

(b) causes or worsens an occupational, social, mental or physical problem or disorder;

"propeller" means a device for propelling an aircraft that has blades on an engine driven shaft and that, when rotated, produces by its action on the air, a thrust approximately perpendicular to its plane of rotation. It includes control components normally supplied by its manufacturer, but does not include main and auxiliary rotors or rotating airfoils of engines;

"psychoactive substance" means alcohol, opioids, cannabinoids, sedatives and hynotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded;

"repair" means the restoration of an aeronautical product to an airworthy condition to ensure that the aircraft continues to comply with the design aspects of the appropriate airworthiness requirements used for the issuance of the type certificate for the respective aircraft type, after it has been damaged or subjected to wear;

"Required Communication Performance (RCP) specification" means a set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based communication;

"Required Surveillance Performance (RSP) specification" means a set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based surveillance;

"Required Navigation Performance (RNP)" means a statement of the navigation performance necessary for operation within a defined airspace;

"rest period" means a continuous and defined period of time, subsequent to or prior to duty, during which flight or cabin crew members are free of all duties;

"runway surface condition" means the state of the surface of the runway: either dry, wet, or contaminated—

(a) contaminated runway. A runway is contaminated when more than 25 per cent of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by—

(i) water, or slush more than 3 mm (0.125 in) deep;

(ii) loose snow more than 20 mm (0.75 in) deep; or

(iii) compacted snow or ice, including wet ice.

(b) dry runway. A dry runway is one which is clear of contaminants and visible moisture within the required length and the width being used; and

(c) wet runway. A runway that is neither dry nor contaminated;

"Runway Visual Range (RVR)" means the range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line;

"RVSM" means reduced vertical separation minimum;

"RVSM (Reduced Vertical Separation Minima) Airspace" means any airspace or route between flight level 290 and flight level 410 inclusive where the aircraft are separated vertically by 1000ft (300m);

"safe forced landing" means unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface;

"safety management system" means a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures;

"safety programme" means an integrated set of regulations and activities aimed at improving safety;

"safety-sensitive personnel" means persons who might endanger aviation safety if they perform their duties and functions improperly including, but not limited to, crew members, aircraft maintenance personnel and air traffic controllers;

"serious injury" means an injury which is sustained by a person in an accident and which —

(a) requires hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received;

(b) results in a fracture of any bone (except simple fractures of fingers, toes or nose);

(c) involves lacerations which cause severe haemorrhage, nerve, muscle or tendon damage;

(d) involves injury to any internal organ;

(e) involves second or third degree burns, or any burns affecting more than 5% of the body surface; or

(f) involves verified exposure to infectious substances or injurious radiation;

"small aeroplane" means an aeroplane having a maximum certified take-off mass of 5,700 kg (12,500 lbs) or less;

"special VFR" means a controlled VFR traffic authorized by air traffic control to operate within the control zone under meteorological conditions below the visual meteorological conditions or at night;

"State of the Aerodrome" means the State in whose territory the aerodrome is located;

"state of design" means the Contracting State which approved the original type certificate and any subsequent supplemental type certificates for an aircraft, or which approved the design of an aircraft, aircraft component or appliance;

"State of Registry" means the State on whose register the aircraft is entered;

"State of the Operator" means the State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence;

"substance" means alcohol, sedatives, hypnotics, anxiolytics, hallucinogens, opioids, cannabis, inhalants, central nervous system stimulants such as cocaine, amphetamines, and similarly acting sympathomimetics, phencyclidine or similarly acting arylcyclohexylamines, and other psychoactive drugs and chemicals;

"Synthetic Vision system (SVS)" means a system to display data-derived synthetic images of the external scene from the perspective of the flight deck;

"take-off decision point" means the point used in determining take-off performance from which, an engine failure occurring at this point, either a rejected take-off may be made or a take-off safely continued;

"Target Level of Safety (TLS)" means a generic term representing the level of risk which is considered acceptable in particular circumstances;

"technical Instructions" means edition of the Technical Instructions for the Safe Transport of Dangerous Goods by Air approved and published by decision of the Council of the International Civil Aviation Organisation;

"threshold time" means the range, expressed in time, established by the Authority, to an en-route alternate aerodrome, whereby any time beyond requires an EDTO approval from the Authority;

"Total Vertical Error (TVE)" means the vertical geometric difference between the actual pressure altitude flown by an aircraft and its assigned pressure altitude (flight level);

"training program" means a program that consists of courses, courseware, facilities, flight training equipment, and personnel necessary to accomplish a specific training objective and may include a core curriculum and a specialty curriculum;

"Tribunal" means the National Civil Aviation Administrative Review Tribunal established under section 66 of the Act;

Visual Meteorological Conditions (VMC) means meteorological terms expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima;

"V_1" means take-off decision speed; and

"V_{mo}" means maximum operating speed.

PART II – GENERAL AVIATION REGULATIONS

3. Applicability.

These Regulations shall be applicable to general aviation operations with aeroplanes as described in Part II and Part III.

4. Compliance with laws, regulations and procedures.

The pilot-in-command of a Kenyan registered aeroplane shall—

(a) comply with the Kenyan laws, regulations, and procedures;

(b) comply with the laws, regulations and procedures of any other State;

(c) be familiar with the laws, regulations and procedures, pertinent to the performance of his or her duties, prescribed for the areas to be traversed, the aerodromes to be used and the air navigation facilities relating thereto and the pilot-incommand shall ensure that other members of the flight crew are familiar with such laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the aeroplane;

(d) have responsibility for operational control;

(e) notify the appropriate local authority without delay, if an emergency situation which endangers the safety or security of the aeroplane or persons necessitates the taking of action which involves a violation of local regulations or procedures. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the Director-General during the next working day from the time of landing;

(f) have available on board the aeroplane the essential information concerning the search and rescue services in the area over which the aeroplane will be flown; and

(g) ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications.

5. Dangerous goods.

(1) A Kenyan-registered aeroplane shall not carry any dangerous goods unless—

(a) the Authority has granted to the operator a dangerous goods permit, subject to such conditions as the Authority finds it fit, to carry dangerous goods on board its aeroplane; and

(b) such goods are carried or loaded as cargo in accordance with—

(i) the provisions approved by the Authority and any conditions to which such approval may be subject; and

(ii) in accordance with the Technical Instructions for the Safe Transport of Dangerous Goods by Air approved and published by the Authority in compliance with the decisions of the Council of the International Civil Aviation Organisation for the time being in force.

(2) An application for a dangerous goods permit shall—

(a) be submitted to the Authority for consideration before the proposed date of shipment; and

(b) contain the information required by the Authority and the duly completed dangerous goods transport document at the time the application is made.

(3) The Authority may issue a dangerous goods permit for the carriage of dangerous goods on a single return flight (ad hoc permit) or on more than 10 return flights over a period of 6 months (block permit).

(4) Subregulation (1) and (2) shall not apply to the following dangerous goods that are carried in compliance with the Technical Instructions—

(a) required to be aboard the aeroplane in accordance with the relevant airworthiness requirements and operating regulations or that are authorised by the State of the operator to meet special requirements;

(b) required to provide, during flight, medical aid to a patient;

(c) required to provide, during flight, veterinary aid or a humane killer for an animal;

(d) required to provide, during flight, aid in connection with search and rescue operations;

(e) permitted for carriage by passengers or crew members;

(f) intended for use or sale during the flight in question;

(g) vehicles carried in aeroplane designed or modified for vehicle ferry operations; or

(h) required for the propulsion of the means of transport or the operation of its specialised equipment during transport such as refrigeration units or that are required in accordance with any operating regulations such as fire extinguishers.

6. Use of psychoactive substances.

(1) A member of a flight crew shall not perform any function specified in the privileges applicable to his licence if he is under the influence of any psychoactive substance which may render him unable to perform such functions in a safe and proper manner.

(2) Safety-sensitive personnel shall not undertake any function while under the influence of any psychoactive substance, by reason of which human performance is impaired.

7. Specific approvals.

The pilot-in-command shall not conduct operations for which a specific approval is required unless such approval has been issued by the Authority and specific approvals shall follow the layout and contain at least the information listed in the First Schedule.

FLIGHT OPERATIONS

8. Operating facilities.

The pilot-in-command shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground or water facilities including communication facilities and navigation aids available and directly required for such flight, for the safe operation of the aeroplane, are adequate for the type of operation under which the flight is to be conducted.

9. Operational management.

(1) An aeroplane shall not be taxied on the movement area of an aerodrome unless the person at the controls is an appropriately qualified pilot or—

(a) has been duly authorized by the owner or in the case where it is leased the lessee, or a designated agent;

(b) is fully competent to taxi the aeroplane;

(c) is qualified to use the radio if radio communications are required; and

(d) has received instructions from a competent person with respect of aerodrome layout, and where appropriate, information on routes, signs, marking, lights, ATC signals and instructions, phraseology and procedures, and is able to conform to the operational standards required for safe aeroplane movement at the aerodrome.

(2) The pilot-in-command shall establish aerodrome operating minima in accordance with criteria specified by the Authority, for each aerodrome to be used in operations. Such

minima shall not be lower than any that may be established for such aerodromes by the State of the Aerodrome, except when specifically approved by that State.

(3) The Authority may approve operational credit(s) for operations with aeroplanes equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS. Such approvals shall not affect the classification of the instrument approach procedure.

(4) Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows—

(a) type A– a minimum descent height or decision height at or above 75 m (250 ft); and

(b) type B– a decision height below 75 m (250 ft) and Type B instrument approach operations are categorized as—

(i) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800 m or a runway visual range not less than 550 m;

(ii) Category II (CAT II): a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m;

(iii) Category IIIA (CAT IIIA): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range not less than 175 m;

(iv) Category IIIB (CAT IIIB): a decision height lower than 15 m (50 ft) or no decision height and a runway visual range less than 175 m but not less than 50 m; and

(v) Category IIIC (CAT IIIC): no decision height and no runway visual range limitations.

(5) The operating minima for 2D instrument approach operations using instrument approach procedures shall be determined by establishing a minimum descent altitude (MDA) or minimum descent height (MDH), minimum visibility and, if necessary, cloud conditions.

(6) The operating minima for 3D instrument approach operations using instrument approach procedures shall bedetermined by establishing a Decision Altitude (DA) or Decision Height (DH) and the minimum visibility or RVR.

(7) The pilot-in-command shall ensure that passengers are made familiar with the location and use of—

(a) seat belts;

(b) emergency exits;

(c) life jackets, if the carriage of life jackets is prescribed;

(d) oxygen dispensing equipment if the use of oxygen is anticipated; and

(e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

(8) The pilot-in-command shall ensure that all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use.

(9) In an emergency during flight, the pilot-in-command shall ensure that passengers are instructed in such emergency action as may be appropriate to the circumstances.

(10) The pilot-in-command shall ensure that, during take-off and landing and whenever considered necessary by reason of turbulence or any emergency occurring during flight, all persons on board an aeroplane shall be secured in their seats by means of the seat belts or harnesses provided.

10. Flight preparation.

(1) A flight shall not be commenced until the pilot-incommand is satisfied that—

(a) the aeroplane is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aeroplane;

(b) the instruments and equipment installed in the aeroplane are appropriate, taking into account the expected flight conditions;

(c) any necessary maintenance has been performed in accordance with Regulations 39, 40, and 41;

(d) the mass of the aeroplane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;

(e) any load carried is properly distributed and safely secured; and

(f) the aeroplane operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.

(2) The pilot-in-command should have sufficient information on climb performance with all engines operating to enable determination of the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique.

(3) Before commencing a flight the pilot-in -command shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under the instrument flight rules, shall include—

(a) a study of available current weather reports and forecasts; and

(b) the planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned, because of weather conditions.

(4) VFR flights shall not be commenced unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown under VFR will, at the appropriate time, be such as to enable compliance with these rules.

(5) A flight to be conducted in accordance with the instrument flight rules shall not—

(a) take off from the departure aerodrome unless the meteorological conditions, at the time of use, are at or above the aerodrome operating minima for that operation; and

(b) take off or continue beyond the point of in-flight re-planning unless at the aerodrome of intended landing or at each alternate aerodrome to be selected in compliance with subregulation (6), current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions will be, at the estimated time of use, at or above the aerodrome operating minima for that operation.

(6) The Authority shall establish criteria to be used for the estimated time of use of an aerodrome including a margin of time.

(7) A flight to be operated in known or expected icing conditions shall not be commenced unless the aeroplane is certificated and equipped to cope with such conditions.

(8) A flight to be planned or expected to operate in suspected or known ground icing conditions shall not take off unless the aeroplane has been inspected for icing and, if necessary, has been given appropriate de-icing or anti-icing treatment. Accumulation of ice or other naturally occurring contaminants shall be removed so that the aeroplane is kept in an airworthy condition prior to take-off.

(9) A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the aeroplane carries sufficient fuel and oil to ensure that it can safely complete the flight. The amount of fuel to be carried must permit-

(a) when the flight is conducted in accordance with the instrument flight rules and a destination alternate aerodrome is not required in accordance with subregulation (5) or when the flight is to an isolated aerodrome, flight to the

aerodrome of intended landing, and after that, have a final reserve fuel for at least 45 minutes at normal cruising altitude; or

(b) when the flight is conducted in accordance with the instrument flight rules and a destination alternate aerodrome is required, flight to the aerodrome of intended landing, then to an alternate aerodrome, and after that, have a final reserve fuel for at least 45 minutes at normal cruising altitude; or

(c) when the flight is conducted in accordance with day VFR, flight to the aerodrome of intended landing, and after that, have a final reserve fuel for at least 30 minutes at normal cruising altitude; or

(d) when the flight is conducted in accordance with night VFR, flight to the aerodrome of intended landing and thereafter have a final reserve fuel for at least 45 minutes at normal cruising altitude.

(10) The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

(11) An aeroplane shall not be re-fuelled when passengers are embarking, on board or disembarking unless it is attended by the pilotin-command or other qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available.

(12) When re-fuelling with passengers embarking, on board or disembarking, two-way communications should be maintained by the aeroplane's intercommunication system or other suitable means between the ground crew supervising the re-fuelling and the pilot-in-command or other qualified personnel required by subregulation (9).

(13) The pilot-in-command shall ensure that breathing oxygen is available to crew members and passengers in sufficient quantities for all flights at such altitudes where a lack of oxygen might result in impairment of the faculties of crew members or harmfully affect passengers.

Absolute pressure	*Metres*	*Feet*
700 hPa	3, 000	10, 000
620 hPa	4, 000	13, 000
376 hPa	7, 600	25, 000

11. In-flight procedures.

(1) A flight shall not be continued towards the aerodrome of intended landing, unless the latest available information indicates that at the expected time of arrival, a landing can be effected at that aerodrome or at least one destination alternate aerodrome, in compliance with the operating minima established in regulation (9) (2).

(2) An instrument approach shall not be continued below 300 m (1 000 ft) above the aerodrome elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the aerodrome operating minimum.

(3) If, after entering the final approach segment or after descending below 300 m (1 000 ft) above the aerodrome elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, an aeroplane shall not continue its approach-to-land beyond a point at which the limits of the aerodrome operating minima would be infringed.

(4) When weather conditions likely to affect the safety of other aircraft are encountered, they shall be reported as soon as possible.

(5) Hazardous flight conditions encountered, other than those associated with meteorological conditions, should be reported to the appropriate aeronautical station as soon as possible and the reports so rendered shall give such details as may be pertinent to the safety of other aircraft.

(6) During take-off and landing all flight crew members required to be on flight deck duty shall be at their stations.

(7) During en route all flight crew members required to be on flight deck duty shall remain at their stations except when their absence is necessary for the performance of duties in connection with the operation of the aeroplane or for physiological needs.

(8) All flight crew members shall keep their seat belts fastened when at their stations.

(9) When safety harnesses are provided, any flight crew member occupying a pilot's seat shall keep the safety harness fastened during the take-off and landing phases; all other flight crew members shall keep their safety harnesses fastened during the take-off and landing phases unless the shoulder straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.

(10) All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, shall use breathing oxygen continuously whenever the circumstances prevail for which supply has been prescribed in accordance with these Regulations.

(11) An operator shall establish procedures to ensure cabin crew are safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of loss of pressurization and, in addition, they should have such means of protection as will enable them to administer first aid to passengers during stabilized flight following the emergency.

(12) Passengers shall be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurization.

(13) The pilot-in-command shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining.

(14) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

(15) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAYMAYDAY FUEL, when the calculated usable fuel estimated to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

(16) One or more instrument approach procedures designed to support instrument approach operations shall be approved and promulgated by the State in which the aerodrome is located to serve each instrument runway or aerodromeutilized for instrument flight operations.

(17) Aeroplanes operated in accordance with the instrument flight rules shall comply with the instrument approach procedures approved by the State in which the aerodrome is located.

12. Duties of pilot-in-command.

(1) The pilot-in-command shall be responsible for the operation, safety and security of the aeroplane and the safety of all crew members, passengers and cargo on board.

(2) The pilot-in-command shall be responsible for ensuring that a flight—

(a) shall not be commenced if any flight crew member is incapacitated from performing duties by any cause such as injury, sickness, fatigue, the effects of any psychoactive substance; and

(b) shall not be continued beyond the nearest suitable aerodrome when flight crew members' capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness or lack of oxygen.

(3) The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the aeroplane, resulting in serious injury or death of any person or substantial damage to the aeroplane or property.

13. Cabin baggage (take-off and landing)

The pilot-in-command shall ensure that all baggage carried onto an aeroplane and taken into the passenger cabin is securely stowed.

14. Aeroplane perfomance operating limitations.

(1) An aeroplane shall be operated—

(a) in compliance with the terms of its airworthiness certificate or equivalent approved document;

(b) within the operating limitations prescribed by the Authority; and

(c) if applicable, within the mass limitations imposed by compliance with the applicable noise certificate issued by the Authority, unless otherwise authorised in exceptional circumstances for a certain aerodrome or a runway where there is no noise disturbance problem, by the competent authority of the State in which the aerodrome is situated.

(2) A flight shall not be commenced unless placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the Authority for visual presentation, are displayed in the aeroplane.

(3) The pilot-in-command shall determine that aeroplane performance will permit the take-off and departure to be carried out safely.

15. Aeroplane instruments, equipment and flight documents.

In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, an aeroplane shall not fly unless the instruments, equipment and flight documents prescribed in the regulations hereunder are installed or carried, as appropriate, in aeroplanes according to the aeroplane use and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be acceptable to the Authority.

16. Aeroplanes on all flights.

(1) An aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural manoeuvres and observe the operating limitations of the aeroplane in the expected operating conditions.

(2) An aeroplane shall be equipped with or carry on board—

(a) an accessible first-aid kit;

(b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the aeroplane and at least one shall be located in—

(i) the pilot's compartment; and

(ii) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew;

(c) a seat or belt for each—

(i) person over the age of 24 months; and

(ii) seat and restraining belts for each berth;

(d) the following manuals, charts and information—

(i) the flight manual or other documents or information concerning any operating limitations prescribed for the aeroplane by the Authority, required for the application of regulation 15;

(ii) any specific approval issued by the Authority, if applicable, for the operation(s) to be conducted;

(iii) current and suitable charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted; and

(iv) the journey log book for the aeroplane; and

(e) where the aeroplane is fitted with fuses that are accessible in flight, spare electrical fuses of appropriate ratings for replacement of those fuses.

(3) Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in an aeroplane for which the individual certificate of airworthiness is first issued on or after 31st December, 2011 and any extinguishing agent used in a portable fire extinguisher in an aeroplane for which the individual certificate of airworthiness is first issued on or after the 31st December, 2018 shall meet the applicable minimum requirements in accordance with the Third Schedule to the Civil Aviation (Instruments and Equipment) Regulations.

(4) Aeroplanes on all flights should be equipped with the ground-air signal codes for searchand rescue purposes.

(5) Aeroplanes on all flights should be equipped with a safety harness for each flight crew member seat.

17. Marking of break-in points.

Marking for break-in by rescue crews in emergency situations shall conform to the requirements outlined in the Civil Aviation (Aircraft Nationality and Registration Marks) Regulations.

18. All aeroplanes operated as VFR flights.

All aeroplanes when operated as VFR flights shall be—

(a) equipped with a means of measuring and displaying—

(i) magnetic heading;

(ii) barometric altitude; and

(iii) indicated airspeed;

(b) equipped with, or shall carry, a means of measuring and displaying time in hours, minutes and seconds;

(c) equipped with such additional equipment as may be prescribed by the Authority; and

(d) VFR flights which are operated as controlled flights should be equipped in accordance with regulation 22.

19. Aeroplanes on flights over water.

(1) Seaplanes for all flights shall be equipped with—

(a) one life jacket, or equivalent individual floatation device, for each person on board, stowed in a position readily accessible from the seat or berth;

(b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable;

(c) one anchor; and

(d) one sea anchor (drogue), when necessary to assist in maneuvering.

(2) All single-engined landplanes should carry one life jacket or equivalent individual floatation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided when—

(a) flying en route over water beyond gliding distance from the shore; or

(b) taking off or landing at an aerodrome where, in the opinion of the pilot-in-command, the take-off or approach path is so disposed over water that in the event of a mishap there would be a likelihood of a ditching.

(3) All aeroplanes operated on extended flights over water shall be equipped with, at a minimum, one life jacket or equivalent individual floatation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.

(4) The pilot-in-command of an aeroplane operated on an extended flight over water shall determine the risks to survival of the occupants of the aeroplane in the event of a ditching.

(5) The pilot-in-command shall take into account the operating environment and conditions such as, but not limited to, sea state and sea and air temperatures, the distance from land suitable for making an emergency landing, and the availability of search and rescue facilities.

(6) Based upon the assessment of the risks in subregulation (5), the pilot-in-command shall, in addition to the equipment required in regulation 20 ensure that the aeroplane is equipped with—

(a) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment, including means of sustaining life, as is appropriate to the flight to be undertaken and in accordance with the Civil Aviation (Instrument and Equipment) Regulations; and

(b) equipment for making the distress signals described in the Civil Aviation (Rules of Air) Regulations.

20. Aeroplanes on flights over designated land areas.

Aeroplane, when operated across land areas which have been designated by the Authority concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signaling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

21. Aeroplanes on high altitude flights.

(1) Aeroplanes intended to be operated at high altitudes shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in regulation 9.

(2) Pressurised aeroplanes for which the individual certificate of airworthiness was first issued on or after the 1st January, 1990 shall not be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa unless it is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurisation.

22. All aeroplanes operated in accordance with the instrument flight rules.

All aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be—

(a) equipped with a means of measuring and displaying—

(i) magnetic heading (standby compass);

(ii) barometric altitude;

(iii) indicated airspeed, with a means of preventing malfunctioning due to either condensation or icing;

(iv) turn and slip;

(v) aircraft attitude;

(vi) stabilized aircraft heading;

(vii) whether the supply of power to the gyroscopic instruments is adequate;

(viii) the outside air temperature; and

(ix) rate-of-climb and descent;

(b) equipped with, or shall carry, a means of measuring and displaying time in hours, minutes and seconds; and

(c) equipped with such additional instruments or equipment as may be prescribed by the appropriate authority.

23. Aeroplanes when operated at night.

A person shall not operate an aeroplane at night unless it is equipped with—

(a) the equipment specified in regulation 22;

(b) the lights required by the Civil Aviation (Rules of the Air) Regulations and as specified in the Second Schedule for aircraft in flight or operating on the movement area of an aerodrome;

(c) a landing light;

(d) illumination for all flight instruments and equipment that are essential for the safe operation of the aeroplane that are used by the flight crew;

(e) lights in all passenger compartments; and

(f) an independent portable light for each crew member station.

24. Aeroplanes complying with the noise certification.

A person shall not operate an aeroplane unless there is carried on board a document attesting noise certification in accordance with the Civil Aviation (Airworthiness) Regulations.

25. Mach number indicator.

A person shall not operate an aeroplane with speed limitations expressed in terms of Mach number unless the aeroplane is equipped with a means of displaying Mach number.

26. Aeroplanes required to be equipped with Ground Proximity Warning Systems (GPWS).

(1) A person shall not operate a turbine-engined aeroplane of maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers unless the aeroplane is equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

(2) The ground proximity warning system required in subregulation (1) shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

(3) The ground proximity warning system required in subregulation (1) shall provide, at a minimum, warnings of at least the following circumstances—

(a) excessive descent rate;

(b) excessive altitude loss after take-off or go-around; and

(c) unsafe terrain clearance.

(4) The ground proximity warning system required in subregulation (1) contained in an aeroplane with an individual certificate of airworthiness that was first issued after the 1st January, 2011 shall provide, as a minimum, warnings of at least the following circumstances —

(a) excessive descent rate;

(b) excessive terrain closure rate;

(c) excessive altitude loss after take-off or go-around;

(d) unsafe terrain clearance while not in landing configuration;

(e) gear not locked down;

(f) flaps not in a landing position; and

27. Emergency Locator Transmitter (ELT).

A person shall not operate an aeroplane unless it is equipped with—

(a) at least one ELT of any type;

(b) at least one automatic ELT for aeroplanes for which the individual certificate of airworthiness was first issued after the 1st July 2008; or

(c) ELT equipment carried to satisfy the requirements of (a) and (b) above shall operate in accordance with the relevant provisions of Civil Aviation (Instruments and Equipment) Regulations.

28. Microphones.

When operating under the instrument flight rules all flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level or altitude.

29. Aeroplanes required to be equipped with a pressure-altitude reporting transponder.

(1) A person shall not operate an aeroplane unless the aeroplane is equipped with a pressure-altitude reporting transponder which operates in accordance with the Civil Aviation (Instrument and Equipment) Regulations and Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

(2) Unless exempted by the Authority, no person shall undertake VFR flights with an aeroplane unless the aeroplane is equipped with a pressure-altitude reporting transponder which operates in accordance with the Civil Aviation (Instrument and Equipment) Regulations and Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

30. Aeroplanes equipped with automatic landing systems, a Head-Up Display (HUD) or equivalent displays, Enhanced Vision Systems (EVS), Synthetic Vision Systems (SVS) or Combined Vision Systems (CVS).

(1) The Authority shall establish acriteria for the safe operations of aeroplanes equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system.

(2) In establishing operational criteria for the use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the Authority shall ensure that—

(a) the equipment meets the appropriate airworthiness certification requirements;

(b) the operator or owner has carried out a safety risk assessment associated with the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS;

(c) the operator or owner has established and documented the procedures for the use of, and training requirements for, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.

31. Flight data recorders and aircraft data recording system

(1) Flight Data Recorders ('FDRs') are of the following types—

(a) types I and IA FDRs shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation; and

(b) type II FDRs shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices.

(2) A person shall not operate an aeroplane for which the application for type certification is submitted to a Contracting State on or after the 1st January 2016, and which are required to be fitted with an FDR shall record the pilot input or control surface position and primary controls (pitch, roll, yaw) parameters at a maximum recording interval of 0.125 seconds.

(3) A person shall not operate an aeroplane equipped with FDRs of the following types—

(a) engraving metal foil FDRs;

(b) analogue FDRs using frequency modulation (FM);

(c) photographic film FDRs; and

(d) magnetic tape FDRs.

(4) All FDRs shall be capable of retaining the information recorded during at least the last 25 hours of their operation.

32. Cockpit voice recorders and cockpit audio recording systems.

(1) Magnetic tape and wire CVRs are prohibited.

(2) All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.

(3) All CVRs shall be capable of retaining the information recorded during at least the last two hours of their operation.

33. Applicability of data link recorders.

(1) All aeroplanes for which the individual certificate of airworthiness is first issued on or after the 1st January, 2016, which utilize any of the data link communications applications listed in 5.1.2 of the Third Schedule and are required to carry a Cockpit Voice Recorder (CVR), shall record on a flight recorder all data link communications messages.

(2) All aeroplanes which are modified on or after 1st January 2016 to install and utilize any of the data link communications applications listed in 5.1.2 of the Third Schedule and are required to carry a CVR shall record on a flight recorder the data link communications messages.

(3) Data link recording shall be able to be correlated to the recorded cockpit audio.

(4) The minimum recording duration shall be equal to the duration of the CVR.

34. Flight recorders: General.

(1) Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed and flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

(2) Flight recorders shall not be switched off during flight time.

(3) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident and the flight recorders shall not be reactivated before their disposition.

(4) The pilot-in-command or the owner or operator, shall ensure, to the extent possible, in the event the aeroplane becomes involved in an accident or incident, the preservation of all related flight recorder records, and if necessary the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with Civil Aviation (Aircraft Accident and Incident) Regulations.

(5) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

35. Electronic Flight Bags (EFBs).

(1) Where portable Electronic Flight Bags ('EFBs') are used on board an aeroplane, the pilot-in-command or the operator or owner shall ensure that they do not affect the performance of the aeroplane systems, equipment or the ability to operate the aeroplane.

(2) Where EFBs are used on board an aeroplane the pilot-incommand, the owner or operator of the aeroplane the shall—

(a) assess the safety risk(s) associated with each EFB function;

(b) establish the procedures for the use of, and training requirements for, the device and each EFB function; and

(c) ensure that, in the event of an EFB failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.

(3) The Authority shall establish criteria for the operational use of EFB functions to be used for the safe operation of aeroplanes.

(4) In establishing operational criteria for the use of EFBs, the Authority shall ensure that—

(a) the EFB equipment and its associated installation hardware, including interaction with aeroplane systems if applicable, meet the appropriate airworthiness certification requirements;

(b) the operator or owner has assessed the risks associated with the operations supported by the EFB function(s);

(c) the operator or owner has established requirements for redundancy of the information (if appropriate) contained in and displayed by the EFB function(s);

(d) the operator or owner has established and documented procedures for the management of the EFB function(s) including any databases it may use; and

(e) the operator or owner has established and documented the procedures for the use of, and training requirements for, the EFB function(s).

AEROPLANE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

36. Communication equipment.

(1) An aeroplane to be operated in accordance with the instrument flight rules or at night shall be provided with radio communication equipment in accordance with the Kenya Civil Aviation (Instrument and Equipment) Regulations and such equipment shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the Authority.

(2) When compliance with regulation 37 requires that more than one communication equipment unit be provided, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.

(3) An aeroplane to be operated in accordance with VFR, but as a controlled flight, shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate Authority.

(4) An aeroplane to be operated on a flight to which the provisions of Regulation 20 or 21 apply shall, unless exempted by the Authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the Authority.

(5) The radio communication equipment required in accordance with regulation 37 shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

(6) For operations where communication equipment is required to meet an RCP specification for Performance-Based Communication (PBC), an aeroplane shall, in addition to the requirements specified in regulation 37—

(a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s);

(b) have information relevant to the aeroplane RCP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or the Authority; and

(c) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane RCP specification capabilities included in the MEL.

(7) The Authority shall establish criteria for operations where an RCP specification for PBC has been prescribed.

37. Navigation equipment.

(1) An aeroplane shall be provided with navigation equipment which will enable it to proceed—

(a) in accordance with its flight plan; and

(b) in accordance with the requirements of air traffic services;

except when, if not so precluded by the Authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

(2) For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, an aeroplane shall, in addition to the requirements specified in subregulation (1)—

(a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and

(b) have information relevant to the aeroplane navigation specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or the Authority; and

(c) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane navigation specification capabilities included in the MEL.

(3) The Authority shall establish criteria for operations where a navigation specification for PBN has been prescribed.

(4) In establishing criteria for operations where a navigation specification for PBN has been prescribed, the Authority shall require that the operator or owner establish—

(a) normal and abnormal procedures including contingency procedures;

(b) flight crew qualification and proficiency requirements, in accordance with the appropriate navigation specifications;

(c) training for relevant personnel consistent with the intended operations; and

(d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with the appropriate navigation specifications.

(5) The Authority shall issue a specific approval for operations based on PBN authorization required (AR) navigation specifications.

(6) A person shall not operate an aeroplane in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specifications (MNPS) are prescribed, unless the aeroplane is provided with navigation equipment which—

(a) continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and

(b) has been authorized by the Authority for the MNPS operations concerned.

(7) A person shall not operate an aeroplane in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, unless the aeroplane—

(a) is provided with equipment which is capable of—

(i) indicating to the flight crew the flight level being flown;

(ii) automatically maintaining a selected flight level;

(iii) providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ±90 m (300 ft); and

(iv) automatically reporting pressure-altitude;

(b) is authorized by the Authority for operation in the airspace concerned; and

(c) demonstrates a vertical navigation performance in accordance with Second Schedule.

(8) Prior to granting the RVSM approval required in accordance with subregulation (7) (b) the Authority shall be satisfied that—

(a) the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Second Schedule;

(b) the owner or operator has instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and

(c) the owner or operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

(9) The Authority shall ensure that, in respect of those aeroplanes mentioned in subregulation (7), adequate provisions exist for—

(a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with Civil Aviation (Air Navigation Services) Regulations; and

(b) taking immediate corrective action for individual aircraft, or aircraft type groups, identified in such reports as not complying with the height-keeping requirements for operation in airspace where RVSM is applied

(10) The Authority shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the owner or operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer.

(11) If an owner or operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

(12) The Authority, shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and owners or operators found to be operating in RVSM airspace without a valid RVSM approval.

(13) The aeroplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate in accordance with subregulation (1) and where applicable subregulation (2), (6) and (7).

(14) On flights in which it is intended to land in instrument meteorological conditions, an aeroplane shall be provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected and this equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in instrument meteorological conditions and for any designated alternate aerodromes.

38. Surveillance equipment.

(1) A person shall not operate an aeroplane unless the aeroplane is provided with surveillance equipment that will enable it to operate in accordance with the requirements of air traffic services.

(2) A person shall not undertake operations of an aeroplane where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS) unless—

(a) the aeroplane in addition to the requirements specified in subregulation (1) is provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);

(b) has information relevant to the aeroplane RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or the Authority; and

(c) where the aeroplane is operated in accordance with a MEL, has information relevant to the aeroplane RSP specification capabilities included in the MEL.

(3) The Authority shall establish criteria for operations where an RSP specification for PBS has been prescribed.

(4) In establishing criteria for operations where an RSP specification for PBS has been prescribed, the Authority shall require that the operator or the owner establish—

(a) normal and abnormal procedures, including contingency procedures;

(b) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;

(c) a training programme for relevant personnel consistent with the intended operations; and

(d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.

(5) The Authority shall ensure that, in respect of those aeroplanes mentioned in Regulation 39 (2), adequate provisions exist for—

(a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with Civil Aviation(Air Traffic Services) Regulations, 2018; and

(b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specification(s).

AEROPLANE MAINTENANCE

39. Owner's maintenance responsibilities.

(1) The owner of an aeroplane, or operator shall ensure that, in accordance with procedures acceptable to the Authority—

(a) the aeroplane is maintained in an airworthy condition;

(b) the operational and emergency equipment necessary for an intended flight is serviceable; and

(c) the certificate of airworthiness of the aeroplane remains valid.

(2) The owner or operator shall not operate the aeroplane unless it is maintained and released to service under a system acceptable to the Authority.

(3) When the certificate of release to service is not issued by an approved maintenance organization in accordance with the Civil Aviation (Airworthiness Regulations), the person signing the certificate of release to service should be licensed in accordance with Civil Aviation (Personnel Licensing Regulations).

(4) The owner or operator shall ensure that the maintenance of the aeroplane is performed in accordance with a maintenance programme acceptable to the Authority.

40. Maintenance records.

(1) The owner of an aeroplane, or the operator, shall ensure that the following records are kept for the periods mentioned in subregulation (2)—

(a) the total time in service (hours, calendar time and cycles, as appropriate) of the aeroplane and all life-limited components;

(b) the current status of compliance with all applicable mandatory continuing airworthiness information;

(c) appropriate details of modifications and repairs;

(d) the time in service (hours, calendar time and cycles, as appropriate) since the last overhaul of the aeroplane or its components subject to a mandatory overhaul life;

(e) the current status of the aeroplane's compliance with the maintenance programme; and

(f) the detailed maintenance records to show that all requirements for the signing of a certificate of release to service have been met.

(2) The records in subregulation (1)(a) to (e) shall be kept for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service and the records in subregulation (1)(f) for a minimum period of one year after the signing of the certificate of release to service.

(3) In the event of a temporary change of owner or operator, the records shall be made available to the new owner or operator. In the event of any permanent change of owner or operator, the records shall be transferred to the new owner or operator.

41. Modifications and repairs.

(1) A person shall not perform modifications and repairs to an aircraft unless those modification and repairs comply with airworthiness requirements acceptable to the Authority.

(2) An operator shall—

(a) establish the procedures to ensure that records supporting compliance with the airworthiness requirements are retained;

(b) ensure that major repairs or major modifications are carried out in accordance with technical data acceptable to the Authority;

(c) promptly, upon completion of a major modification or major repair, prepare a report of each major modification or major repair of an airframe, aircraft engine, propeller or appliance of an aircraft operated by the operator; and

(d) submit a copy of each report of a major modification and repair to the Authority and keep a copy of each report of a major repair and modification available for inspection.

42. Certificate of release to service.

A person shall not operate an aeroplane unless the aeroplane has a valid certificate of release to service—

(a) completed and signed, as prescribed by the Authority, to certify that the maintenance work performed has been completed satisfactorily and in accordance with data and procedures acceptable to the Authority.

(b) contains a certification including—

(i) basic details of the maintenance performed;

(ii) the date such maintenance was completed;

(iii) when applicable, the identity of the approved maintenance organization; and

(iv) the identity of the authorized person or persons signing the release.

AEROPLANE FLIGHT CREW

43. Composition of the flight crew.

A person shall not operate an aeroplane unless the number and composition of the flight crew are not be less than that specified in the flight manual or other documents associated with the certificate of airworthiness.

44. Qualifications.

(1) The pilot-in-command shall—

(a) ensure that each flight crew member holds a valid licence issued by the Authority, or if issued by another Contracting State, rendered valid by the Authority;

(b) ensure that flight crew members are properly rated; and

(c) be satisfied that flight crew members have maintained competency.

(2) The pilot-in-command of an aeroplane equipped with an airborne collision avoidance system (ACAS II) shall ensure that each flight crew member has been appropriately trained to competency in the use of ACAS II equipment and the avoidance of collision.

MANUALS, LOGS AND RECORDS

45. Flight manual.

(1) A person shall not operate an aeroplane registered in Kenya unless there is available in the aeroplane—

(a) a current Aeroplane Flight Manual accepted by the Authority; or

(b) a current accepted Pilot Operating Handbook or Owner's manual, markings and placards, or any combination thereof which provide the pilot-in-command with the necessary limitations for safe operation.

(2) A person shall not operate an aircraft within or over Kenya without complying with the operating limitations specified in subregulation (1).

(3) The Aeroplane Flight Manual shall be updated by implementing changes made mandatory by the Authority.

46. Journey log book.

(1) The operator shall ensure a journey log book is maintained for every aeroplane engaged in air navigation in which particulars of the aeroplane, its crew and each journey is entered.

(2) The aeroplane journey log should contain the following items—

(a) aeroplane nationality and registration;

(b) date;

(c) crew member names and duty assignments;

(d) departure and arrival points and times;

(e) purpose of flight;

(f) observations regarding the flight; and

(g) signature of the pilot-in-command.

47. Records of emergency and survival equipment carried.

The owner of an aeroplane, or operator, shall at all times have available for immediate communication to rescue coordination centres, lists containing information on the emergency and survival equipment carried on board the aeroplane. The information shall include, as applicable, the number, colour and type of life rafts and pyrotechnics, details of emergency medical supplies, water supplies and the type and frequencies of the emergency portable radio equipment.

48. Security of aereoplane.

The pilot-in-command shall be responsible for the security of the aeroplane during its operation.

49. Reporting acts of unalawful interference.

Following an act of unlawful interference, the pilot-incommand shall submit a report in writing of such an act to the designated local Authority.

PART III – LARGE AND TURBOJET AEROPLANES

50. Applicability.

This part shall be applicable to—

(a) general aviation operations for—

(i) aeroplanes with a maximum certificated take-off mass exceeding 5 700 kg;

(ii) aeroplanes equipped with one or more turbojet engines; or

(iii) aeroplanes with a sitting configuration of more than nine passenger seats; and

(b) corporate aviation operations involving three or more aircraft that are operated by pilots employed for the purpose of flying the aircraft.

CORPORATE AVIATION OPERATIONS

51. Compliance with laws, requlations and procedures.

(1) The operator shall ensure that all employees know that they must comply with the laws, regulations and procedures of those States in which operations are conducted.

(2) The operator shall ensure that all pilots are familiar with the laws, regulations and procedures, pertinent to the performance of their duties, prescribed for the areas to be traversed, the aerodromes to be used and the air navigation facilities relating thereto and the operator shall ensure that other members of the flight crew are familiar with such of these laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the aeroplane.

(3) The pilot-in-command shall be responsible for operational control and the operator shall describe the operational control system in the operations manual and identify the roles and responsibilities of those involved with the system.

(4) The operator shall ensure that the pilot-in-command has available on board the aeroplane all the essential information concerning the search and rescue services in the area over which the aeroplane shall be flown.

(5) The operator shall ensure that flight crew members demonstrate the ability to speak and understand the language used for aeronautical radiotelephony communications as specified in Civil Aviation (Personnel Licensing) Regulations.

52. Safety management.

An operator shall establish and maintain a safety management system that is appropriate to the size and complexity of the operation in accordance with the Civil Aviation (Safety Management) Regulations.

FLIGHT OPERATIONS

53. Operating facilities.

The operator shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground or water facilities including communication facilities and navigation aids available and directly required on such flight, for the safe operation of the aeroplane, are adequate for the type of operation under which the flight is to be conducted.

54. Operational management.

(1) If an operator has an operating base in a country other than Kenya, the operator shall notify that State in which the operating base is located.

(2) Upon notification in accordance with subregulation (1), safety and security oversight shall be coordinated between the State in which the operating base is located and the Authority

(3) The operator shall provide, for the use and guidance of personnel concerned, an operations manual containing all the instructions and information necessary for operations personnel to perform their duties and the operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date and all such amendments or revisions shall be issued to all personnel that are required to use this manual.

(4) The operator shall ensure that all operations personnel are properly instructed in their particular duties and responsibilities and the relationship of such duties to the operation as a whole.

(5) The operator shall issue operating instructions and provide information on aeroplane climb performance with all engines operating to enable the pilot-in-command to determine the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique and this information shall be included in the operations manual.

(6) The operator shall ensure that when passengers are being carried, no emergency or abnormal situations shall be simulated.

(7) Checklists shall be used by flight crews prior to, during and after all phases of operations, and in emergencies, to ensure compliance with the operating procedures contained in the aircraft operating manual and the aeroplane flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual and the design and utilization of checklists shall observe Human Factors principles and the operator shall specify, for flights which are to be conducted in accordance with the instrument flight rules, the method of establishing terrain clearance altitudes.

(8) The operator shall establish aerodrome operating minima, in accordance with criteria specified by the Authority, for each aerodrome to be used in operations and such minima shall not be lower than any that may be established for such aerodromes by the State of the Aerodrome, except when specifically approved by that State.

(9) The operator shall establish and implement a fatigue management programme that ensures that all operator personnel involved in the operation and maintenance of aircraft do not carry out their duties when fatigued and the programme shall address flight and duty times and be included in the operations manual.

(10) The operator shall ensure that passengers are made familiar with the location and use of—

(a) seat belts;

(b) emergency exits;

(c) life jackets, if the carriage of life jackets is prescribed;

(d) oxygen dispensing equipment, if the provision of oxygen for the use of passengers is prescribed; and

(e) other emergency equipment provided for individual use, including passenger emergency briefing cards.

(11) The operator shall ensure that all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use.

(12) The operator shall ensure that in an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

(13) The operator shall ensure that during take-off and landing and whenever considered necessary, by reason of turbulence or any emergency occurring during flight, all passengers on board an aeroplane are secured in their seats by means of the seat belts or harnesses provided.

55. Flight preprations.

(1) The operator shall develop procedures to ensure that a flight is not commenced unless—

(a) the aeroplane is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the aeroplane;

(b) the instruments and equipment installed in the aeroplane are appropriate, taking into account the expected flight conditions;

(c) any necessary maintenance has been performed in accordance with Regulations 76 to 80;

(d) the mass of the aeroplane and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;

(e) any load carried is properly distributed and safely secured; and

(f) the aeroplane operating limitations, contained in the flight manual, or its equivalent, is not exceeded.

(2) The operator shall make available sufficient information on climb performance with all engines operating to enable determination of the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique.

(3) The operator shall specify flight planning procedures to provide for the safe conduct of the flight based on considerations of aeroplane performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes concerned and these procedures shall be included in the operations manual.

(4) A take-off alternate aerodrome shall be selected and specified in the flight plan if either the meteorological conditions at the aerodrome of departure are below the applicable aerodrome landing minima for that operation or if it would not be possible to return to the aerodrome of departure for other reasons.

(5) The take-off alternate aerodrome shall be located within the following flight time from the aerodrome of departure—

(a) or aeroplanes with two engines, one hour of flight time at a one-engine-inoperative cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass; or

(b) for aeroplanes with three or more engines two hours of flight time at an all engines operating cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass.

(6) For an aerodrome to be selected as a take-off alternate the available information shall indicate that, at the estimated time of use, the conditions will be at or above the applicable aerodrome operating minima for that operation.

(7) An aeroplane shall carry a sufficient amount of usable fuel to complete the planned flight safely and to allow for deviations from the planned operation.

(8) The amount of usable fuel to be carried shall, as a minimum, be based on—

(a) fuel consumption data—

(i) provided by the aeroplane manufacturer; or

(ii) if available, current aeroplane-specific data derived from a fuel consumption monitoring system; and

(b) the operating conditions for the planned flight including—

(i) anticipated aeroplane mass;

(ii) notices to airmen;

(iii) current meteorological reports or a combination of current reports and forecasts;

(iv) air traffic services procedures, restrictions and anticipated delays and

(v) the effects of deferred maintenance items or configuration deviations.

(9) The pre-flight calculation of usable fuel required shall include—

(a) taxi fuel, which shall be the amount of fuel expected to be consumed before take-off taking into account local conditions at the departure aerodrome and auxiliary power unit (APU) fuel consumption;

(b) trip fuel, which shall be the amount of fuel required to enable the aeroplane to fly from take-off until landing at the destination aerodrome taking into account the operating conditions of subregulation (5)(b);

(c) contingency fuel, which shall be the amount of fuel required to compensate for unforeseen factors and it shall be not less than five per cent of the planned trip fuel;

(d) destination alternate fuel, which shall be, where a destination alternate aerodrome is required, the amount of fuel required to enable the aeroplane to—

(i) inform a missed approach at the destination aerodrome;

(ii) climb to the expected cruising altitude;

(iii) fly the expected routing;

(iv) descend to the point where the expected approach is initiated; and

(v) conduct the approach and landing at the destination alternate aerodrome; or

(e) where a flight is operated without a destination alternate aerodrome, the amount of fuel required to enable the aeroplane to fly for 15 minutes at holding speed at 450 m (1500 ft) above destination aerodrome elevation in standard conditions; or

(f) where the aerodrome of intended landing is an isolated aerodrome—

(i) for a reciprocating engine aeroplane, the amount of fuel required to fly for 45 minutes plus 15 per cent of the flight time planned to be spent at cruising level, including final reserve fuel, or two hours, whichever is less; or

(ii) for a turbine-engined aeroplane, the amount of fuel required to fly for two hours at normal cruise consumption above the destination aerodrome, including final reserve fuel;

(g) final reserve fuel, which shall be the amount of fuel on arrival at the destination alternate aerodrome, or the destination aerodrome when no destination alternate aerodrome is required—

(i) for a reciprocating engine aeroplane, the amount of fuel required to fly for 45 minutes; or

(ii) for a turbine-engined aeroplane, the amount of fuel required to fly for 30 minutes at holding speed at 450 m (1 500 ft) above aerodrome elevation in standard conditions;

(h) additional fuel, which shall be the supplementary amount of fuel required to enable the aircraft to descend as necessary and proceed to land at an alternate aerodrome in the event of engine failure or loss of pressurization based on the assumption that such a failure occurs at the most critical point along the route; and

(i) discretionary fuel, which shall be the extra amount of fuel to be carried at the discretion of the pilot-in-command.

(10) Operators should determine one final reserve fuel value for each aeroplane type and variant in their fleet rounded up to an easily recalled figure.

(11) The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

(12) The operator shall establish policies and procedures to ensure that in-flight fuel checks and fuel management are performed.

(13) The pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

(14) The pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final

reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.

(15) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel.

(16) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAYMAYDAY FUEL when the calculated usable fuel estimated to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

(17) When conducting operations beyond 60 minutes from a point on a route to an en-route alternate aerodrome operators should ensure that—

(a) en-route alternate aerodromes are identified; and

(b) the pilot-in-command has access to current information on the identified en-route alternate aerodromes, including operational status and meteorological conditions.

(18) An aeroplane shall not be re-fuelled when passengers are embarking, on board or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available.

(19) When re-fuelling with passengers embarking, on board or disembarking, two-way communication shall be maintained by the aeroplane's intercommunication system or other suitable means between the ground crew supervising the re-fuelling and the qualified personnel on board the aeroplane.

(20) A flight to be operated at flight altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply—

(a) all crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 hPa and 620 hPa; and

(b) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa;

(21) A flight to be operated with a pressurized aeroplane shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 hPa and in addition, when an aeroplane is operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa and cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

56. In-flight procedures.

(1) In the aircraft operating manual recommended the operator shall include operating procedures for conducting instrument approaches.

(2) All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, shall usebreathing oxygen continuously whenever the circumstances prevail for which its supply has been required in or under regulation 11(5).

(3) All flight crew members of pressurized aeroplanes operating above an altitude where the atmospheric pressure is less than 376 hPa shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen upon demand.

(4) Unless otherwise specified in an air traffic control instruction, to avoid unnecessary airborne collision avoidance system (ACAS II) resolution advisories in aircraft at or

approaching adjacent altitudes or flight levels, pilots should consider using appropriate procedures to ensure that a rate of climb or descent of less than 8 m/s or 1500 ft/min (depending on the instrumentation available) is achieved throughout the last 300 m (1 000 ft) of climb or descent to the assigned altitude or flight level, when made aware of another aircraft at or approaching an adjacent altitude or flight level.

57. Duties of pilot-in-command.

(1) The pilot-in-command shall ensure that the checklists specified in regulation (54) (7) are complied with in detail.

(2) The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the aeroplane, resulting in serious injury or death of any person or substantial damage to the aeroplane or property and in the event that the pilot-in-command is incapacitated the operator shall take the forgoing action.

(3) The pilot-in-command shall be responsible for reporting all known or suspected defects in the aeroplane, to the operator, at the termination of the flight.

(4) The pilot-in-command shall be responsible for the journey log book or the general decclaration containing the information listed in regulation 40.

58. Cabin baggage (take-off and landing).

The operator shall specify procedures to ensure that all baggage carried onto an aeroplane and taken into the passenger cabin is adequately and securely stowed.

AEROPLANE PERFORMANCE OPERATING LIMITATIONS

59. Applicability.

(1) The Standards contained in subregulations (2) to (5) of this regulation are applicable to aeroplanes over 5 700 kg certificated on or after 13 June 1960, in accordance with Civil Aviation (Airworthiness) Regulations.

(2) An aeroplane shall be operated in compliance with the terms of its certificate of airworthiness and within the approved operating limitations contained in its flight manual.

(3) The Authority shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of this Part.

(4) A person shall not commence a flight unless the performance information provided in the flight manual indicates that subregulations (2) to (5) can be complied with for the flight to be undertaken.

(5) In applying the Standards of this Part, account shall be taken of all factors that significantly affect the performance of the aeroplane (such as: mass, operating procedures, the pressure altitude appropriate to the elevation of the aerodrome, temperature, wind, runway gradient and condition of runway, that is, presence of slush, water or ice, for landplanes, water surface condition for seaplanes) and such factors shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance in accordance with which the aeroplane is being operated.

60. Mass limitations take off.

(1) The mass of the aeroplane at the start of take-off shall not exceed the mass at which subregulation (2) is complied with, or the mass at which subregulation (3) and subregulation (4) are complied with, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is envisaged in applying subregulation (3) and subregulation (4) and, in respect of alternate aerodromes.

(2) In no case shall the mass at the start of take-off exceed the maximum take-off mass specified in the flight manual for the pressure altitude appropriate to the elevation of the

aerodrome, and if used as a parameter to determine the maximum take-off mass, any other local atmospheric condition.

(3) In no case shall the estimated mass for the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the maximum landing mass specified in the flight manual for the pressure altitude appropriate to the elevation of those aerodromes, and if used as a parameter to determine the maximum landing mass, any other local atmospheric condition.

(4) In no case shall the mass at the start of take-off, or at the expected time of landing at the aerodrome of intended landing and at any destination alternate aerodrome, exceed the relevant maximum masses at which compliance has been demonstrated with the Civil Aviation (Airworthiness) Regulations, unless otherwise authorized in exceptional circumstances for a certain aerodrome or a runway where there is no noise disturbance problem, by the competent authority of the State in which the aerodrome is situated.

(5) The pilot in command shall ensure that the aeroplane is able, in the event of a critical engine failing at any point in the take-off, either to discontinue the take-off and stop within either the accelerate-stop distance available or the runway available, or to continue the take-off and clear all obstacles along the flight path by an adequate margin until the aeroplane is in a position to comply with subregulation (8).

(6) The pilot in command in determining the length of the runway available, shall take account of the loss, if any, of runway length due to alignment of the aeroplane prior to take-off.

(7) The pilot in command shall ensure that in the event of the critical engine becoming inoperative at any point along the route or planned diversions therefrom, to continue the flight to an aerodrome at which the standard of subregulation (9) can be met, without flying below the minimum obstacle clearance altitude at any point.

(8) The pilot in command shall ensure that the aeroplane at the aerodrome of intended landing and at any alternate aerodrome, after clearing all obstacles in the approach path by a safe margin, is able to land, with assurance that it can come to a stop or, for a seaplane, to a satisfactorily low speed, within the landing distance available and allowance shall be made for expected variations in the approach and landing techniques, if such allowance has not been made in the scheduling of performance data.

AEROPLANE INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

61. General.

(1) Where a Master Minimum Equipment List (MMEL) is established for the aircraft type, the operator shall include in the operations manual a Minimum Equipment List (MEL) approved by the Authority of the aeroplane which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative.

(2) The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft and the manual shall be consistent with the aircraft flight manual and checklists to be used and the design of the manual shall observe Human Factors principles.

62. Aeroplanes on all flights.

(1) In addition to the requirements contained in regulation 16(2), the operator shall ensure that the aeroplane is equipped with—

(a) accessible and adequate medical supplies in accordance to the Civil Aviation (Instrument and Equipment) Regulations, appropriate to the number of passengers the aeroplane is authorized to carry;

(b) a safety harness for each flight crew seat and the safety harness for each pilot seat which shall incorporate a device which will automatically restrain the occupant's torso in the event of rapid deceleration and the safety harness for

each pilot seat shall incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight control; and

(c) means of ensuring that the following information and instructions are conveyed to passengers—

(i) when seat belts are to be fastened;

(ii) when and how oxygen equipment is to be used if the carriage of oxygen is required;

(iii) restrictions on smoking;

(iv) location and use of life jackets or equivalent individual flotation devices where their carriage is required;

(v) location of emergency equipment; and

(vi) location and method of opening emergency exits.

(2) The pilot-in-command shall ensure that the aeroplane carries on board—

(a) the operations manual prescribed in regulation 77, or those parts of it that pertain to flight operations;

(b) the flight manual for the aeroplane, or other documents containing performance data required for the application of regulation 61 and any other information necessary for the operation of the aeroplane within the terms of its certificate of airworthiness, unless these data are available in the operations manual; and

(c) the checklists to which regulation (54) refers.

63. Flight data recorders

(1) A person shall not operate an aeroplane of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness was first issued on or after the 1st January 2005 unless the aeroplane is equipped with a Type IA FDR.

(2) A person shall not operate an aeroplane of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness was first issued on or after 1st January 1989 unless the aeroplane is equipped with a Type I FDR.

(3) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after the 1st January 1989, shall be equipped with a Type II FDR.

64. Cockpit Voice Recorders.

(1) A person shall not operate a turbine-engined aeroplane of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification was submitted to a Contracting State on or after the 1st January, 2016 and required to be operated by more than one pilot unless the aeroplane is equipped with a CVR.

(2) A person shall not operate an aeroplane of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness was first issued on or after the 1st January, 1987 unless the aeroplane is equipped with a CVR.

(3) A person shall not operate an aeroplane of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after the 1st January 2021 unless the aeroplane is equipped with a CVR capable of retaining the information recorded during at least the last twenty-five hours of its operation.

(4) All aeroplanes of a maximum certificated take-off mass over 5 700 kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).

65. Aeroplanes on long-range over-water flights

(1) The operator of an aeroplane operated on an extended flight over water shall determine the risks to survival of the occupants of the aeroplane in the event of a ditching.

(2) The operator shall take into account the operating environment and conditions such as, but not limited to, sea state and sea and air temperatures, the distance from land suitable for making an emergency landing, and the availability of search and rescue facilities.

(3) Based upon the assessment of the risks in subregulation (2), the operator shall, in addition to the equipment required in regulation 20, ensure that the aeroplane is appropriately equipped with—

(a) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such lifesaving equipment, including means of sustaining life, as is appropriate to the flight to be undertaken; and

(b) life jackets and equivalent individual flotation device, when carried in accordance with regulation 20, shall be equippedwith a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of regulation 20 is met by the provision of individual flotation devices other than life jackets.

(4) Aeroplanes for which the individual certificate of airworthiness was first issued before the 1st January 1990 shall—

(a) be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization for pressurized aeroplanes intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa;

(b) be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in regulation 9 for aeroplanes intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments;

(c) be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa but which is provided with means of maintaining pressures greater than 700 hPa in personnel; and

(d) have compartments to be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in regulation 9.

66. Aeroplanes in icing conditions.

A person shall not operate an aeroplane unless the aeroplane is equipped with suitable de-icing and anti-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.

67. Aeroplanes operated in accordance with the instrument flight rules.

In addition to the requirements contained in regulation 23, aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with two independent altitude measuring and display systems.

68. Emergency power supply for electrically operated attitude indicating instruments.

(1) Aeroplanes introduced into service after the 1st January 1975 shall be fitted with an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating, for a minimum period of 30 minutes, an attitude indicating instrument (artificial horizon), clearly visible to the pilot-incommand.

(2) The emergency power supply shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given on the instrument panel that the attitude indicator(s) is being operated by emergency power.

(3) Aircraft with advanced cockpit automation systems (glass cockpits) shall have system redundancy that provides the flight crew with attitude, heading, airspeed and altitude indications in case of failure of the primary system or display.

(4) Instruments that are used by any one pilot shall be arranged as to permit the pilot to see their indications readily from his or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

69. Pressurized aeroplanes when carrying passengers — weather-detecting equipment.

(1) A person shall not operate a pressurized aeroplane when carrying passengers unless it is equipped with operative weatherdetecting equipment capable of detecting thunderstorms whenever such aeroplanes are being operated in areas where such conditions may be expected to exist along the route either at night or under instrument meteorological conditions.

(2) Aeroplanes intended to be primarily operated above 15 000 m (49 000 ft) shall carry equipment to measure and indicate continuously the dose rate of total cosmic radiation being received (that is, the total of ionizing and neutron radiation of galactic and solar origin) and the cumulative dose on each flight and the display unit of the equipment shall be readily visible to a flight crew member.

70. Aeroplanes carrying passengers — cabin crew seats.

(1) Aeroplanes for which the individual certificate of airworthiness is first issued on or after the 1st January, 1981, shall be equipped with a forward or rearward facing seat (within 15 degrees of the longitudinal axis of the aeroplane), fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of regulation 89.

(2) Aeroplanes for which the individual certificate of airworthiness was first issued before the 1st January, 1981 shall have Cabin crew seats provided in accordance with regulation 90 or regulation 91 located near floor level and other emergency exits as required by the Authority for emergency evacuation.

71. Aeroplanes required to be equipped with an Airborne Collision Avoidance System (ACAS).

(1) A person shall not operate a turbine-engine aeroplane of a maximum certificated take-off mass in excess of 15 000 kg, or authorized to carry more than 30 passengers, for which the individual airworthiness certificate was first issued after the 24th November, 2005, unless the aeroplane is equipped with an Airborne Collision Avoidance System (ACAS II).

(2) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg but not exceeding 15 000 kg, or authorized to carry more than 19 passengers, for which the individual airworthiness certificate is first issued after the 1st January, 2008 shall be equipped with an Airborne Collision Avoidance System (ACAS II).

72. Aeroplanes required to be equipped with a pressure-altitude reporting transponder.

Aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of the Civil Aviation (Surveillance and Collision Avoidance System) Regulations.

AEROPLANE COMMUNICATION, NAVIGATION ANDSURVEILLANCE EQUIPMENT

73. Communication equipment.

In addition to the requirements set out in regulation 37(1) to regulation 37(5), an aeroplane shall be provided with radio communication equipment capable of—

(a) conducting two-way communication for aerodrome control purposes;

(b) receiving meteorological information at any time during flight; and

(c) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

74. Installation

The equipment installation shall be such that the failure of any single unit required for communications, navigation or surveillance purposes or any combination thereof will not result in the failure of another unit required for communications, navigation or surveillance purposes.

75. Electronic navigation data management.

(1) The operator of an aeroplane shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the Authority has approved the operator's procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the existing equipment.

(2) The Authority shall ensure that the operator continues to monitor both the process and products.

(3) The operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all necessary aeroplanes.

AEROPLANE MAINTENANCE

76. Operator's maintenance resposnsibilities.

(1) The operator shall comply with the requirements of regulation 38.

(2) The operator shall ensure that all maintenance personnel receive initial and continuation training acceptable to the Authority and appropriate to their assigned tasks and responsibilities and this shall include human factors and coordination with other maintenance personnel and flight crew.

77. Operator's maintenence control manual.

The operator shall provide a maintenance control manual, acceptable to the Authority, as specified in regulation 86, for the use and guidance of maintenance and operations personnel. The design of the manual should observe Human Factors principles.

78. Maintenance programme.

(1) The operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, acceptable to the Authority, containing the information required under regulation 87.

(2) The design and application of the operator's maintenance programme shall observe Human Factors principles.

(3) The operator shall ensure copies of all amendments to the maintenance programme shall be furnished promptly to all organizations or persons to whom the maintenance programme has been issued.

79. Continuing airworthiness information.

The operator of an aeroplane, shall ensure that the information resulting from maintenance and operational experience with respect to continuing airworthiness, is transmitted as required by the Civil Aviation (Airworthiness) Regulations.

80. Certificate of release to service.

(1) The operator of an aeroplane shall ensure that a certificate of release to service is completed and signed, to certify that the maintenance work has been performed in accordance with the maintenance programme or other data and procedures acceptable to the Authority.

(2) certificate of release to service shall contain a certification including—

(a) basic details of the maintenance performed;

(b) the date such maintenance was completed;

(c) when applicable, the identity of the approved maintenance organization; and

(d) the identity of the person or persons signing the release.

AEROPLANE FLIGHT CREW

81. Composition of the flight crew.

(1) The operator shall designate a pilot to act as pilot-in-command for each flight.

(2) When a separate flight engineer's station is incorporated in the design of an aeroplane, the flight crew shall include at least one flight engineer especially assigned to that station, unless the duties associated with that station can be satisfactorily performed by another flight crew member, holding a flight engineer licence, without interference with regular duties.

82. Filght crew member emergency duties.

(1) The operator shall, for each type of aeroplane, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation.

(2) Recurrent training in accomplishing these functions shall be contained in the operator's training programme and shall include instruction in the use of all emergency and life-saving equipment required to be carried, and drills in the emergency evacuation of the aeroplane.

83. Flight crew member training programmes.

(1) The operator shall establish and maintain a training programme, acceptable to the Authority that is designed to ensure that a person who receives training acquires and maintains the competency to perform assigned duties, including skills related to human performance.

(2) Ground and flight training programmes shall be established, either through internal programmes or through a training services provider, and shall include or make reference to a syllabus for those training programmes in the company operations manual.

(3) The training programme shall include training to competency for all equipment installed.

(4) Flight simulators should be used to the maximum extent practicable for initial and annual recurrent training.

84. Flight crew member licensing.

(1) The operator shall—

(a) ensure that each flight crew member assigned to duty holds a valid licence issued by the Authority, or if issued by another Contracting State, rendered valid by the Authority;

(b) ensure that flight crew members are properly rated; and

(c) be satisfied that flight crew members are competent to carry out assigned duties.

(2) The operator of an aeroplane equipped with an Airborne Collision Avoidance System (ACAS II) shall ensure that each flight crew member has been appropriately trained to competency in the use of ACAS II equipment and the avoidance of collisions.

(3) The operator shall not assign a pilot to act as pilot-in-command of an aeroplane unless that pilot has made at least three takeoffs and landings within the preceding 90 days on the same type of aeroplane or in a flight simulator approved for the purpose.

(4) The operator shall not assign a co-pilot to operate at the flight controls of an aeroplane during take-off and landing unless that pilot has made at least three take-offs and landings within the preceding 90 days on the same type of aeroplane or in a flight simulator approved for the purpose.

(5) The operator shall ensure that piloting technique and the ability to execute emergency procedures is checked periodically in such a way as to demonstrate the pilot's competence and where the operation may be conducted under the instrument flight rules, the operator shall ensure that the pilot's competence to comply with such rules is demonstrated to either a check pilot of the operator or a representative of the State issuing the pilot licence.

85. Flight Operations Officer/Flight Dispatcher.

The operator should ensure that any person assigned as a flight operations officer or flight dispatcher is trained and maintains familiarization with all features of the operation which are pertinent to their duties, including knowledge and skills related to human factors as required in the Civil Aviation (Personnel Licensing) Regulations.

MANUALS, LOGS AND RECORDS

86. Operator's maintenance control manual.

The operator's maintenance control manual provided in accordance with regulation 77, which may be issued in separate parts, shall be developed according to industry codes of practice or to the guidance material issues by the Authority, and should at a minimum contain information about—

(a) the means for complying with the procedures required by regulation 76(1);

(b) the means of recording the names and duties of the person or persons required by regulation 76(1);

(c) the maintenance programme required by regulation 78(1);

(d) the methods used for the completion and retention of the operator's maintenance records required by regulation 80;

(e) the procedures for complying with the service information reporting requirements of Civil Aviation (Airworthiness) Regulations;

(f) the procedures for implementing action resulting from mandatory continuing airworthiness information;

(g) a system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;

(h) the aircraft types and models to which the manual applies;

(i) the procedures for ensuring that unserviceability affecting airworthiness are recorded and rectified; and

(j) procedures for advising the Authority of significant inservice occurrences.

87. Maintenance programme.

(1) A maintenance programme for each aeroplane as required by Regulation 78 shall contain the following information—

(a) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilization of the aeroplane;

(b) when applicable, a continuing structural integrity programme;

(c) procedures for changing or deviating from paragraphs(a) and (b) above as approved by the Authority; and

(d) when applicable and approved by the Authority, condition monitoring and reliability programme descriptions for aircraft systems, components and engines.

(2) Maintenance tasks and intervals that have been specified as mandatory in approval of the type design, or approved changes to the maintenance programme, shall be identified as such.

(3) The maintenance programme shall be based on maintenance programme information made available by the State of Design or by the organization responsible for the type design, and any additional applicable experience.

88. Flight recorder records.

The owner of the aeroplane, or the operator, shall ensure, to the extent possible, in the event the aeroplane becomes involved in an accident or incident, the preservation of all related flight recorder records and, if necessary, the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with Civil Aviation (Aircraft Accident and Incident Investigation) Regulations.

CABIN CREW

89. Assignment of emergency duties

(1) The requirement for cabin crew for each type of aeroplane shall be determined by the operator, based on seating capacity or the number of passengers carried, in order to effect a safe and expeditious evacuation of the aeroplane, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation.

(2) The operator shall assign these functions for each type of aeroplane.

90. Cabin crew at emergency evacuation stations

When cabin crew are required by the Authority, each cabin crew member assigned to emergency evacuation duties shall occupy a seat provided in accordance with regulation 71 during take-off and landing and whenever the pilot-in-command so directs.

91. Protection of cabin crew during flight

Each cabin crew member shall be seated with seat belt on or, when provided, safety harness fastened during take-off and landing and whenever the pilot-in-command so directs.

92. Training

(1) The operator shall ensure that a training programme is completed by all persons before being assigned as a cabin crew member.

(2) The operator should establish and maintain a cabin crew training programme that is designed to ensure that persons who receive training acquire the competency to perform their assigned duties and includes or makes reference to a syllabus for the training programme in the company operations manual and the training programme should include human factors training.

93. Reporting acts of unlawful interference

Following an act of unlawful interference, the pilot-in-command shall submit a report of such an act to the designated local authority.

94. Security programme

(1) The operator shall establish, implement and maintain a written operator security program that ensures crew members act in the most appropriate manner to minimize the consequences of acts of unlawful interference.

(2) The security programme mentioned in (1) shall, as a minimum, include the following elements—

(a) determination of the seriousness of any occurrence;

(b) crew communication and coordination;

(c) appropriate self-defence responses;

(d) use of non-lethal protective devices assigned to crew members whose use is authorized by the Authority;

(e) cockpit procedures to protect the aircraft; and

(f) aircraft search procedures and guidance on least-risk bomb locations where practicable.

PART IV – EXEMPTION

95. Requirement for application

(1) A person may apply to the Authority for an exemption from any of these Regulations.

(2) An application for exemption shall be submitted at least sixty days in advance of the proposed effective date.

(3) A request for an exemption must contain the applicant's name—

(a) physical address and mailing address;

(b) telephone number;

(c) fax number if available; and

(d) email address if available.

(4) The application shall be accompanied by a fee specified by the Authority, for technical evaluation.

96. Request for exemption

(1) An application for an exemption shall contain the following—

(a) a citation of the specific requirement from which the applicant seeks exemption;

(b) an explanation of why the exemption is needed;

(c) a description of the type of operations to be conducted under the proposed exemption;

(d) the proposed duration of the exemption;

(e) an explanation of how the exemption would be in the public interest, that is, benefit the public as a whole;

(f) a detailed description of the alternative means by which the applicant will ensure a level of safety equivalent to that established by the regulation in question;

(g) a review and discussion of any known safety concerns with the requirement, including information about any relevant accidents or incidents of which the applicant is aware; and

(h) if the applicant seeks to operate under the proposed exemption outside of the Kenya airspace, the application shall indicate whether the exemption would contravene any provision of the Standards and Recommended Practices of the International Civil Aviation Organization (ICAO) as well as the Regulations pertaining to the airspace in which the operation will occur.

(2) Where the applicant seeks emergency processing, the application must contain supporting facts and reasons that the application was not timely filed, and the reasons it is an emergency.

(3) The Authority may deny an application if the Authority finds that the applicant has not justified the failure to apply for an exemption in a timely fashion.

97. Initial review by the Authority

(1) The Authority shall review the application for accuracy and compliance with the requirements of Regulations 95 and 96.

(2) If the application appears on its face to satisfy the provisions of this regulation and the Authority determines that a review of its merits is justified, the Authority will publish a detailed summary of the application in the Kenya Gazette, aeronautical information circular or at least one local daily newspaper for comment and specify the date by which comments must be received by the Authority for consideration.

(3) Where the filing requirements of Regulations 95 and 96 have not been met, the Authority will notify the applicant and take no further action until and unless the applicant corrects the application and re-files it in accordance with these Regulations.

(4) If the request is for emergency relief, the Authority shall publish the application or the Authority's decision as soon as possible after processing the application.

98. Evaluation of the request

(1) After initial review, if the filing requirements have been satisfied, the Authority shall conduct an evaluation of the request to include—

(a) determination of whether an exemption would be in the public interest;

(b) a determination, after a technical evaluation of whether the applicant's proposal would provide a level of safety equivalent to that established by the regulation, although where the Authority decides that a technical evaluation of the request would impose a significant burden on the Authority's technical resources, the Authority may deny the exemption on that basis;

(c) a determination of whether a grant of the exemption would contravene the applicable ICAO Standards and Recommended Practices; and

(d) a recommendation based on the preceding elements, of whether the request should be granted or denied, and of any conditions or limitations that should be part of the exemption.

(2) The Authority shall notify the applicant by letter and publish a detailed summary of its evaluation and decision to grant or deny the request.

(3) The summary referred to in subregulation (2) shall specify the duration of the exemption and any conditions or limitations of the exemption.

(4) If the exemption affects a significant population of the aviation community of the Kenya the Authority shall publish the summary in the Aeronautical Information Circular.

PART V – GENERAL PROVISIONS

99. Possession of the licence

(1) A holder of a licence, certificate or authorisation or other document issued by the Authority shall have in his physical possession or at the work site when exercising the privileges of that licence, certificate, authorisation or such other document.

(2) A flight crew of a foreign registered aircraft shall hold a valid licence, certificate or authorisation and have in his physical possession or at the work site when exercising the privileges of that licence, certificate or authorisation.

100. Drug and alcohol testing and reporting

(1) Any person who performs any function related to operation of aircraft under these Regulations may be tested for drug or alcohol usage.

(2) The Authority may prohibit any person from carrying out the functions related to operation of aircraft, who—

(a) tests positive for drug or alcohol usage;

(b) refuses to submit to a test; or

(c) refuses to furnish or to authorise the release of the test results requested by the Authority.

101. Inspection of licences and certificates

A person who holds a licence, certificate, authorisation or such other document required by these Regulations shall present it for inspection upon a request from the Authority or any person authorized by the Authority.

102. Change of name

(1) A holder of a licence, certificate, authorisation or other document issued under by the Authority may apply to change the name on a licence, certificate, authorisation or such other document.

(2) The holder shall include with any such request—

(a) a court order, or other legal document verifying the name change; and

(b) the current licence, certificate, authorisation or such other document sought to be amended.

(3) The Authority may change the licence, certificate, authorisation or such other document and issue a replacement thereof.

(4) The Authority shall return to the holder the original documents specified in subregulation 2(b) and retain copies thereof and return the replaced licence, certificate or authorisation with the appropriate endorsement.

(5) A licence, certificate, authorisation or such other document issued to a person under these Regulations is not transferable.

103. Change of address

(1) A holder of a certificate, or authorisation issued under these Regulations shall notify the Authority of the change in the physical and mailing address and shall do so in the case of—

(a) physical address, at least fourteen days in advance; and

(b) mailing address upon the change.

(2) A person who does not notify the Authority of the change in the physical address within the time frame specified in subregulation (1) shall not exercise the privileges of the certificate or authorisation.

104. Replacement of documents

A person may apply to the Authority in the prescribed form for replacement of documents issued under these Regulations if the documents are lost or destroyed.

105. Certificate suspension and revocations

(1) The Authority may, where it considers it to be in the public interest, suspend provisionally, pending further investigation, any certificate, approval, permission, exemption, authorisation or such other document issued, granted or having effect under these Regulations.

(2) The Authority may, upon the completion of an investigation which has shown sufficient ground to its satisfaction and where it considers it to be in the public interest, revoke, suspend, or vary any certificate, approval, permission, exemption or such other document issued or granted under these Regulations.

(3) The Authority may, where it considersit to be in the public interest, prevent any person or aircraft from flying.

(4) A holder or any person having the possession or custody of any certificate, approval, permission, exemption or such other documents which has been revoked, suspended or varied under these Regulations shall surrender it to the Authority within 14 days from the date of revocation, suspension or variation.

(5) The breach of any condition subject to which any certificate, approval, permission, exemption or any other document has been granted or issued under these Regulations shall render the document invalid during the continuance of the breach.

106. Use and retention of certificates and records

(1) A person shall not—

(a) use any certificate, approval, permission, exemption or such other document issued or required by or under these Regulations which has been forged, altered, revoked, or suspended, or to which he is not entitled;

(b) forge or alter any certificate, approval, permission, exemption or such other document issued or required by or under these Regulations;

(c) lend any certificate, approval, permission, exemption or such other document issued or required by or under these Regulations to any other person; or

(d) make any false representation for the purpose of procuring for himself or any other person the issue renewal or variation of any such certificate, approval, permission or exemption or such other document.

(2) During the period for which it is required under these Regulations to be preserved, a person shall not mutilate, alter, render illegible or destroy any records, or any entry made therein, required by or under these Regulations to be maintained, or knowingly make, or procure or assist in the making of, any false entry in any such record, or wilfully omit to make a material entry in such record.

(3) All records required to be maintained by or under these Regulations shall be recorded in a permanent and indelible material.

(4) A person shall not purport to issue any certificate, document or exemption under these Regulations unless he is authorised to do so by the Authority.

107. Reports of violation

(1) Any person who knows of a violation of the Act, any amendment thereto, or any rule, regulation, or order issued there under, shall report it to the Authority.

(2) The Authority will determine the nature and type of any additional investigation or enforcement action that need be taken.

108. Enforcement of directions

(1) The Authority shall take enforcement action on any regulated entity that fails to comply with the provisions of these Regulations.

(2) Inspectors of the Authority holding valid delegations shall take necessary action to preserve safety where an undesirable condition has been detected.

(3) The action(s) referred to in subregulation (2) may include—

(a) in the case of a regulated entity, imposition of operating restrictions until such a time that the existing undesirable condition has been resolved; and

(b) in the case of a licensed personnel, require that the individual does not exercise the privileges of the license until such a time that the undesirable condition has been resolved.

(4) In carrying out the enforcement actions pursuant to the provisions of subregulation (2), the inspectors of the Authority shall invoke the powers with due care and act in good faith in the interest of preserving safety.

109. Aeronautical user fees

(1) The Authority may notify the fees to be charged in connection with the issue, validation, renewal, extension or variation of any certificate, licence or such other document, including the issue of a copy thereof, or the undergoing of any examination, test, inspection or investigation or the grant of any permission or approval, required by, or for the purpose of these Regulations any orders, notices or proclamations made there under.

(2) Upon an application being made in connection with which any fee is chargeable in accordance with the provisions of subregulation (1), the applicant shall be required, before the application is entertained, to pay the prescribed fees.

(3) If, after that payment has been made, the application is withdrawn by the applicant or otherwise ceases to have effect or is refused, the Authority, shall not refund any payment made.

110. Application of regulations to Government and visiting forces, etc.

(1) These Regulations shall apply to aircraft, not being a military aircraft belonging to or exclusively employed in the service of the Government, and for the purposes of such application, the department or other authority for the time being responsible for management of the aircraft shall be deemed to be the operator of the aircraft, and in the case of an aircraft belonging to the Government, to be the owner of the interest of the Government in the aircraft.

(2) Except as otherwise expressly provided, the naval, military and air force authorities and member of any visiting force and property held or used for the purpose of such a force shall be exempt from the provision of these regulations to the same extent as if the visiting force formed part of the military force of the Kenya.

111. Extra-territorial application of Regulations

Except where the context otherwise requires, the provisions of these Regulations shall—

(a) in so far as they apply, whether by express reference or otherwise, to aircraft registered in Kenya, apply to such aircraft wherever they may be;

(b) in so far as they apply, whether by express reference or otherwise, to other aircraft, apply to such aircraft when they are within the Kenya;

(c) in so far as they prohibit, require or regulate, whether by express reference or otherwise, the doing of anything by any person in, or by any of the crew of, any aircraft registered in Kenya, shall apply to such persons and crew, wherever they may be; and

(d) in so far as they prohibit, require or regulate, whether by express reference or otherwise, the doing of anything in relation to any aircraft registered in Kenya by other persons shall, where such persons are citizens of the Kenya, apply to them wherever they may be.

112. Flights over any foreign country

(1) The operator or pilot-in-command of an aircraft registered in the Kenya (or, if the operator's principal place of business or permanent residence is in the Kenya, any other aircraft) which is being flown over any foreign State shall not allow that aircraft to be used for a purpose which is prejudicial to the security, public order or public health of, or to the safety of air navigation in relation to that State.

(2) A person does not contravene subregulation (1) if that person neither knew nor had reasons to suspect that the aircraft was being or was to be used for a purpose referred to in subregulation (1).

(3) The operator or pilot-in-command of an aircraft registered in Kenya (or, if the operator's principal place of business or permanent residence is in the Kenya, any other aircraft) which is being flown over any foreign State shall comply with any directions given by the appropriate aeronautical authorities of that State whenever—

(a) the flight has not been duly authorised; or

(b) there are reasonable grounds for the appropriate aeronautical authorities to believe that the aircraft is being or will be used for a purpose which is prejudicial to the security, public order or public health of, or to the safety of air navigation in relation to that State, unless the lives of persons on board or the safety of the aircraft would thereby be endangered.

(4) A person does not contravene subregulation (3) if he neither knew nor suspected that the directions were being given by the appropriate aeronautical authorities.

(5) The requirement in subregulation (3) shall not prejudice the need to comply with other requirements or directions of aeronautical authority.

(6) In this regulation "appropriate aeronautical authorities" includes any person, whether a member of a country's military or civil authorities, authorised under the law of the foreign State to issue directions to aircraft flying over that State.

PART VI – GENERAL PROVISIONS

113. Contravention of Regulations

A person who contravenes any provision of these Regulations may have his licence, certificate, approval, authorization, exemption or other document revoked or suspended.

114. Appeals to the Tribunal

A person who is aggrieved with the decision of the Authority under these regulations may within twenty one days appeal to the tribunal.

115. Offences

(1) If any provision of these Regulations, is contravened in relation to an aircraft, the operator of that aircraft and the pilot in command, if the operator or the pilot in command is not the person who contravened that provision shall, without prejudice to the liability of any other person under these Regulations for that contravention, be deemed to have contravened that provision unless he or she proves that the contravention occurred without his consent or connivance and that he or she exercised all due diligence to prevent the contravention.

(2) A person who contravenes any provision specified as an "A" provision in the Fifth Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding one million shillings for each offence and or to imprisonment for a term not exceeding one year or to both.

(3) A person who contravenes any provision specified as a "B" provision in the Fifth Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding two million shillings for each offence and or to imprisonment for a term not exceeding three years or to both.

(4) A person who contravenes any provision of these Regulations not being a provision referred to in the Fifth Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding two million shillings, and in the case of a second or subsequent conviction for the like offence to a fine not exceeding four million shillings.

116. Transitional

(1) A licence, certificate, permit or authorization issued or granted by the Authority before the commencement of these Regulations shall remain operational until it expires or is revoked, annulled or replaced.

(2) Notwithstanding any other provision of these Regulations, a person who at the commencement of these Regulations, is carrying out any acts, duties or operations affected by these Regulations shall, within one (1) year from the date of commencement, or within such longer time that the Cabinet Secretary may, by notice in the Gazette prescribe, comply with the requirements of these Regulations or cease to carry out such acts, duties or operations.

FIRST SCHEDULE [r. 7.]

GENERAL AVIATION SPECIFIC APPROVALS

PURPOSE AND SCOPE

1.1. Specific approvals shall have a standardized format which contains the minimum information required in the specific approval template.

Note.— When the operations to be conducted require a specific approval, a copy of the document(s) needs to be carried on board (see subregulation 15(2)).

SPECIFIC APPROVAL TEMPLATE

ISSUING AUTHORITY and CONTACT DETAILS[1]

Issuing Authority [1] ----------
Address ----------
Signature:---------- Date:[2]

Telephone:----------
Fax:----------
Email: ----------

OWNER/OPERATOR

Name [3]:----------
Address: ----------
Telephone:----------
Fax:----------
Email----------

Aircraft model [4] and registration marks:

SPECIFIC APPROVAL	**YES**	**NO**	**DESCRIPTION REMARKS [5]**
Low visibility operations			
Approach and landing	#	#	CAT [6]: _____ m RVR: DH: _____ ft
Take-off	#	#	RVR[7]: _____ m
Operational credit(s)	#	#	[8]
RVSM	#	#	
AR navigation specifications for PBN operations	#	#	[9]
Other [10]	#	#	

Notes:-

1. Civil Aviation Authority name and contact details, including the telephone country code and email if available.

2. Issuance date of the specific approval (dd-mm-yyyy) and signature of the authority representative.

3. Owner or operator's name and address.

*4. Insert the aeroplane make, model and series, or master series, if a series has been designated. The CAST/ICAO taxonomy is available at: http:*www.intlaviationstandards.org/.

5. List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria).

6. Insert the applicable precision approach category (CAT II, IIIA, IIIB or IIIC). Insert the minimum RVR in metres and decision height in feet. One line is used per listed approach category.

7. Insert the approved minimum take-off RVR in metres. One line per approval may be used if different approvals are granted.

8. List the airborne capabilities (i.e. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.

9. Performance-based navigation (PBN): one line is used for each PBN AR navigation specification approval (e.g. RNP AR APCH), with appropriate limitations listed in the "Description" column.

10. Other specific approvals or data can be entered here, using one line (or one multi-line block) per approval (e.g. specific approach operations approval, MNPS).

ATTACHMENT 1. A — CARRIAGE AND USE OF OXYGEN

INTRODUCTION

The performance of crew members and the well-being of passengers during flights at such altitudes where a lack of oxygen might result in impairment of faculties are of major concern. Research conducted in altitude chambers or by exposure to mountain elevations indicates that human tolerance could be related to the altitude concerned and the exposure time. The subject is dealt with in detail in the *Manual of Civil Aviation Medicine* (Doc 8984). In light of the above and to further assist the pilot-in-command in providing the oxygen supply intended by Regulation 9(8) of this Regulations, the following guidelines, which take into account the requirements already established in the Civil Aviation (Operations of Aircraft Commercial Air Transport) Regulations, are considered relevant.

OXYGEN SUPPLY

1.1 A flight to be operated at altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa should not be commenced unless sufficient stored breathing oxygen is carried to supply

(a) all crew members and at least 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 hPa and 620 hPa; and

(b) all crew members and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

1.2 A flight to be operated with a pressurized aeroplane should not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all crew members and passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 hPa. In addition, when an aeroplane is operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa and cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

2. USE OF OXYGEN

2.1 All flight crew members, when engaged in performing duties essential to the safe operation of an aeroplane in flight, should use breathing oxygen continuously whenever the circumstances prevail for which its supply has been indicated to be necessary in 1.1 or

1.2.

2.2 All flight crew members of pressurized aeroplanes operating above an altitude where the atmospheric pressure is less than 376 hPa should have available at the flight duty station a quick donning type of mask which will readily supply oxygen upon demand.

Note.— Approximate altitudes in the Standard Atmosphere corresponding to the values of absolute pressure used in the text are as follows:

Absolute pressure	*Metres*	*Feet*
700 hPa	*3 000*	*10 000*
620 hPa	*4 000*	*13 000*
376 hPa	*7 600*	*25 000*

ATTACHMENT 1. B — AUTOMATIC LANDING SYSTEMS

HEAD-UP DISPLAY (HUD) OR EQUIVALENT DISPLAYS AND VISION SYSTEMS

INTRODUCTION

The material in this attachment provides guidance for certified automatic landing systems, HUD or equivalent displays and vision systems intended for operational use in aircraft engaged in international air navigation. These systems and hybrid systems may be installed and operated to reduce workload, improve guidance, reduce flight technical error and enhance situational awareness and/or to obtain operational credits. Automatic landing systems, HUD or equivalent displays and vision systems may be installed separately or together as part of a hybrid system. Any operational credit for their use requires a specific approval from the Authority.

Note 1.— "Vision systems" is a generic term referring to the existing systems designed to provide images, i.e. enhanced vision systems (EVS), synthetic vision systems (SVS) and combined vision systems (CVS).

Note 2.— Operational credit can be granted only within the limits of the airworthiness approval.

Note 3.— Currently, operational credit has been given only to vision systems containing an image sensor providing a real-time image of the actual external scene on a HUD.

Note 4.— More detailed information and guidance on automatic landing systems, HUD or equivalent displays and vision systems are contained in the Manual of All-Weather Operations *(Doc 9365). This manual should be consulted in conjunction with this attachment*.

1. HUD AND EQUIVALENT DISPLAYS

1.1.General

1.1.1 A HUD presents flight information into the pilot's forward external field of view without significantly restricting that external view.

1.1.2 Flight information should be presented on a HUD or an equivalent display, as required for the intended use.

1.2..Operational applications

1.2.1 Flight operations with a HUD can improve situational awareness by combining flight information located on head-down displays with the external view to provide pilots with more immediate awareness of relevant flight parameters and situation information while they continuously view the external scene. This improved situational awareness can also reduce errors in flight operations and improve the pilot's ability to transition between instrument and visual references as meteorological conditions change.

1.2.2 A HUD may be used to supplement conventional flight deck instrumentation or as primary flight displays if certified for this purpose.

1.2.3 An approval HUD may—

(a) qualify for operations with reduced visibility or reduced RVR; or

(b) replace some parts of the ground facilities such as touchdown zone and/or centre line lights.

1.2.4 The functions of a HUD may be provided by a suitable equivalent display. However, before such systems can be used, the appropriate airworthiness approval should be obtained.

1.3. HUD training

Training and recent experience requirements for operations using HUD or equivalent displays should be established by the Authority. The training should address all flight operations for which the HUD or equivalent display is used.

VISION SYSTEMS

2.1. General

2.1.1 Vision systems can display electronic real-time images of the actual external scene achieved through the use of image sensors, i.e. EVS, or display synthetic images, which are derived from the on-board avionic systems, i.e. SVS. Vision systems can also consist of a combination of these two systems called combined vision systems (CVS). Such a system may display electronic real-time images of the external scene using the EVS component of the system. The information from vision systems may be displayed headup and/or head-down. Operational credit may be granted to vision systems which are appropriately qualified.

2.1.2 Light emitting diode (LED) lights may not be visible to infrared-based vision systems. Operators of such vision systems will need to acquire information about the LED implementation programmes at aerodromes where they intend to operate. More details about the consequences of LED lights are contained in the *Manual of All-Weather Operations* (Doc. 9365).

2.1. Operational applications

2.2.1 Flight operations with EVS allow the pilot to view an image of the external scene obscured by darkness or other visibility restrictions. The use of EVS will also allow acquisition of an image of the external scene earlier than with natural, unaided vision, hence providing for a smoother transition to references by natural vision. The improved acquisition of an image of the external scene may improve situational awareness. It may also qualify for operational credit if the information from the vision system is presented to the pilots in a suitable way and the necessary airworthiness approval and specific approval by the Authority have been obtained for the combined system.

2.2.2 Vision system imagery may also enable pilots to detect other aircraft on the ground, terrain or obstructions on the or adjacent to runways or taxiway.

2.3.. Operational concepts

2.3.1 Instrument approach operations include an instrument phase and a visual phase. The instrument phase ends at the published MDA/H or DA/H unless a missed approach is initiated. Using the EVS or CVS does not change the applicable MDA/H or DA/H. The continued approach to landing from MDA/H or DA/H will be conducted using visual references. This also applies to operations with vision systems. The difference is that the visual references will be acquired by use of an EVS or CVS, natural vision or the vision system in combination with natural vision.

2.3.2 Down to a defined height in the visual segment, typically at or above 30 m (100 ft), the visual references may be acquired solely by means of the vision system. The defined height depends on the airworthiness approval and the specific approval by the Authority.

Below this height the visual references should be solely based on natural vision. In the most advanced applications, the vision system may be used down to touchdown without the requirement for natural vision acquisition of visual references. This means that such a vision system may be the sole means of acquiring visual references and can be used without natural vision.

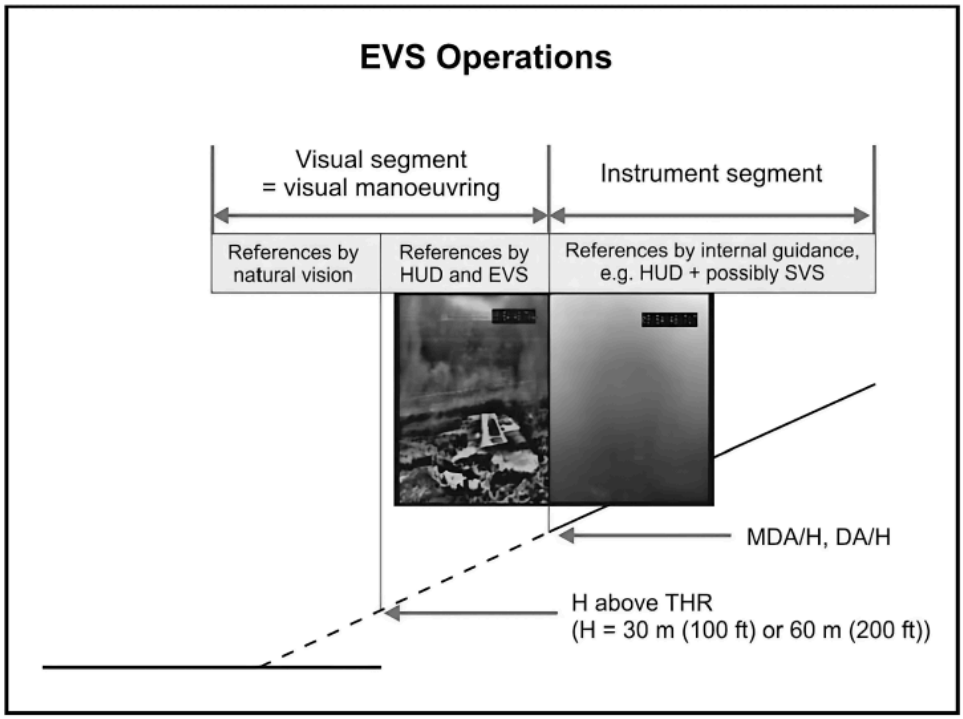


Figure 2.B-1. EVS operations - transition from instrument to visual references

2.4.Vision systems training

Training and recent experience requirements should be established by the Authority. Training should address all flight operations for which the vision system is used.

2.5. Visual references

2.5.1 In principle, the required visual references do not change due to the use of an EVS or CVS, but those references are allowed to be acquired by means of the vision system until a certain height during the approach as described in 2.3.2.

2.5.2 In States that have developed requirements for operations with vision systems, the use of visual references have been regulated and examples of this are provided in the *Manual of All-Weather Operations* (Doc 9365).

HYBRID SYSTEMS

A hybrid system generically means that two or more systems are combined. The hybrid system typically has improved performance compared to each of the component systems, which in turn may qualify for operational credit. The inclusion of systems in the hybrid system normally enhances the performance of the system. *The Manual of All-Weather Operations* (Doc 9365) contains some examples of hybrid systems.

4.. OPERATIONAL CREDITS

4.1 Aerodrome operating minima are expressed in terms of minimum visibility/RVR and MDA/H or DA/H. When aerodrome operating minima are established, the combined

capability of the aircraft equipment and on-ground infrastructure should be taken into account. Better equipped aircraft may be able to operate into lower natural visibility conditions, lower DA/H and or operate with less ground infrastructure. Operational credit means that the aerodrome operating minima may be reduced in case of suitably equipped aircraft. Another way to grant operational credit is to allow visibility requirements to be fulfilled, wholly or partly, by means of the on-board systems. HUD, automatic landing or vision systems, which were not available at the time the criteria for aerodrome operating minima were originally established.

4.2 The granting of operational credits does not affect the classification (i.e. Type or Category) of an instrument approach procedure since they are designed to support instrument approach operations conducted with aircraft with the minimum equipment prescribed.

4.3 The relation between the procedure design and the operation can be described as follows. The OCA/H is the end product of the procedure design, which does not contain any RVR or visibility values. Based on the OCA/H and all the other elements such as available runway visual aids, the operator will establish MDA/H or DA/H and RVR/visibility, i.e. the aerodrome operating minima. The values derived should not be less than those that may be prescribed by the State of the Aerodrome.

5..OPERATIONAL PROCEDURES

In accordance with Chapter 2.4, 2.4.15.2, the operator should develop suitable operational procedures associated with the use of an automatic landing system, a HUD or an equivalent display, vision systems and hybrid systems. These procedures should be included in the operations manual and cover at least the following—

(a) limitations;

(b) operational credits;

(c) flight planning;

(d) ground and airborne operations;

(e) crew resource management;

(f) standard operating procedures; and

(g) ATS flight plans and communication.

6.APPROVALS

6.1. General

Note.— When the application for a specific approval relates to operational credits for systems not including a vision system, the guidance on approvals in this attachment may be used to the extent applicable as determined by the Authority.

6.1.1 The operator that wishes to conduct operations with an automatic landing system, a HUD or equivalent display, vision system or hybrid system will need to meet certain criteria and, in some instances, obtain specific approvals (see Chapter 2.2, 2.2.2.2 and Chapter 2.4, 2.4.15). The extent of the approvals will depend on the intended operation and the complexity of the equipment.

6.1.2 Systems may be used to improve situational awareness without a specific approval. However, the standard operating procedures for these systems should be specified in the operations manual or equivalent document. An example of this type of operation may include an EVS or an SVS on a head-down display that is used only for situational awareness of the surrounding area of the aircraft during ground operations where the display is not in the pilot's primary field of view. For enhanced situational awareness, the installation and operational procedures need to ensure that the operation of the vision system does not interfere with normal procedures or the operation or use of other aircraft systems. In some

cases, modifications to these normal procedures for other aircraft systems or equipment may be necessary to ensure compatibility.

6.1.3 Chapter 2.2, 2.2.2.2.1.1 states that operational credits based on the use of an automatic landing system, a HUD or an equivalent display, EVS, SVS or CVS or any combination of those systems into a hybrid system, should be specifically approved.

6.1.4 The Standard in Chapter 2.4, 2.4.15 requires the Authority to establish criteria for the use of an automatic landing system, a HUD or an equivalent display, EVS, SVS or CVS or any combination of those systems into a hybrid system "for the safe operation of an aeroplane" and specifies such criteria. When operational credits are granted by the Authority as per the Standard in Chapter 2.2, 2.2.2.2.1.1, the use of that system becomes essential for the safety of those operations and approval of the use of such systems is part of the operational credit specific approval. The use of these systems solely for enhanced situational awareness, reduced flight technical error and/or reduced workload is an important safety feature, but does not require a specific approval.

6.1.5 Any operational credit that has been granted should be reflected in the specific approval template and be carried on board the particular aeroplane.

6.2. Specific approvals for operational credit

6.2.1 To obtain operational credit the operator will need to specify the desired operational credit and submit an application in accordance with Chapter 2.1, 2.1.4. The content of a suitable application should include—

(a) *Applicant details.* The official name and any business or trading name(s), address, mailing address, email address and contact telephone/fax numbers of the applicant.

(b) Aircraft details. Aircraft make(s), model(s) and registration mark(s).

(c) Operator's vision system compliance list. The contents of the compliance list are included in the Manual of All-Weather Operations (Doc 9365). The compliance list should include the information that is relevant to the approval requested and the registration marks of the aircraft involved. If more than one type of aircraft/fleet is included in a single application, a completed compliance list should be included for each aircraft/fleet.

(d) Documents to be included with the application. Copies of all documents to which the operator has made references should be included in the application. There should be no need to send complete manuals; only the relevant sections/pages should be required. Additional guidance material can be found in the Manual of All-Weather Operations (Doc 9365).

(e) Name, title and signature.

6.2.2 The following items should be covered in a vision systems compliance list—

(a) reference documents used in compiling the submission for approval;

(b) flight manual;

(c) feedback and reporting of significant problems;

(d) requested operational credit and resulting aerodrome operating minima;

(e) operations manual (or an equivalent document) entries including MEL (where applicable) and standard operating procedures;

(f) safety risk assessment;

(g) training programmes; and

(h) continuing airworthiness.

Note:-Expanded guidance on these items is contained in the Manual of All-Weather Operations (Doc 9365).

ATTACHMENT 2. A — COMPANY OPERATIONS MANUAL

The following is the suggested content of a company operations manual. It may be issued in separate parts corresponding to specific aspects of an operation. It should include the instructions and information necessary to enable the personnel concerned to perform their duties safely and shall contain at least the following information—

(a) table of contents;

(b) amendment control page and list of effective pages, unless the entire document is reissued with each amendment and the document has an effective date on it;

(c) duties, responsibilities and succession of management and operating personnel;

(d) operator safety management system;

(e) operational control system;

(f) MEL procedures (where applicable);

(g) normal flight operations;

(h) standard operating procedures (SOPs);

(i) weather limitations;

(j) flight and duty time limitations;

(k) emergency operations;

(l) accident/incident considerations;

(m) personnel qualifications and training;

(n) record keeping;

(o) a description of the maintenance control system;

(p) security procedures (where applicable);

(q) performance operating limitations;

(r) use/protection of FDR/CVR records (where applicable);

(s) handling of dangerous goods; and

(t) use of head-up displays (HUD)/enhanced vision systems (EVS).

ATTACHMENT 2.B — MINIMUM EQUIPMENT LIST (MEL)

Supplementary to 3.6.1.1

1. If deviations from the requirements of States in the certification of aircraft were not permitted, an aircraft could not be flown unless all systems and equipment were operable. Experience has proved that some un-serviceability can be accepted in the short term when the remaining operative systems and equipment provide for continued safe operations.

2. The State should indicate through approval of a minimum equipment list those systems and items of equipment that may be inoperative for certain flight conditions with the intent that no flight can be conducted with inoperative systems and equipment other than those specified.

3. A minimum equipment list, approved by the State of the Operator, is therefore necessary for each aircraft, based on the master minimum equipment list established for the aircraft type by the organization responsible for the type design in conjunction with the State of Design.

4. The State of the Operator should require the operator to prepare a minimum equipment list designed to allow the operation of an aircraft with certain systems or equipment inoperative provided an acceptable level of safety is maintained.

5. The minimum equipment list is not intended to provide for operation of the aircraft for an indefinite period with inoperative systems or equipment. The basic purpose of the minimum equipment list is to permit the safe operation of an aircraft with inoperative systems or equipment within the framework of a controlled and sound programme of repairs and parts replacement.

6. Operators are to ensure that no flight is commenced with multiple minimum equipment list items inoperative without determining that any interrelationship between inoperative systems or components will not result in an unacceptable degradation in the level of safety or undue increase in the flight crew workload.

7. The exposure to additional failures during continued operation with inoperative systems or equipment should also be considered in determining that an acceptable level of safety is being maintained. The minimum equipment list may not deviate from requirements of the flight manual limitations section, emergency procedures or other airworthiness requirements of the Authority or of the State of the Operator unless the appropriate airworthiness authority or the flight manual provides otherwise.

8. Systems or equipment accepted as inoperative for a flight should be placarded where appropriate and all such items should be noted in the aircraft technical log to inform the flight crew and maintenance personnel of the inoperative system or equipment.

9. For a particular system or item of equipment to be accepted as inoperative, it may be necessary to establish a maintenance procedure, for completion prior to flight, to deactivate or isolate the system or equipment. It may similarly be necessary to prepare an appropriate flight crew operating procedure.

10. The responsibilities of the pilot-in-command in accepting an aeroplane for operation with deficiencies in accordance with a minimum equipment list are specified in 2.2.3.1.

SECOND SCHEDULE [r. 32(b).]

ALTIMETRY SYSTEM PERFORMANCE

REQUIREMENTS FOR OPERATIONS IN RVSM AIRSPACE

1. In respect of groups of aeroplanes that are nominally of identical design and build with respect to all details that could influence the accuracy of height-keeping performance, the height-keeping performance capability shall be such that the total vertical error (TVE) for the group of aeroplanes shall have a mean no greater than 25 m (80 ft) in magnitude and shall have a standard deviation no greater than $28 – 0.013z2$ for $0 \leq z \leq 25$ when z is the magnitude of the mean TVE in metres, or $92 – 0.004z2$ for $0 \leq z \leq 80$ where z is in feet. In addition, the components of TVE shall have the following characteristics—

(a) the mean altimetry system error (ASE) of the group shall not exceed 25 m (80ft) in magnitude;

(b) the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 m (245 ft); and

(c) the differences between cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

2. In respect of aeroplanes for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belonging to a group of aeroplanes encompassed by paragraph 1, the height-keeping performance capability shall be such that the components of the TVE of the aeroplane have the following characteristics—

(a) the ASE of the aeroplane shall not exceed 60 m (200 ft) in magnitude under all flight conditions; and

(b) the differences between the cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

THIRD SCHEDULE [r. 33.]

FLIGHT RECORDERS

The material in this Schedule concerns flight recorders intended for installation in aeroplanes engaged in international air navigation. Crash-protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) or a data link recorder (DLR). Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS).

1. GENERAL REQUIREMENTS

1.1 Non-deployable flight recorder containers shall—

(a) be painted a distinctive orange or yellow colour;

(b) carry reflective material to facilitate their location; and

(c) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kilohertz (kHz). At the earliest practical date, but not later than 1 January 2018, this device shall operate for a minimum of ninety days.

Note.— Current industry practice is to phase out yellow flight recorder containers at the end of the service life of the flight recorders.

1.2 The flight recorder systems shall be installed so that—

(a) the probability of damage to the recordings is minimized;

(b) they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads;

(c) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and

(d) if the flight recorder systems have a bulk erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.

1.3 The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

1.4 Means shall be provided for an accurate time correlation between the recorder systems recordings.

1.5 The manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems.

(a) manufacturer's operating instructions, equipment limitations and installation procedures; and

(b) manufacturer's test reports.

2. FLIGHT DATA RECORDER (FDR)

2.1 The flight data recorder shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power.

2.2 Parameters to be recorded

2.2.1 Flight data recorders shall be classified as Type I, Type IA and Type II depending upon the number of parameters to be recorded.

2.2.2 The parameters that satisfy the requirements for FDRs are listed in the paragraphs below. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity. In addition, the parameters designated by an asterisk

(*) shall be recorded if an information data source for the parameter is used by aeroplane systems or the flight crew to operate the aeroplane. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

2.2.2.1 The following parameters shall satisfy the requirements for flight path and speed —

(a) Pressure altitude;

(b) Indicated airspeed or calibrated airspeed;

(c) Air-ground status and each landing gear air-ground sensor when practicable;

(d) Total or outside air temperature;

(e) Heading (primary flight crew reference);

(f) Normal acceleration;

(g) Lateral acceleration;

(h) Longitudinal acceleration (body axis);

(i) Time or relative time count;

(j) Navigation data*: drift angle, wind speed, wind direction, latitude/longitude;

(k) Groundspeed*;

(l) Radio altitude*.

2.2.2.2 The following parameters shall satisfy the requirements for attitude

(a) Pitch attitude;

(b) Roll attitude;

(c) Yaw or sideslip angle*;

(d) Angle of attack*.

2.2.2.3 The following parameters shall satisfy the requirements for engine power:

(a) Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust/power lever position;

(b) Thrust reverse status*;

(c) Engine thrust command*;

(d) Engine thrust target*;

(e) Engine bleed valve position*;

(f) Additional engine parameters*:

EPR, N1, indicated vibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3/

2.2.2.4 The following parameters shall satisfy the requirements for configuration.

(a) Pitch trim surface position;

(b) Flaps*: trailing edge flap position, cockpit control selection;

(c) Slats*: leading edge flap (slat) position, cockpit control selection;

(d) Landing gear*: landing gear, gear selector position;

(e) Yaw trim surface position*;

(f) Roll trim surface position*;

(g) Cockpit trim control input position pitch*;

(h) Cockpit trim control input position roll*;

(i) Cockpit trim control input position yaw*;

(j) Ground spoiler and speed brake*: Ground spoiler position, ground spoiler selection, speed brake position, speed brake selection;

(k) De-icing or anti-icing systems selection*;

(l) Hydraulic pressure (each system)*;

(m) Fuel quantity in CG trim tank*;

(n) AC electrical bus status*;

(o) DC electrical bus status*;

(p) APU bleed valve position*

(q) Computed centre of gravity*

2.2.2.5 The following parameters shall satisfy the requirements for operation:

(a) Warnings;

(b) Primary flight control surface and primary flight control pilot input: pitch axis, roll axis, yaw axis;

(c) Marker beacon passage;

(d) Each navigation receiver frequency selection;

(e) Manual radio transmission keying and CVR/FDR synchronization reference;

(f) Autopilot/autothrottle/AFCS mode and engagement status*;

(g) Selected barometric setting*: pilot, first officer;

(h) Selected altitude (all pilot selectable modes of operation)*;

(i) Selected speed (all pilot selectable modes of operation)*;

(j) Selected Mach (all pilot selectable modes of operation)*;

(k) Selected vertical speed (all pilot selectable modes of operation)*

(l) Selected heading (all pilot selectable modes of operation)*;

(m) Selected flight path (all pilot selectable modes of operation)*: course/DSTRK, path angle;

(n) Selected decision height*;

(o) EFIS display format*: pilot, first officer;

(p) Multi-function/engine/alerts display format*;

(q) GPWS/TAWS/GCAS status*: selection of terrain display mode including popup display status, terrain alerts, both cautions and warnings, and advisories, on/off switch position;

(r) Low pressure warning*: hydraulic pressure, pneumatic pressure;

(s) Computer failure*;

(t) Loss of cabin pressure*;

(u) TCAS/ACAS (traffic alert and collision avoidance system/airborne collision avoidance system)*;

(v) Ice detection*;

(w) Engine warning each engine vibration*;

(x) Engine warning each engine over temperature*;

(y) Engine warning each engine oil pressure low*;

(z) Engine warning each engine over speed*;

(aa) Wind shear warning*;

(bb) Operational stall protection, stick shaker and pusher activation*

(cc) All cockpit flight control input forces*: control wheel, control column, rudder pedal cockpit input forces;

(dd) Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path;

(ee) Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path;

(ff) DME 1 and 2 distances*;

(gg) Primary navigation system reference*: GNSS, INS, VOR/DME, MLS, Loran C, ILS;

(hh) Brakes*: left and right brake pressure, left and right brake pedal position;

(ii) Date*;

(jj) Event marker*;

(kk) Head-up display in use*;

(ll) Para visual display on*.

Note.— It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the range, sampling, accuracy or resolution guidance detailed in this Schedule.

2.2.2.6 Type IA FDR. This FDR shall be capable of recording, as appropriate to the aeroplane, at least the 78 parameters in Table A1.3-1.

2.2.2.7 Type I FDR. This FDR shall be capable of recording, as appropriate to the aeroplane, at least the first.

32 parameters in Table A1.3-1.

2.2.2.8 Type II FDR. This FDR shall be capable of recording, as appropriate to the aeroplane, at least the first.

15 parameters in Table A1.3-1.

2.2.2.9 The parameters that satisfy the recommendations for flight path and speed as displayed to the pilot(s) are listed below. The parameters without an (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an (*) are to be recorded if an information source for the parameter is displayed to the pilot and is practicable to record.

(a) Pressure altitude;

(b) Indicated airspeed or calibrated airspeed;

(c) Heading (primary flight crew reference);

(d) Pitch attitude;

(e) Roll attitude;

(f) Engine thrust/power;

(g) Landing gear status*;

(h) Total or outside air temperature*;

(i) Time*;

(j) Navigation data*: Drift angle, wind speed, wind direction, latitude/longitude;

(k) Radio altitude*.

2.3 Additional information

2.3.1 A Type IIA FDR, in addition to a 30-minute recording duration, shall retain sufficient information from the preceding take-off for calibration purposes.

2.3.2 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.

2.3.3 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator/owner. The documentation shall be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

3. COCKPIT VOICE RECORDER (CVR) AND COCKPIT AUDIO RECORDING SYSTEM (CARS)

3.1 Signals to be recorded

The CVR and CARS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR and CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

3.1.1 The CVR shall record on four separate channels, or more, at least the following.

(a) voice communication transmitted from or received in the aeroplane by radio;

(b) aural environment on the flight deck;

(c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed;

(d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and

(e) digital communications with ATS, unless recorded by the FDR.

3.1.2 The CARS shall record on two separate channels, or more, at least the following.

(a) voice communication transmitted from or received in the aeroplane by radio;

(b) aural environment on the flight deck; and

(c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed.

3.1.3 The recorder shall be capable of recording on at least four channels simultaneously. On a tape-based CVR, to ensure accurate time correlation between channels, the recorder shall record in an in-line format. If a bi-directional configuration is used, the in-line format and channel allocation shall be retained in both directions.

3.1.4 The preferred channel allocation shall be as follows−

Channel 1 — co-pilot headphones and live boom microphone;

Channel 2 — pilot headphones and live boom microphone;

Channel 3 — area microphone;

Channel 4 — time reference plus the third and fourth crew members' headphone and live microphone, if applicable.

Note 1.— Channel 1 is located closest to the base of the recording head.

Note 2.— The preferred channel allocation presumes use of current conventional magnetic tape transport mechanisms and is specified because the outer edges of the tape have a higher risk of damage than the middle. It is not intended to preclude use of alternative recording media where such constraints may not apply.

4. AIRBORNE IMAGE RECORDER (AIR) AND AIRBORNE IMAGE RECORDING SYSTEM (AIRS)

4.1 Classes

4.1.1 A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1.—To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

Note 2.— There are no provisions for Class A AIR or AIRS in this document.

4.1.2 A Class B AIR or AIRS captures data link message displays.

4.1.3 A Class C AIR or AIRS captures instruments and control panels.

Note.— A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS, or where an FDR is not required.

4.1.4 The AIR or AIRS must start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS must start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

5. DATA LINK RECORDER (DLR)

5.1 Applications to be recorded

5.1.1 Where the aircraft flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note.— Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

5.1.2 Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the

system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

(a) Data link initiation capability;

(b) Controller-pilot data link communications;

(c) Data link flight information services;

(d) Automatic dependent surveillance — contract;

(e) Automatic dependent surveillance — broadcast*;

(f) Aeronautical operational control*.

Note.— Descriptions of the applications are contained in Table A1.3-2.

6. AIRCRAFT DATA RECORDING SYSTEMS (ADRS)

6.1 Parameters to be recorded

ADRS shall be capable of recording, as appropriate to the aeroplane, at least the essential (E) parameters in Table A1.3-3.

6.2 Additional information

6.2.1 The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the appropriate certificating authority.

6.2.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator/owner. The documentation shall be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

7. INSPECTIONS OF FLIGHT RECORDER SYSTEMS

7.1 Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

7.2 FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording system inspection intervals of one year; subject to the approval from the appropriate regulatory authority, this period may be extended to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring. DLR systems or DLRS shall have recording system inspection intervals of two years; subject to the approval from the appropriate regulatory authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.

7.3 Recording system inspections shall be carried out as follows.

(a) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;

(b) the analysis of the FDR or ADRS shall evaluate the quality of the recorded data to determine if the bit error rate (including those errors introduced by recorder, the acquisition unit, the source of the data on the aeroplane and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;

(c) a complete flight recording from the FDR or ADRS shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;

(d) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;

(e) an examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;

(f) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and

(g) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

7.4 A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

7.5 A report of the recording system inspection shall be made available on request to regulatory authorities for monitoring purposes.

7.6 Calibration of the FDR system—

(a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters, and to ensure that parameters are being recorded within the calibration tolerances; and

(b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

70* Hydraulic pressure (each system)

71* Loss of cabin pressure

72* Cockpit trim control input position pitch

73* Cockpit trim control input position roll

74* Cockpit trim control input position yaw

75 All cockpit flight control input forces (control wheel, control column, rudder pedal)

76* Event marker

77* Date

78* Actual navigation performance or estimated position error or estimated position uncertainty

Full range	2	±5%	100 psi
Discrete	1		
Full range	1	±5%	0.2% of full range or as installed
Full range	1	±5%	0.2% of full rangeor as installed
Full range	1	±5%	0.2% of full range or as installed
Full range (±311 N(±70 lbf), ±378 N	1	±5%	0.2% of full range or as installed

(±85 lbf), ±734 N (±165 lbf))		
Discrete	1	
365 days	64	
As installed	4	As installed

Note.— The preceding 78 parameters satisfy the requirements for a Type IA FDR.

Notes.—

1. V_{so} stalling speed or minimum steady flight speed in the landing configuration is in Section "Abbreviations and Symbols".

2. V_{D} design diving speed.

3. Refer to subregulation 28(1)b, for increased recording requirements.

4. Record sufficient inputs to determine power.

5. For aeroplanes with control systems in which movement of a control surface will back drive the pilot's control, "or" applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot's control, "and" applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.

6. If signal available in digital form.

7. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.

8. If signals readily available.

If further recording capacity is available, recording of the following additional information should be considered—

operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority—

(a) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

(b) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;

(c) warnings and alerts;

(d) the identity of displayed pages for emergency procedures and checklists;

(e) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.

Table A1.3-2. Description of applications for data link recorders

Item No.	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context	C

		management (CM), respectively.	
2	Controller-pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for	C

		example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services.		
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the aeroplane are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*	
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*	

Key—

C: Complete contents recorded.

M: Information that enables correlation to any associated records stored separately from the aeroplane.

*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

Table A1.3-3. Parameter guidance for aircraft data recording systems

No.	Parameter name	Parameter category	Minimum recording range	Maximum recording interval in	Minimum recording accuracy	Minimum recording resolution	Remarks

				seconds			
1	Heading (Magnetic or True)	R*	±180°	1	±2°	0.5°	*If not available, record rates
2	Pitch attitude	E*	±90°	0.25	±2°	0.5°	* If not available, record rates
3	Roll attitude	E*	±180°	0.25	±2°	0.5°	* If not available, record rates
4	Yaw rate	E*	±300°/s	0.25	±1% + drift of 360°/h	2°/s	* Essential if no of 360°/h heading available
5	Pitch rate	E*	±300°/s	0.25	±1% + drift of 360°/h	2°/s	* Essential if no of 360°/h pitch attitude available
6	Roll rate	E*	±300°/s	0.25	±1% + drift of 360°/h	2°/s	* Essential if no roll attitude available
7	Positioning system: latitude/ longitude	E	Latitude: ±90° 2 Longitude: ±180°	(1 if available)	As installed (0.00015° recommended)	0.00005°	
8	Positioning system estimated error	E*	Available range	2 (1 if available)	As installed	As installed	* If available
9	Positioning system: altitude	E	–300 m (–1000 ft) to maximum certificated altitude of aircraft + 1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5ft)	

10	Positioning system: time*	E	24 hours	1	±0.5 s	0.1 s	* UTC time preferred where available.
11	Positioning system: ground speed	E	0–1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
12	Positioning system: channel	E	0–360°	2 (1 if available)	As installed (±2° recommended)	0.5°	
13	Normal acceleration	E	–3 g to +6 g(*)	0.25 (0.125 if available)	As installed (±0.09 excluding a datum error of ±0.45 g recommended)	0.004 g	
14	Longitudinal acceleration	E	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 excluding a datum error of ±0.05 g recommended)	0.004 g	
15	Lateral acceleration	E	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 excluding a datum error of ±0.05 g recommended)	0.004 g	
16	External static pressure (or pressure altitude)	R	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
17	Outside air temperature	R	–50° to +90°C or available	2	As installed	1°C	

	(or total air temperature)		sensor range		(±2°C recommended)		
18	Indicated air speed	R	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
19	Engine RPM	R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
20	Engine oil pressure	R	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
21	Engine oil temperature	R	Full range	Each engine	As installed each second (5% of full range recommended)	2% of full range	
22	Fuel flow or pressure	R	Full range	Each engine each second	As installed	2% of full range	
23	Manifold pressure	R	Full range	Each engine each second	As installed	0.2% of full range	
24	Engine thrust/ power/torque parameters required to determine propulsive thrust/ power*	R	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/ N1 or torque/ Np as appropriate to the particular engine shall be recorded to determine

							power in both normal and reverse thrust. A margin for possible overspeed should be provided.
25	Engine gas generator speed (Ng)	R	0–150%	Each engine each second	As installed	0.2% of full range	
26	Free power turbine	R	0–150%	Each engine each second	As installed	0.2% of full range	
27	Coolant temperature	R	Full range	1	As installed (±5°C recommended)	1°C	
28	Main voltage	R	Full range	Each engine each second	As installed	1 Volt	
29	Cylinder head temperature	R	Full range	Each cylinder each second	As installed	2% of full range	
30	Flaps position	R	Full range or each discrete position	2	As installed	0.5°	
31	Primary flight control surface position	R	Full range	0.25	As installed	0.2% of full range	
32	Fuel quantity	R	Full range	4	As installed	1% of full range	
33	Exhaust gas temperature	R	Full range	Each engine each second	As installed	2% of full range	
34	Emergency voltage	R	Full range	Each engine	As installed	1 Volt	

				each second		
35	Trim surface position	R	Full range or each discrete position	1	As installed	0.3% of full range
36	Landing gear position	R	Each discrete position*	Each gear every two seconds	As installed	* Where available, record up-and locked and down and locked position
37	Novel/ unique aircraft features	R	As required	As required	As required	As required

Key:

E: Essential parameters

R: Recommended parameters

FOURTH SCHEDULE [r. 37(7) & (8).]

LIGHTS TO BE DISPLAYED BY AEROPLANES

(a) Terminology

When the following terms are used in this Schedule, they have the following meanings—

(a) Angle of coverage A is formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left respectively, looking aft along the longitudinal axis to a vertical plane passing through the longitudinal axis.

(b) Angle of coverage F is formed by two intersecting vertical planes making angles of 110 degrees to the right and 110 degrees to the left respectively, looking forward along the longitudinal axis to a vertical plane passing through the longitudinal axis.

(c) Angle of coverage L is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the left of the first, when looking forward along the longitudinal axis.

(d) Angle of coverage R is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

(e) Horizontal plane. The plane containing the longitudinal axis and perpendicular to the plane of symmetry of the aeroplane.

(f) Longitudinal axis of the aeroplane. A selected axis parallel to the direction of flight at a normal cruising speed, and passing through the centre of gravity of the aeroplane.

(g) Making way. An aeroplane on the surface of the water is “making way” when it is under way and has a velocity relative to the water.

(h) Under command. An aeroplane on the surface of the water is "under command" when it is able to execute manoeuvres as required by the International Regulations for Preventing Collisions at Sea for the purpose of avoiding other vessels.

(i) Under way. An aeroplane on the surface of the water is "under way" when it is not aground or moored to the ground or to any fixed object on the land or in the water.

(j) Vertical planes. Planes perpendicular to the horizontal plane.

(k) Visible. Visible on a dark night with a clear atmosphere.

(b) Navigation Lights To Be Displayed In The Air

Note.— The lights specified herein are intended to meet the requirements of the Civil Aviation (Rules of the Air) Regulations, for navigation lights.

As illustrated in Figure 1, the following unobstructed navigation lights shall be displayed —

(a) a red light projected above and below the horizontal plane through angle of coverage L;

(b) a green light projected above and below the horizontal plane through angle of coverage R;

(c) a white light projected above and below the horizontal plane rearward through angle of coverage A.

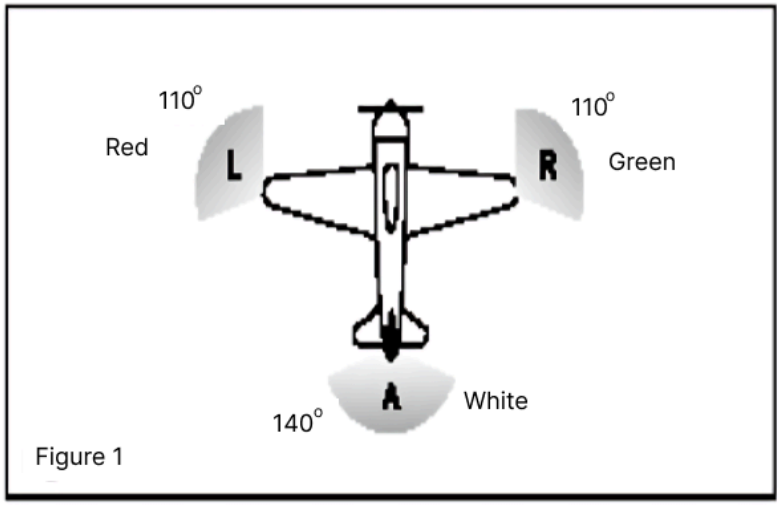


Figure 1

(c) lights to be displayed on the water

3.1. General

Note.— The lights specified herein are intended to meet the requirements of the Civil Aviation (Rules of the Air) Regulations for lights to be displayed by aeroplanes on the water.

The International Regulations for Preventing Collisions at Sea require different lights to be displayed in each of the following circumstances—

(a) when under way;

(b) when towing another vessel or aeroplane;

(c) when being towed;

(d) when not under command and not making way;

(e) when making way but not under command;

(f) when at anchor;

(g) when aground.

The lights required by aeroplanes in each case are described below.

3.2 When under way as illustrated in Figure 2, the following appearing as steady, unobstructed lights—

(a) a red light projected above and below the horizontal through angle of coverage L;

(b) a green light projected above and below the horizontal through angle of coverage R;

(c) a white light projected above and below the horizontal through angle of coverage A; and

(d) a white light projected through angle of coverage F.

Note:-The lights described in a), b) and c) should be visible at a distance of at least 3.7 km (2 NM). The light described in d) should be visible at a distance of 9.3 km (5 NM) when fitted to an aeroplane of 20 m or more in length or visible at a distance of 5.6 km (3 NM) when fitted to an aeroplane of less than 20 m in length.

3.3 When towing another vessel or aeroplane as illustrated in Figure 3, the following appearing as steady, unobstructed lights—

(a) the lights described in 3.2;

(b) a second light having the same characteristics as the light described in 3.2 d) and mounted in a vertical line at least 2 m above or below it; and

(c) a yellow light having otherwise the same characteristics as the light described in 3.2 c) and mounted in a vertical line at least 2 m above it.

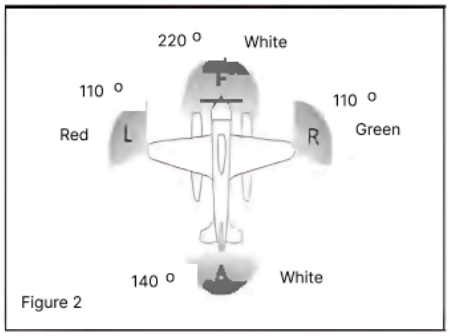


Figure 2

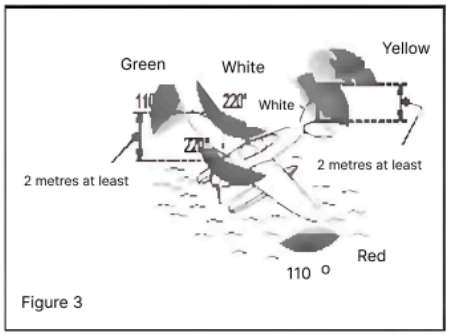


Figure 3

3.4 When being towed the lights described in 3.2 a), b) and c) appearing as steady, unobstructed lights.

3.5 When not under command and not making way as illustrated in Figure 4, two steady red lights placed where they can best be seen, one vertically over the other and not less than 1 m apart, and of such a character as to be visible all around the horizon at a distance of at least 3.7 km (2 NM).

3.6 When making way but not under command as illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 a), b) and c).

Note.— The display of lights prescribed in 3.5 and 3.6 is to be taken by other aircraft as signals that the aeroplane showing them is not under command and cannot therefore get out of the way. They are not signals of aeroplanes in distress and requiring assistance.

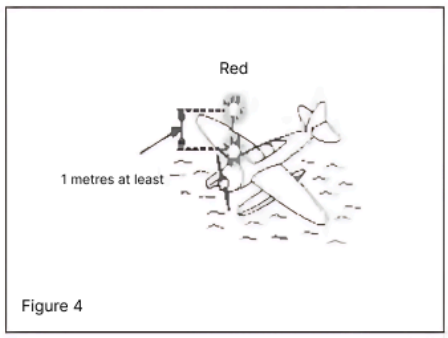


Figure 4

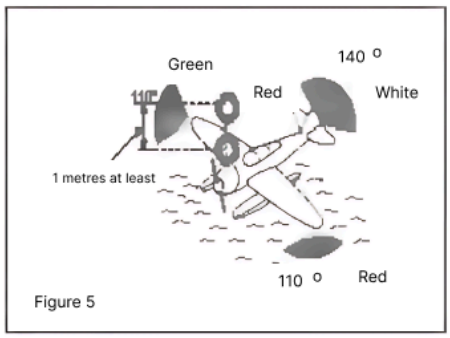
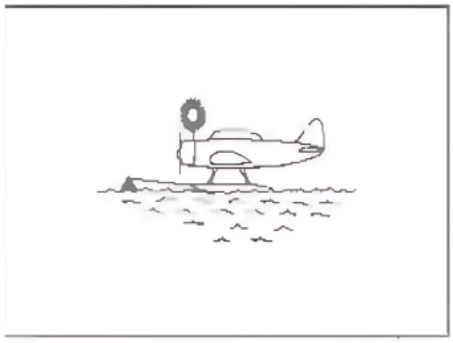


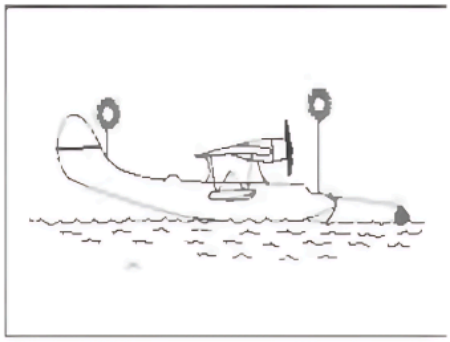
Figure 5

3.7 When at anchor—

(a) If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).

(b) If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).

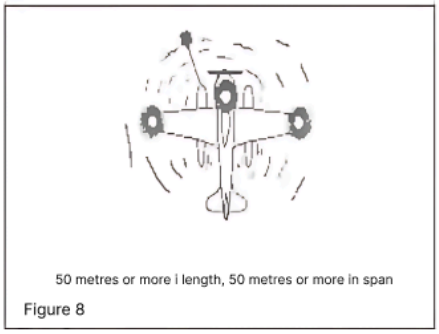




(c) If 50 m or more in span a steady white light on each side (Figures 8 and 9) to indicate the maximum span and visible, so far as practicable, all around the horizon at a distance of at least 1.9 km (1 NM).

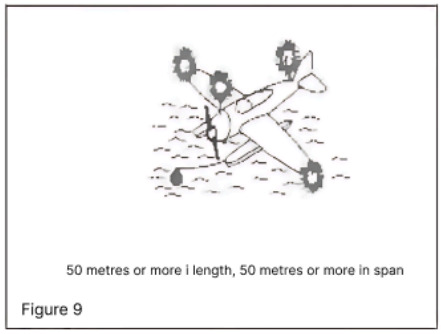
3.8 When aground

The lights prescribed in 3.7 and in addition two steady red lights in vertical line, at least 1 m apart so placed as to be visible all around the horizon.



50 metres or more i length, 50 metres or more in span

Figure 8



50 metres or more i length, 50 metres or more in span

Figure 9

FIFTH SCHEDULE [r. 115 (2),(3) & (4)]

PENALTIES

1.	Citation	B
2.	Interpretation	B
3.	Applicability	
4.	Compliance with laws, regulations and procedures	B
5.	Dangerous goods	A
6.	Use of psychoactive substances	A
7.	Specific approval	A
8.	Operating facilities	B
9.	Operational management	B
10.	Flight preparation	B
11.	In-flight procedures	B
12.	Duties of pilot-in-command	B
13.	Cabin baggage (take-off and landing)	B
14.	Aeroplane performance operating limitations	B
15.	Aeroplane instruments, equipment and flight documents	B
16.	Aeroplanes on all flights	B
17.	Marking of break in points	B
18.	All aeroplanes operated as VFR flights	B
19.	Aeroplanes on flights over water	B
20.	Aeroplanes on flights over designated land areas	B
21.	Aeroplanes on high altitude flights	B

22.	All aeroplanes operated in accordance with the instrument flight rules	B
23.	Aeroplanes when operated at night	B
24.	Aeroplanes complying with the noise certification	B
25.	Mach number indicator	B
26.	Aeroplanes required to be equipped with ground proximity warning systems (GPWS)	B
27.	Emergency locator transmitter (ELT)	B
28.	Microphones	B
29.	Aeroplanes required to be equipped with a pressure-altitude reporting transponder	B
30.	Aeroplanes equipped with automatic landing systems, a head-up display B (HUD) or equivalent displays, enhanced vision systems (EVS), synthetic vision systems (SVS) and/or combined vision systems (CVS)	B
31.	Flight recorders and aircraft data recording systems	B
32.	Cockpit voice recorders and cockpit audio recording systems	B
33.	Data link recorders	B
34.	Flight recorders general	B
35.	Electronic flight bags (EFBs	B
36.	Communication equipment	B
37.	Navigation equipment	B
38.	Surveillance equipment	B
39.	Owner’s maintenance responsibilities	B
40.	Maintenance records	B
41.	Modifications and repairs	B
42.	Certificate of release to service	B
43.	Composition of the flight crew	B

44.	Qualifications	B
45.	Flight manual	B
46.	Journey log book	B
47.	Records of emergency and survival equipment carried	B
48.	Security of aeroplanes	B
49.	Reporting acts of unlawful interference	B
50.	Applicability	B
51.	Compliance with laws, regulations and procedures	B
52.	Safety management	B
53.	Operating Facilities	B
54.	Operational management	B
55.	Flight preparation	B
56.	In-Flight Procedures	B
57.	Duties of pilot-in-command	B
58.	Cabin baggage (take-off and landing)	B
59.	Applicable to aeroplanes over 5 700 kg certificated on or after 13 June 1960	B
60.	Mass limitations take off	B
61.	General	B
62.	Aeroplanes on all flights	B
63.	Flight data recorders	B
64.	Cockpit Voice Recorders	B
65.	Aeroplanes on long-range over-water flights	B
66.	Aeroplanes in icing conditions	B
67.	Aeroplanes operated in accordance with the instrument flight rules	B
68.	Emergency power supply for electrically operated attitude indicating instruments	B
69.	Pressurized aeroplanes when carrying passengers — weather-detecting equipment	B
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THE CIVIL AVIATION (LICENSING OF AIR SERVICES) REGULATIONS, 2018

ARRANGEMENT OF REGULATIONS

PARTICULARS TO BE FURNISHED IN CONNECTION WITH AN APPLICATION FOR A LICENCE

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FOURTH SCHEDULE [r. 19] —	INFORMATION FOR ASSESSMENT OF FINANCIAL FITNESS OF NEW APPLICANT FOR AIR SERVICE LICENCE OR EXISTING AIR CARRIERS
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SIXTH SCHEDULE [r. 25(1)] —	PARTICULARS OF APPLICANT TO BE PUBLISHED
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THE CIVIL AVIATION (LICENSING OF AIR SERVICES) REGULATIONS, 2018

[Legal Notice 167 of 2018]

PART I – PRELIMINARY

1. Citation.

These Regulations may be cited as the Civil Aviation (Licensing of Air Services) Regulations, 2018.

2. Interpretation.

In these Regulations, unless the context otherwise requires—

"aeronautical authority" means the Cabinet Secretary responsible for civil aviation matters in Kenya;

"air carrier" or **"airline"** means an enterprise licensed and approved by a competent authority of a state to offer or operate an air service;

"air operator certificate" means a certificate authorizing an air carrier to carry out specified commercial air transport operations;

"air service" means any service performed by means of an aircraft for hire or reward;

"air transport officer" means any person appointed as such under regulation 72;

"appeals Tribunal" means the National Civil Aviation Administrative Review Tribunal established under section 66 of the Act;

"Authority" means the Kenya Civil Aviation Authority re-established under section 4 of the Civil Aviation Act;

"authorization" means granting of permission in the form of designation, licence, operating authorization, temporary licence, short term licence or any other approval issued under these regulations to operate an aircraft for an air service or in transit with or without a stop in Kenya;

"Cabinet Secretary" means the Cabinet Secretary for the time being responsible for civil aviation matters;

"capacity" means the number of seats or cargo space or both offered to the general public on an air service over a given period;

"concerted practice" means co-operative or coordinated conduct between eligible airlines, achieved through direct or indirect contact, that replaces their independent action, but which does not amount to an agreement;

"Contracting State" means a State which is a party to the Convention on international civil aviation signed at Chicago on the Seventh Day of December, 1944;

"designation" means authorization granted by the aeronautical Authority to an airline, whose principal place of business is in Kenya, to carry out international scheduled air service;

"Director-General" means the Director-General of the Kenya Civil Aviation Authority;

"domestic scheduled air service" means an air service where flights are undertaken between two or more airports within Kenya according to a published flights timetable with each flight being open to use by members of the public;

"dominant position" means a situation where an eligible airline either by itself or acting in collusion with one or more eligible airlines, is in a position to control the relevant market

by means of, amongst other factors, revenue generated for a particular service or group of services;

"dry lease" means a contractual arrangement where the leased aircraft is operated by flight crew members of the lessee;

"essential air service obligation" means any public service obligation imposed upon an air carrier to take all necessary measures to ensure the provision of a service satisfying fixed standards of continuity, regularity, capacity and pricing, which standards the air carrier would not assume if it were solely considering its commercial interest;

"foreign aircraft" means an aircraft registered in a foreign State;

"franchise" means the rights and privileges granted by an airline to another airline under a franchise agreement;

"franchise agreement" means an agreement under which a franchise is granted;

"franchise approval" means an approval granted by the Authority to an airline to operate franchise business;

"internal air service" means an air service operated within Kenya, and includes an air service which may pass through the airspace of another state without providing air service in that other state;

"international air service" means an air service provided between Kenya and at least one other state and excludes an air service which may pass through the airspace of another state without providing air service in that other state;

"international non-scheduled air service" means an air service other than an international scheduled air service undertaken with a specific flight or a series of flights;

"international scheduled air service" means an air service where flights are undertaken between Kenya and one or more countries according to a published flights timetable with each flight being open to use by members of the public;

"licence" means a licence granted under these Regulations;

"material fact" means any information that can reasonably be expected to have a significant effect on the person making a decision;

"undertaking" means a sole proprietor, a partnership or a company;

"misrepresentation" means a statement represented as fact that the person making it knew or ought to have known to be untrue at the time it was made;

"inclusive tour charters" means a tour which is sold as a package consisting of—

(a) such fixed accommodation and other land arrangements of services as may be appropriate for such persons in Kenya; and

(b) the transport of persons by air to and from any destination in Kenya;

"operating authorization" means a licence issued under regulation 13;

"passenger" means any person, other than a crew member, who travels in an aircraft with the consent of the air carrier and includes the baggage of such person;

"temporary licence" means a licence granted under regulation 33;

"seat" means any area in an aircraft designed to be occupied by a passenger, other than the area occupied by the luggage of such passenger;

"short-term licence" means a licence granted under regulation 34; and

"wet lease" means a contractual arrangement where the leased aircraft is operated by flight crew members of the lessor.

PART II – LICENSING OF INTERNAL AIR SERVICES

3. Operating without a licence prohibited.

A person shall not use an aircraft within Kenya for the provision of any air service except under and in accordance with the terms and conditions of a licence issued by the Authority under these Regulations.

4. Application for a licence under this Part.

(1) A person who—

(a) intends to provide any air service;

(b) intends to renew a licence for an existing air service;

(c) intends to vary the terms or conditions specified on the licence; or

(d) is deemed by the Authority to have made significant changes as provided under regulation 21(3), shall apply to the Authority for a licence.

(2) An application for a licence for any of the categories of air service set out in the First Schedule shall be made to the Authority in a prescribed form and shall contain the particulars set out in the Second Schedule.

(3) The Authority shall develop procedures for processing an application for licence under this Part.

(4) An application for a licence shall be signed by—

(a) in the case of a sole proprietor, the owner;

(b) in the case of a body corporate, a director or an authorized officer; and

(c) in the case of a partnership, a partner or an authorized officer.

(5) An application for a licence, other than a short-term licence, shall be made to the Authority not less than ninety days before the date on which it is desired to take effect.

(6) Where an application is made in a consolidated form for different categories of air services, the provisions of these Regulations relating to payment of fees shall apply to each category of air service as if the applications were lodged separately.

5. Issuance of licence under this Part.

(1) A licence may be issued for any category of air service and aircraft as set out in the First and the Third Schedules respectively if the applicant satisfies the Authority that—

(a) the applicant is a citizen of Kenya; or

(b) in the case of a body corporate or a partnership, at least fifty one (51%) per cent of the voting rights are ultimately held by the State, a citizen of Kenya or both:

Provided that the Authority may exempt any person from the requirements of this provision having regard to the special nature of the air service;

(c) the aircraft which will be used in operating the air service is a Kenyan registered aircraft:

Provided that the Authority may after considering the application, accept such other foreign registered aircraft subject to the aircraft meeting the operational and technical standards in force in Kenya;

(d) the applicant has met the requirements of Regulations 19, 20 and 47;

(e) the applicant is able to meet the requirements of the Authority for an air operator's certificate for the category of service and aircraft as those set out in the First and Third schedules; and

(f) the applicant meets the requirements of any law relating to aviation safety and security, public health, environmental protection and business operations in general.

(2) For the purpose of this regulation "special nature of the air service" shall include service in the interest of social welfare, charity, for purposes of salvage on humanitarian grounds or of assistance in saving life or in the public interest.

6. Additional requirements for scheduled internal air service.

An air carrier licensed to operate scheduled air service within Kenya and whose principal place of business is in Kenya shall be required prior to commencement and during continuance of such operations to ensure that it—

(a) has an effective reservations and sales system;

(b) has a sufficient number of aircraft to cope with the proposed route-schedule;

(c) has toilet facilities on board aircraft operating on a sector with a flight duration of ninety minutes or more;

(d) has submitted a flight timetable and obtained approval by the Authority prior to operation;

(e) files monthly traffic and tariff statistics with the Authority; and,

(f) is qualified for self-passenger handling or has engaged a qualified passenger handling entity at each airport of operation.

7. Conditions to a licence for internal air service.

(1) The Authority may, in the interest of aviation safety and security, environmental protection, public health, and in order to ensure fair trading practices or for any other reason in the interest of the public impose conditions to a licence that—

(a) specify the routes or areas that may be operated under the licence;

(b) determine the classes or descriptions of passengers or goods that may be carried; and

(c) the approved schedule of air services shall be observed.

(2) Any person having a financial interest in the business of the licensee shall—

(a) refrain from stipulating that any other person shall refuse booking facilities to any other licensee;

(b) deny booking facilities to any other licensee; or

(c) refrain from granting such facilities to other licensees on onerous terms.

(3) Where a licensed air carrier has started to operate a scheduled passenger air service on a new route—

(a) with an aircraft of not more than twenty revenue seats; and

(b) with a capacity not more than ten thousand seats per year, the Authority may decline to license another air carrier on that route for a period of two years.

8. Public interest and development of air service.

In exercising its discretion under regulation 5, the Authority shall have regard to the co-ordination and development of air services generally with the object of ensuring the most effective service to the public while avoiding uneconomic overlap, and generally to the interests of the public, including those of persons requiring or likely to require facilities for air transport, as well as those of persons providing such facilities and in particular the Authority shall have regard to—

(a) the existence of other air services in the area through which the proposed air service is to be operated;

(b) the possibilities of air transport in that area;

(c) the degree of efficiency and regularity of the air services, if any, already provided in that area, whether by the applicant or by other operators;

(d) the period for which such services have been operated by the applicant or by other operators;

(e) the extent to which it is probable that the applicant will be able to provide a satisfactory service in respect of continuity, regularity of operation, frequency, punctuality, reasonableness of charges and general efficiency;

(f) the financial resources of the applicant;

(g) the type of aircraft proposed to be used on the service;

(h) the competence of the applicant, having regard to his previous conduct and experience, organization, staffing, his equipment, maintenance and other arrangements, to secure the safe operation of aircraft of the types specified in the application on flights of the description and for the purposes so specified; and

(i) any representation made under regulation 25.

9. Essential service obligation.

(1) The Authority may, upon consultation with the Cabinet Secretary, impose an essential air service obligation to an air carrier in respect of scheduled air services to an airport serving a peripheral region or low density routes in Kenya which are considered vital for—

(a) the availability of services to all consumers including low income, rural and disadvantaged passengers and shippers; and

(b) economic development of the region in which the airport is located.

(2) The Cabinet Secretary shall publish the existence of this essential service obligation in the Kenya Gazette.

(3) The Authority in imposing an essential air service obligation shall assess the adequacy of the service referred in subregulation (1) having regard to—

(a) public interest;

(b) the possibility for the region, of having recourse to other forms of transport and the ability of such forms to meet the transport needs under consideration; and

(c) the airfares and conditions which can be quoted to users.

(4) In instances where other forms of transport cannot ensure an adequate and uninterrupted service, the Authority may include in the essential service obligation the requirement that any air carrier intending to operate the route gives a guarantee that it shall operate the route for a minimum period of two years in addition to the other terms of the essential service obligation.

(5) The right to operate the service referred to under subregulation (4) shall be granted by way of a public tender for an airport or route(s).

(6) Where no air carrier is willing to offer the required level of service following the tendering process, the Authority may nominate any three air carriers for appointment by the Cabinet Secretary to offer the service.

(7) The Cabinet Secretary may put in place compensation mechanism based on the prevailing market rates, grant exclusive rights to the nominee referred in sub regulation (6) and shall review the situation after a period of two years.

PART III – LICENSING OF INTERNATIONAL AIR SERVICES

10. Operating without a licence prohibited.

A person shall not use an aircraft for the provision of any air service, to, from or in transit through Kenya, except under and in accordance with the terms and conditions of a licence issued by the Authority under these Regulations.

11. Application for a licence under this Part.

(1) A person who—

(a) intends to provide any air service;

(b) intends to renew a licence for an existing air service;

(c) intends to vary the terms or conditions specified on the licence; or

(d) is deemed by the Authority to have made significant changes as provided under regulation 21(3), shall apply to the Authority for a licence.

(2) An application for a licence of any of the categories set out in the First schedule shall be made to the Authority in a prescribed form and shall contain the particulars set out in the Second Schedule.

(3) The Authority shall develop procedures for processing an application for licence under this part.

(4) An application for a licence shall be signed by—

(a) in the case of a sole proprietor, the owner;

(b) in the case of a body corporate, a director or an authorized officer; and

(c) in the case of a partnership, a partner or an authorized officer.

(5) An application for a licence, other than a short-term licence, shall be made to the Authority not less than ninety days before the date on which it is desired to take effect.

(6) Where an application is made in a consolidated form for different categories of air services, the provisions of these regulations relating to payment of fees shall apply to each category of air service as if the applications were lodged separately.

12. Issuance of a licence under this Part.

A licence may be issued for any category of air service or aircraft as set out in the First and Third Schedules respectively, if the applicant satisfies the Authority that—

(a) the applicant is a citizen of Kenya; or

(b) in the case of a body corporate or a partnership, fifty one (51%) per cent of the voting rights are ultimately held by the State, a citizen of Kenya or both:

Provided that for the purposes of this regulation, the Authority may accept any applicant eligible under a criterion set out in any multilateral agreement or arrangement to which Kenya is signatory;

(c) the aircraft which will be used in operating the air service is a Kenyan registered aircraft:

Provided that the Authority may after considering the application, accept such other foreign registered aircraft subject to the aircraft meeting the operational and technical standards in force in Kenya.

(d) the applicant has met the requirements of Regulations 19, 20 and 47;

(e) the applicant is able to meet the requirements of the Authority for an air operator's certificate for the category of service and aircraft as those set out in the First and Third Schedules respectively;

(f) the applicant has held a licence for domestic scheduled air service or non scheduled air service or both, for a period of one (1) year;

(g) the applicant meets the requirements of any law relating to aviation safety and security, public health, environmental protection and business operations in general.

13. Issuance of Operating Authorization.

(1) An airline whose principal place of business is in a foreign State shall not operate a scheduled air service to, from, or across Kenya unless there is in force an operating authorization for that air service issued by the Authority in accordance with subregulation (2).

(2) The Authority shall, on request, issue to an airline referred to in sub regulation (1) an operating authorization in the event that—

(a) there is in force between Kenya and the State in which the airline has its principal place of business an air service agreement or arrangement under which scheduled air services may be operated;

(b) the airline has been designated in accordance with the provisions of the relevant agreement or arrangement; and

(c) the Authority is satisfied that the airline conforms to and complies with the terms and conditions of the relevant agreement or arrangement.

(3) An operating authorization shall remain valid as long as the relevant agreement or arrangement is in force.

(4) The Operating Authorization referred in subregulation (2) may be amended, suspended or revoked in accordance with the terms and conditions of the relevant agreement or arrangement.

(5) The Authority shall cause to be published procedures to be followed and particulars to be supplied by applicants and the applicable fee for an authorization referred to in this regulation.

14. Terms and conditions of licence.

A licensed air carrier whose principal place of business is in Kenya shall not engage in the provision of air services outside Kenya except under and in accordance with the terms and conditions of the licence issued by the Authority.

15. Conditions for international scheduled air service.

An air carrier whose principal place of business is in Kenya may establish an international scheduled air transport service if the air carrier is licensed and —

(a) has an effective reservations and sales system;

(b) has a sufficient number of aircraft to cope with the proposed route-schedule;

(c) has toilet facilities on board aircraft operating on a sector with a flight duration of ninety minutes or more;

(d) has submitted a flight timetable and obtained approval from the Authority and State of destination prior to operation;

(e) files monthly traffic and tariff statistics with the Authority;

(f) is qualified for self-passenger handling or has engaged a qualified passenger handling entity at each airport of operation; and

(g) has been duly designated for the service by the aeronautical authority in Kenya, in accordance with the relevant air service agreement or arrangement.

16. Foreign aircraft in transit not to over fly or land unless authorized.

(1) A foreign aircraft shall not fly in transit non-stop across Kenya or land in Kenya for non-traffic purposes in the course of a nonscheduled flight unless authorized by the Authority.

(2) In granting authorization under subregulation (1), the Authority may impose on the flight such conditions and requirements as it deems necessary to ensure compliance with the general principles contained in the Chicago Convention and the aircraft shall comply.

(3) Where a foreign registered aircraft makes a non-scheduled flight into Kenya it shall not take on or discharge passengers, cargo or mail for reward except in accordance with the terms and conditions of the authorization issued.

(4) The Authority shall cause to be published procedures to be followed and particulars to be supplied by applicants and the applicable fee for an authorization referred to in this Regulation.

(5) Where it appears that a foreign registered aircraft intends, in the course of a non-scheduled flight over Kenya, to proceed over regions without adequate air navigation facilities, the Authority may direct, for reasons of safety, that the aircraft follows an established air route and such a flight shall be conducted in accordance with such terms and conditions as the Authority may impose.

17. Conditions for non-scheduled international air service licence.

(1) A licence may be issued or varied for non-scheduled international air service if the applicant satisfies the Authority that—

(a) the international air service concerned shall be operated in a manner that complies with the applicable international conventions which Kenya has ratified;

(b) the applicant is fit and able to operate the international air service;

(c) in the case of a foreign applicant, the applicant is appropriately certificated by a competent authority in the home State for the service; and

(d) the proposed air service does not disrupt the existing scheduled air service.

(2) When processing the application, the Authority shall have due regard to fairness, equity and reciprocal treatment accorded to Kenyan air carriers by the State of the applicant.

18. Conditions for operating a non-scheduled air service.

(1) A foreign air carrier issued with a licence by the Authority to operate a non-scheduled international air service shall—

(a) not take on any traffic at any point in Kenya, for discharge within Kenya, except that traffic which the air carrier originally brought in;

(b) furnish the Authority with any statistics, within thirty days from the date of the request;

(c) make the necessary arrangements to ensure that the operation of the air service is facilitated at the terminal airport in Kenya at the time of arrival and departure; and

(d) for air carriers operating inclusive tour charters, transport only inclusive tour package passengers unless specifically authorized by the Authority to transport other traffic.

(2) Any person who contravenes the provisions of subregulation (1) commits an offence and shall, on conviction, be liable, in the first instance, to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year or both and for every subsequent offence, to a fine not exceeding two million shillings or to imprisonment for a term not exceeding two years or to both.

PART IV – GENERAL PROVISIONS RELATING TO LICENCES

19. Further conditions to application for licence.

(1) An applicant for an air service licence shall—

(a) demonstrate to the satisfaction of the Authority the ability to—

(i) meet at any time, its actual and potential obligations, according to its business plan for a period of two years from the start of operations;

(ii) meet its fixed and operational costs incurred from operations according to its business plan established under realistic assumptions, for a period of three months from the start of operations without relying on revenue generated by the operations;

(b) provide all relevant information, in particular the data referred to in Part A of the Fourth Schedule.

(2) For the purpose of sub regulation (1), an applicant shall submit a business plan for the first two years of operation, which shall be in accordance to the format set out in the Fifth Schedule.

(3) In respect of foreign air carriers, the Authority may accept as sufficient evidence, the production of licences, certificates and documents issued by competent authorities in their home States for purposes of assessing competence, technical and financial fitness of the air carrier.

(4) An air carrier licensed under these Regulations shall submit to the Authority audited financial accounts relating to the previous financial year.

(5) An air carrier who wishes to vary the terms and conditions of licence issued by the Authority shall provide the particulars listed in Part B of the Eighth Schedule.

20. Proof of integrity of persons to control operations.

(1) The Authority may require, for the purpose of issuing a licence, proof that the person(s) who shall continuously and effectively control the operations of the air carrier are of unquestionable integrity or that they have not been declared bankrupt or convicted of a criminal offence by an appropriate authority.

(2) For the purposes of subregulation (1) the Authority may accept as sufficient evidence in respect of foreign nationals, the production of documents issued by competent authorities in the States of origin or the State from which the foreign national comes showing that those requirements are met.

21. Notification of change in operation by air carrier.

(1) An air carrier shall notify the Authority in writing at least fourteen days in advance of plans for the—

(a) operation of a new scheduled air service or a non-scheduled air service to a continent or region not previously served;

(b) changes in the type, category or number of aircraft used or a substantial change in the scale of its activities;

(c) changes in the particulars of the membership of a partnership or changes in its legal status;

(d) changes in the controlling shareholding or changes in the ownership of any single shareholding which represents ten per centum or more of the total shareholding of the air carrier or its parent or ultimate holding company; or

(e) changes in the particulars of the key personnel appointed by the licensee to be responsible and accountable for the operations of the air service.

(2) The submission of a one year business plan two months in advance of the period to which it refers shall constitute sufficient notice under this regulation for the purpose of changes to current operations and circumstances which are included in that business plan.

(3) If the Authority deems the changes notified under subregulation (1) and (2) to have a significant bearing on the finances or control of the air carrier, it shall require the air carrier to submit an application for a new licence and return the existing one for cancellation.

22. Aircraft ownership not a condition for licence.

(1) Ownership of aircraft shall not be a condition for granting or maintaining a licence.

(2) Without prejudice to subregulation (1)—

(a) an applicant for an air service licence shall have in place an arrangement for one or more aircraft through ownership or dry lease, at its disposal and under its operational control;

(b) aircraft used by an air carrier shall be registered in its national register.

(3) The Authority may upon request by an air carrier approve operation of an aircraft under a dry lease arrangement for an initial renewable period of twelve (12) months provided that there exists evidence of adequate insurance cover for the operation under dry-lease arrangement.

(4) The Authority may upon request by an air carrier approve operation of an aircraft under a wet lease arrangement to meet temporary and exceptional requirements of an on-going air service operation for a period of six months provided that there exists evidence of adequate insurance cover for the operation under wetlease arrangement.

(5) Notwithstanding sub regulation (4), an approval of a onetime extension for an additional period of six months may be granted subject to—

(a) submission of a statement justifying extension;

(b) the insurance policy adequately covering the additional lease term;

(c) air transport statistics for the preceding six months reflecting consistent and substantial operations; and

(d) the air carrier making arrangements for authentication of the information provided herein at their premises.

(6) For the purpose of this regulation "exceptional circumstances" shall include air carrier's capacity constraints due to its aircraft undergoing heavy maintenance checks, clearance of backlog due to shortage of aircraft and temporary upsurge in demand for services.

23. Approval for use of aircraft from another operator.

(1) No air carrier shall use an aircraft from another carrier or provide its aircraft to another carrier for operations without prior approval from the Authority.

(2) In granting the approval referred under subregulation (1), the Authority shall have regard to—

(a) the ability of the air carrier maintaining air operator certificate requirements;

(b) liability standards and the extent of incorporation of the arrangement in the insurance cover;

(c) extent of disclosure of the arrangement by carrier to the public; and

(d) regularity of air service provided under such arrangement.

(3) The conditions of the approval under subregulation (2) shall be part of the lease, sub charter, code share or aircraft interchange agreement between the parties.

(4) The Authority may during the currency of a lease, subcharter, interchange or code share approval on its own volition or on the application by a lessee or lessor, sub-charterer or a party to an interchange or a code share arrangement, vary, suspend or revoke any of the terms or conditions of any of these approvals or the approval in its entirety.

(5) The Authority shall develop procedures to be followed, the particulars or documents to be supplied by applicants and publish the applicable fee for the lease, sub charter, code share or aircraft interchange agreement approval referred to in this regulation.

24. Condition for provision of air service.

A licensee under this regulation shall not provide or cause to be provided—

(a) air services except under a valid Air Operator Certificate (AOC);

(b) flying instructions except under a valid Approved Training Organization (ATO) certificate, issued by the Authority.

25. Application particulars to be published.

(1) The Authority shall, after the receipt of an application for a licence other than an application for a short-term licence, cause to be published in the Kenya Gazette, a notice containing the particulars of the application and such particulars shall be those set out in the Sixth Schedule.

(2) Any person may, within twenty-one days after the publication of the notice referred to in subregulation (1), make representation(s) in writing to the Authority, in favour of or against an application.

(3) Every representation in favour of or against an application for a licence shall—

(a) be in writing;

(b) state the specific grounds on which it is based;

(c) specify any conditions to be attached to a licence if issued; and

(d) be signed by the person making it, or a person authorized in the case of a body corporate or a partnership.

(4) A copy of every representation in favour of or against an application for a licence shall be sent by the person making it to the applicant at the same time it is sent to the Authority using registered mail.

(5) The Authority may dismiss any representation to an application for a licence where it considers the same to be frivolous and vexatious.

26. Public hearing.

(1) The Authority shall hold a hearing at such places as may be notified for the purpose of determining an application.

(2) The Authority shall give notice of the day, time and venue of the hearing to the applicant(s) and the public.

(3) A person making representation(s) to the Authority may appear at the hearing of an application in person, by a legal representative or other duly authorized representative, but shall not be entitled to recover any costs from the Authority incurred by him or her in the proceedings.

(4) The Authority shall keep record of the proceedings.

(5) The Authority shall make a decision on an application not later than thirty days after the hearing of the application.

(6) In making a decision on an application, the Authority shall consider all representations, relevant information and supporting documents.

(7) The Authority may defer determination of an application in order to obtain further information provided that such a deferment shall not exceed six months from the date of notification of the deferment.

27. Reasons for refusal to issue licence.

(1) The Authority shall, upon request by an applicant or a person who objected the application and subject to payment of the applicable fee, provide reasons in writing for the decision:

Provided that where the reason for the decision relates to matters of national security, the Authority shall not disclose the same except with the consent of the Cabinet Secretary or by a court order.

(2) An applicant whose application for a licence has been unsuccessful may, upon expiry of three months from the date of notification of the decision, submit a new application to the Authority.

28. Decisions to be published.

The Authority shall publish decisions on applications for licence, revocation and suspension of licence in the Kenya Gazette pursuant to the Seventh Schedule.

29. Conditions attached to a licence.

(1) A licence shall be issued to an applicant for any category of air service as set out in the First Schedule on condition—

(a) that the licensee is sufficiently insured in relation to the type of air service and type of aircraft endorsed on the licence including third party liability;

(b) that the requirements of any law relating to aviation and any air traffic control procedure for the time being in force in Kenya are complied with during the currency of the licence; and

(c) that uplift and discharge of air traffic in Kenya complies with national laws and rules relating to aviation safety and security, environment, customs, immigration and public health.

30. Lapse of a licence.

(1) The licence shall lapse—

(a) where an air carrier ceases operations for six consecutive months;

(b) where operations have not commenced within six months after issuance of the licence;

(c) upon a licensee's death, incapacity, bankruptcy in the case of a sole proprietorship or,

(d) as soon as the licensee is under liquidation, sequestrated, incapacitated or placed under receivership as the case may be:

Provided that in the case of death, incapacity, bankruptcy, sequestration or liquidation of the holder of a licence, the appointed receiver manager or trustee of the licensee shall forthwith notify the Authority and submit an application for a new licence within fourteen days for purposes of continuity of operations.

(2) In the case where it is not intended for the operations to continue, the licence shall be returned for cancellation within fourteen (14) days.

(3) For the purpose of this regulation an air carrier shall be deemed—

(a) not to have commenced operations if within six months of issuance of the licence the air carrier has not operated a revenue flight under the terms and conditions of the licence; or

(b) to have ceased operation if the air carrier has not carried out any flight six months after the last recorded revenue flight.

31. Variation, suspension or revocation of licence.

(1) The Authority may vary any terms or conditions of a licence or revoke a licence either on its own volition or on application by the licensee.

(2) Whenever it appears that an air carrier is experiencing financial problems, the Authority may, upon assessment of the carrier's performance, suspend or revoke the licence.

(3) The Authority may suspend or revoke a licence on the ground that the licensee—

(a) has been found guilty of giving false information to the Authority under regulation 68;

(b) has contravened any terms or condition of the licence; or

(c) has contravened or failed to comply with any of the provisions of these Regulations.

(4) The Authority may recall a licence to amend errors of administrative nature provided that upon the lapse of twenty one days' notice without response to such recall, the Authority shall revoke the licence.

32. Procedure for revocation, variation or suspension of licence.

(1) The Authority shall give the licensee twenty one days' notice in writing before varying, revoking or suspending any licence or terms or conditions of a licence stating the grounds upon which it is proposed to vary, revoke or suspend the licence or the terms or conditions of the licence.

(2) At the expiry of the notice specified under subregulation (1) the Authority may—

(a) direct a licensee to comply with such terms or conditions as it may specify within the period determined by the Authority;

(b) vary the licence;

(c) suspend the licence concerned for a period not exceeding two years; or

(d) revoke the licence.

(3) Where a licence is revoked or suspended the Authority shall state in writing the reasons for its decision.

33. Temporary licence.

(1) The Authority may upon request grant a temporary licence to an applicant for a period not exceeding one hundred and twenty days pending determination of the substantive application for licence.

(2) Provisions of these Regulations as to the publication of particulars of applications and representation shall not apply, if the Authority—

(a) is of the opinion that compliance with the procedure for processing of application referred to would defeat the objective of such application;

(b) is satisfied that the applicant conforms to the general requirements relating to an application for licence;

(c) is satisfied that the proposed service is in the interest of social welfare, charity, for purposes of salvage on humanitarian grounds or of assistance in saving life or in the public interest:

Provided that a temporary licence shall not be issued for purposes of acquiring an Air Operator Certificate, an Approved Training Organization Certificate or extending the duration of an expired licence.

34. Short-term licence.

(1) The Authority may upon request grant a short term licence to an applicant for a period not exceeding seven days if satisfied that the application is in public interest and requires expeditious determination, in which case the provisions of these Regulations as to publication of particulars of application and representation shall not apply.

(2) In issuing a licence referred to in subregulation (1), the Authority may impose such terms and conditions as it deems fit and shall have regard to—

(a) public interest;

(b) the need to provide reasonable protection for air carriers of scheduled air services to ensure regularity of the service between Kenya and other States;

(c) any resolution or decision of the International Civil Aviation Organization or of the International Air Transport Association that has been approved by the Authority and is relevant to the particular application.

(3) In the case where a request for a short term licence is made subsequent to a substantive application for a licence, the provisions of subregulation (1) shall not apply.

(4) The Authority may refuse to grant an application for a short term licence on the basis of regularity of short term operations under this regulation.

(5) For the purpose of this subregulation (4), “regularity of operations” shall mean twenty one flights within the seven days’ period.

35. Validity of a licence.

(1) The Authority may issue a licence in accordance with the provisions of these Regulations and such a licence shall, subject to regulation 31, remain in force for such period as specified on the licence:

Provided that:

(a) the duration of a licence issued under these Regulations shall not exceed five years from the date on which it is specified to take effect; or

(b) if an application for renewal has been lodged with the Authority before expiry of the licence held by the applicant, the existing licence shall remain in force until such application has been determined.

(2) Payment of a licence fee shall be made within thirty days from the date of gazettement of the decisions.

(3) In the case where an applicant fails to make payment referred in subregulation (2) it shall be deemed to have forfeited its right to a licence.

36. Limitation of traffic rights in certain cases.

(1) When physical constraints or environmental problems exist the Authority may, subject to this regulation, impose conditions, limit or refuse the exercise of traffic rights in particular when other modes of transport can provide satisfactory levels of service.

(2) Action taken by the Authority in accordance with subregulation (1) shall—

(a) be non- discriminatory on grounds of identity of air carriers;

(b) have a limited period of validity, not exceeding three years, after which it shall be reviewed;

(c) not unduly affect the objectives of these Regulations;

(d) not distort competition between air carriers; and

(e) not be more restrictive than necessary in order to relieve the problems.

37. Form of application and licence.

An application for a licence under these Regulations for any category of air service or aircraft as set out in the First and Third Schedules respectively may be made separately or in a consolidated form and if the Authority considers it convenient, it may, in a similar manner issue a licence separately for each category of air service or aircraft or, in a consolidated form:

Provided that where—

(a) an application is made in a consolidated form for the categories of air services and aircraft, the provisions of these Regulations relating to payment of fees shall apply to each separate category of air service as if they were separate applications; and

(b) a licence is issued in a consolidated form, the provisions of these Regulations relating to the payment of fees and to the imposition and variation of terms or conditions shall apply in respect of each separate category of aircraft or air service as if it were a separate licence.

38. Licence not transferrable.

A licence is not transferrable or assignable.

39. Confidentiality of information disclosed.

Notwithstanding the provisions of these Regulations, the Authority may require an applicant to disclose information as to his or her financial resources, and such information shall be treated as confidential.

40. Provisions as to conveyance of mails.

(1) The holder of a licence shall perform all such reasonable services as the Communications Authority of Kenya may from time to time require in regard to the conveyance of mails (and of any persons who may be in charge thereof) upon air services operated under the licence.

(2) The remuneration for any services performed in pursuance of this regulation shall be such as may from time to time be determined by agreement between the Communications Authority of Kenya and the licence holder.

41. Filing of monthly returns.

(1) The holder of a licence or operating authorization shall make a monthly return in writing to the Authority giving, in respect of the month to which the return relates, the particulars set out in the Eighth Schedule with regard to all air services authorized by the licence or operating authorization.

(2) The returns to be made in accordance with subregulation (1) shall be made on a form prescribed by the Authority, and shall be sent to the Authority not later than two months after the expiration of the month to which the return relates.

42. Production of licence.

The holder of a licence shall produce such licence for inspection upon a request from the Authority or any person authorized by the Authority.

43. Surrender and cancellation of licence.

(1) In the event of the holder of a licence ceasing to operate the air service authorized thereby he or she shall forthwith notify the Authority and return the licence for cancellation:

Provided that where, owing to death, incapacity, bankruptcy, sequestration or liquidation of the holder of a licence or to the appointment of a receiver or manager or trustee in relation to the business of the holder, he or she ceases to operate the air service authorized by the licence, then if the business of the holder is being carried on by some other person, that person shall forthwith notify the Authority and unless an application has been made within fourteen days for a new licence, shall return the licence for cancellation.

(2) A licence may at any time be surrendered by the holder to the Authority for cancellation.

(3) If a licence ceases to have effect, otherwise than by the effluxion of time, or is suspended or revoked, the holder thereof shall, within fourteen days after a notice to that effect has been delivered to him or her personally or sent to him or her by registered mail at the address shown in its application or last notified in accordance with regulation 45, send or deliver the licence to the Authority for retention during the time of suspension or cancellation, and the Authority shall on the removal of a suspension return the licence to the holder.

44. Replacement of a licence.

If a licence has been lost, destroyed or defaced the holder thereof shall forthwith notify the Authority which shall, if satisfied that licence has been lost, destroyed or defaced, issue a duplicate, so marked, and the duplicate so issued shall have the same effect as the original:

Provided that, in the case of a licence that has been defaced, the duplicate shall be issued only after surrender of the original to the Authority.

45. Change of name or address.

An air carrier shall, if it changes its address or company name during currency of its licence, notify such change to the Authority within fourteen days of such change and surrender the licence to the Authority for amendment.

46. Records.

(1) The Authority shall keep a record of all decisions on applications for licence and such record shall contain particulars as set out below to enable the application to be identified—

(a) the date on which the licence is due to commence;

(b) the date on which it is due to expire;

(c) any terms and conditions attached to a granted licence;

(d) in the case of a scheduled air service, terminal and intermediate landing places on the specified route;

(e) in the case of an air service other than a scheduled one, a detailed description of the type of service and the geographical area of operation; and

(f) in the case of a rejection or deferment, reasons as the case may be.

47. Fees.

(1) There shall be paid in respect of an application for, and grant of an authorization or a licence, the applicable fee in respect of each type of air service, category of aircraft and duration of authorization or licence, as may be prescribed by the Authority from time to time.

(2) Fee paid under these Regulations shall be non-refundable.

48. Air ticket.

(1) The holder of a licence shall issue or cause to be issued an air ticket to each passenger to be transported.

(2) An air ticket shall contain the following particulars—

(a) name or trade name of the licensee issuing the ticket;

(b) name of the passenger to be transported;

(c) date of issue and period of validity of the ticket;

(d) places of departure and destination;

(e) place of issue of the ticket;

(f) serial number of the ticket;

(g) name, trade name or the designated International Air Transport Association code of the licensee transporting the passenger; and

(h) cost of the ticket including disclosure of any tax and terms and conditions attached,

Provided that where the air ticket is issued by electronic means, such ticket shall contain substantially the same particulars as set out in this subregulation.

(3) An air ticket issued under subregulation (1) shall contain an endorsement to the effect that the licensee referred to in subregulation (2)(g) is duly licensed and complies with the requirements of the Act and these Regulations.

(4) A licensee shall keep copies of all air tickets issued under subregulation (1) for a period of not less than twelve months from the date on which the flight to which the ticket relates took place.

(5) subject to the provisions of sub regulation (4), a licensee shall upon request by the Authority, furnish it with copies of any air tickets, or any information thereon, for such period as may be determined.

49. Airway bill.

(1) The holder of a licence shall issue or cause to be issued an air waybill in respect of each consignment of cargo to be transported.

(2) An airway bill shall contain the following particulars—

(a) name or trade name of the licensee issuing the airway bill;

(b) contents of such consignment of cargo;

(c) mass and volume of such consignment of cargo;

(d) places of origin and destination;

(e) serial number of the air waybill;

(f) name, trade name or designated International Air Transport Association code of the licensee transporting the cargo; and,

(g) cargo tariff and disclosure of any tax and terms and conditions attached applicable condition:

Provided that where the airway bill is issued by electronic means, such airway bill shall contain substantially the same particulars as set out in this sub regulation.

(3) An airway bill issued under subregulation (1) shall contain an endorsement to the effect that the licensee referred to in subregulation (2)(f) is duly licensed and complies with the requirements of the Act and these Regulations.

(4) A licensee shall keep copies of all airway bills issued under subregulation (1) for a period not less than twelve (12) months from the date on which the flight to which the airway bill relates took place.

(5) subject to the provisions of sub regulation (4), a licensee shall upon request by the Authority, furnish it with copies of any airway bills, or any information thereon, for such period as may be determined.

50. Passenger manifest.

(1) The holder of a licence shall compile or cause to be compiled before each flight a passenger manifest in respect of the flight and such a manifest shall be kept for a period not less than 12 months from the date on which the flight to which it relates took place.

(2) A passenger manifest compiled in terms of sub regulation (1), shall at least contain the name and nationality of each passenger.

(3) Subject to the provisions of sub regulation (1), a licensee shall upon request by the Authority, furnish it with copies of any passenger manifests or any information thereon, for such period as may be determined.

51. Insurance.

(1) A licensee shall be insured at all times to a minimum amount equivalent to one hundred thousand special drawing rights per seat in respect of passengers and their baggage and seventeen special drawing rights per kilogram in respect of cargo for the total number of seats or cargo weight authorized by the certificate of airworthiness applicable to aircraft to be operated.

(2) In respect of third party liability minimum insurance coverage will comply with the requirements of the State.

(3) The minimum amounts of coverage required for passengers, their baggage, cargo and third party liability may be insured for a combined single limit of insurance per any one occurrence.

PART V – FRANCHISING

52. Franchise Approval.

(1) No airline registered in Kenya shall operate as a franchisee or enter into a franchise agreement except under and in accordance with the terms and conditions of a franchise approval granted by the Authority.

(2) No foreign registered airline shall operate as a franchisee within Kenya except under and in accordance with the terms and conditions of a franchise approval granted by the Authority.

(3) The Authority shall develop procedures for franchise approval.

53. Conditions for franchise approval.

A franchise approval shall be granted on condition that the prospective franchisee and franchisor are holders of—

(a) an air service license, in the case of an airline registered in Kenya; and

(b) an operating authorization, in the case of a foreign registered airline, issued in accordance with these Regulations.

54. Application for franchise approval.

(1) Every application for a franchise approval shall be made to the Authority and shall contain the particulars set out in the Ninth Schedule.

(2) The Authority may grant franchise approval in accordance with these Regulations and impose such conditions as it deems appropriate.

(3) In exercising its discretion under subregulation (2), the Authority shall have regard to all relevant factors including—

(a) the need to protect public interest; and

(b) prevention of unfair competition.

55. Franchise information disclosure.

(1) A franchisee shall disclose franchise information to the Authority in accordance with the Ninth Schedule.

(2) The disclosure document shall be updated within sixty (60) days after the end of the franchisor's fiscal year.

(3) Where there has been a material change in the information required to be disclosed under the Ninth Schedule, the disclosure document shall be updated within (30) days of the occurrence of that material change.

(4) If the disclosure document contains a misrepresentation of a material fact or if there is an omission of a material fact required to be disclosed under the Ninth Schedule the Authority without prejudice to any other action may revoke or suspend the franchise license.

(5) A franchisee shall ensure that every marketing, promotional or advertisement of its business shall contain a clear, unequivocal and prominent disclosure to the public that the franchisee is the actual operator.

(6) A franchisee shall cause to be disclosed to the public at the time of booking, ticketing, check-in and in the aircraft the identity of the actual operator of the flight.

56. Conditions of change.

Whenever the conditions of carriage of the franchisor contain more favorable terms to a passenger or shipper than those of the franchisee then those terms of the franchisor (including liability limitation) shall apply to operations by the franchisee.

57. Approval not to confer rights.

The franchise approval shall not be deemed to confer the traffic rights of a franchisee upon the franchisor or vice versa.

58. Revocation, variation or suspension of a franchise approval

The Authority may during the currency of a franchise approval either on its own volition or on application by a franchisee or a franchisor vary, suspend or revoke any of the terms or conditions of the approval or the approval in its entirety.

PART VI – APPEALS FROM DECISIONS OF THE AUTHORITY

59. Right to appeal.

(1) An applicant aggrieved by a decision of the Authority in respect of an application for licence shall have a right of appeal to the Appeals Tribunal.

(2) A person who has made representations only in respect to an application shall not be considered to be a person aggrieved in terms of subregulation (1).

(3) This regulation shall not apply to operating authorisations made under regulation 13 of these Regulations.

PART VII – COMPETITION BETWEEN UNDERTAKINGS

60. Prohibited agreements, decisions and practices.

(1) Any person engaged in the provision of air service shall not be a party to any—

(a) agreements between undertakings;

(b) decisions of associations of such undertakings; or

(c) concerted practices of such undertakings, which may affect provision of air service by having as their object or effect the prevention, restriction, lessening or distortion of competition in the air transport market in Kenya and any such agreements, decisions or practices are prohibited.

(2) Without prejudice to the generality of subregulation (1) agreements, decisions and practices prohibited shall include those that—

(a) directly or indirectly fix air fares, rates and any conditions attached thereto;

(b) limit or controls aircraft capacity, flight frequencies, technical development or investment;

(c) limit sharing of air transport market or sources of supply;

(d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;

(e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts; or

(f) otherwise prevent, distort or restrict competition.

(3) Notwithstanding the provision of subregulation (1) and (2), agreements decisions or practices may be exempted if their objective and effect is for improvement of provision of air services, promotion of technical development, investment for economic progress and allow consumers a fair share of the resulting benefit provided that they—

(a) do not lead to attainment of the objectives referred to in subregulation (2);

(b) afford such undertakings the possibility of promoting fair trading practices in provision of air service.

(4) Agreements, decisions or practices which may be exempted in sub regulation (3) shall include joint planning, co-ordination of capacity, consultation on tariffs for scheduled air services and slot allocation.

(5) Notwithstanding the provisions of sub regulation (3), any undertaking(s) shall apply to the Authority for exemption.

(6) Any person who contravenes this regulation commits an offence and shall be liable to penalties prescribed by the Government Agency responsible for regulating competition in the country.

61. Abuse of dominant position.

Any conduct which amounts to the abuse of a dominant position by affecting competition in the provision of air services in air transport market in Kenya is prohibited.

(2) Without prejudice to the generality of subregulation (1), abuse of dominant position may include—

(a) directly or indirectly imposing unfair air rates, air fares or any conditions attached thereto;

(b) limiting aircraft capacity, flight frequencies, technical development or investment;

(c) applying dissimilar conditions to equivalent transaction with other trading parties, thereby placing them at a competitive disadvantage;

(d) limiting sharing of air transport market or sources of supply through predatory pricing or other practices; or

(e) making the conclusion of contract subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

(3) Any person who contravenes this regulation commits an offence and shall be liable to penalties prescribed by the Government Agency responsible for regulating competition in the country.

62. State aid.

(1) Any aid granted by the State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings engaged in the provision of air service shall, in so far as it affects trade between undertakings in air services, be incompatible with fair competition.

(2) Notwithstanding the provision of subregulation (1), the following shall be compatible with fair competition—

(a) aid having a social character, granted to individual consumers, provided that such aid is granted without discriminating similarly related consumers;

(b) aid to make good the damage caused by natural disasters or exceptional occurrences;

(c) aid granted to the economy of certain areas of Kenya to compensate for the economic disadvantages;

(d) aid to promote the economic development of areas where the standard of living is abnormally low or where there is a serious underemployment;

(e) aid to promote the execution of an important national project or to remedy a serious disturbance in the economy;

(f) aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect air services conditions to an extent contrary to public interest; or

(g) aid to promote culture and heritage conservation where such aid does not affect air service conditions and competition to an extent that is contrary to public interest.

63. Tariffs.

Undertakings licensed to provide air service shall freely fix tariffs and such a tariffs shall be reasonable taking into consideration operational cost, service characteristics, commission rates and reasonable profits.

64. Monopoly not to affect public interest.

Undertakings entrusted with operation of services of general economic interest or having the character of revenue producing monopoly shall be subject to provisions of fair trading practices in so far as the application of such provisions do not obstruct the performance, in law and in fact, for the particular tasks assigned to them and the development of trade in air services must not be affected to such an extent as would be contrary to the public interest.

65. Review of decisions and confidentiality.

(1) The Authority shall, on its own volition or upon reference by a person whose rights or interests have been affected, review agreements, decisions or practices that may affect competition in the provision of air service and may examine books, other business records, take copies from extracts, ask for oral explanations and enter any premises, land and aircraft used by concerned parties.

(2) If after a review, referred to in subregulation (1), the Authority establishes that there has been an infringement, it shall take appropriate measures which may include—

(a) issuing of restraining order;

(b) imposition of a fine; or

(c) suspension or revocation of licence.

(3) A person whose rights or interest have been affected by the decision arising from the review referred to in subregulation (1), may appeal to the Authority for review of the decision within twenty eight days.

(4) The Authority, its officers or servants shall not disclose information received pursuant to this regulation.

66. Co-operation and co-ordination on competition.

The Authority shall co-operate and co-ordinate matters under this part with the Government Agency responsible for regulating competition in the country.

PART IX – OFFENCES AND PENALTIES

67. Penalties.

Any person who contravenes the provisions of Regulations 3,10,13,14,16, 23 (1), 24, 50 or 51 commits an offence and in the case of an aircraft being used for—

(a) international air service shall, on conviction, be liable, for a first offence, to a fine not exceeding two million shillings or to imprisonment for a term not exceeding two years or both, and for a second or subsequent offence to a fine not exceeding three million shillings or to imprisonment for a term not exceeding three years or both; and,

(b) internal air service shall, on conviction, be liable, for a first offence to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year or both; and for a second or subsequent offence to a fine not exceeding two million shillings or to imprisonment for a term not exceeding two years or both.

68. Penalty for false information, etc.

Any person who—

(a) falsifies, counterfeits, alters, defaces, or mutilates a licence or other approvals or is in possession of a licence or other approvals which have been thus falsified, counterfeited, altered, defaced or mutilated;

(b) uses a licence or other approvals of which he or she is not the holder;

(c) permits a licence or other approvals of which he or she is the holder, to be used by any other person; or

(d) either on his own or through an agent knowingly gives false or misleading information on any matter which is material to an application, investigation, appeal to Authority or to any other matter,

commits an offence under these Regulations and shall on conviction, be liable, for a first offence to a fine not exceeding two million shillings or to imprisonment for a term not exceeding two years or both and for a second or subsequent offence to a fine not exceeding three million shillings or to imprisonment for a term not exceeding three years, or to both.

69. Presumption in certain cases.

In any proceeding under these Regulations—

(a) an aircraft used for provision of an air service in contravention of these Regulations shall, until the contrary is proved, be presumed to have been used or caused to be used by an undertaking in whose name the aircraft is registered;

(b) the conveyance in an aircraft of any person in addition to the normal operating crew or of any goods shall, until the contrary is proved, be presumed to be conveyance for hire or reward;

(c) a licence issued under these Regulations, or a copy of any such document certified in writing as such by the Director-General shall be accepted as *prima facie* evidence of the facts stated therein; or

(d) a document signed by the Director-General, stating that a licence has been granted by the Authority to a specified person, shall be accepted as *prima facie* evidence of the facts stated therein.

70. General penalty.

(1) Any person who contravenes or fails to comply with any of the provisions of these Regulations or of any terms or conditions of a licence or approval granted under the provisions of these Regulations for which no penalty has been provided, commits an offence and shall, on conviction, be liable for a first offence, to a fine not exceeding five hundred thousand shillings or to imprisonment for a term not exceeding six months, or to both and in the case of a second or subsequent offence to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year, or to both.

(2) In the case of the holder of a licence or any approval granted under these Regulations, any penalty imposed under the provisions of this regulation shall be without

prejudice to powers of revocation or suspension of the licence by the Authority under Regulations 13(4), 23(4), 31(1) or 58.

(3) The Authority, or any authorised person may, without limiting the generality of this regulation, issue an infringement notice set out in the Act.

(4) An infringement notice may require that the operations of a particular operator be halted until the breach has been rectified.

PART X – MISCELLANEOUS

71. Delegation of powers by Director-General.

(1) The Director-General may, subject to such terms and condition, delegate in writing to an authorized officer any powers or duties conferred upon him or her by the Act or under these Regulations.

(2) Delegation given under sub regulation (1) shall not preclude the Director-General from exercising any powers or performing any duties exercisable by him or her under the Act.

72. Appointment of air transport officers.

(1) The Director-General may appoint air transport officers for the purpose of securing compliance with the provisions of these Regulations and any terms or conditions attached to a licence or any authorization granted thereof.

(2) An air transport officer may at any time and on production if required of his or her authority—

(a) enter and inspect any premises of an airline on which he has reasonable cause to believe that the business of the airline is being carried out in contravention of these Regulations;

(b) examine and take copies of any books, accounts and documents found in those premises relating to or appearing to relate to the business of an airline;

(c) seize any books, accounts or documents found in those premises relating to or appearing to relate to the business of an airline;

(d) question any person who appears to him or her to be engaged in, or carrying on, or employed in the business of an airline in those premises on any matter concerning the application of or compliance with these Regulations or any terms or conditions attached to a licence or any other authorization granted thereof.;

(e) require, by notice in writing, any person who appears to him to be engaged in or carrying on the business of an airline to appear before him at such time and place as he may specify in the notice and provide information or any other document as may be required by the Authority;

(f) board, detain or recall an aircraft already in flight and search such aircraft if he has reasonable grounds to suspect that the aircraft is being used in contravention of these Regulations or that it contains any matter which may be used as evidence in respect of an offence under these Regulations.

73. Procedure on detention or recall of Aircraft.

(1) Where an air transport officer detains or recalls an aircraft already in flight he or she shall, unless he or she is of the opinion that due to the nature of the offence, the aircraft is likely to be allowed to proceed on its flight within a period not exceeding three hours, immediately report such detention or recall to the Director-General:

Provided that under no circumstances shall an air transport officer detain an aircraft for more than three hours from the time of its intended departure or from the time of landing after being recalled unless such longer detention has been authorized by the Director-General under this regulation.

(2) On receipt of a report under this regulation the Director-General may, pending further investigation, order the detained aircraft to proceed on its flight if he or she is of the opinion that the report does not constitute a contravention of these Regulations.

(3) An air transport officer after investigation and upon establishing that there was contravention of these regulations shall, issue an infringement notice stating the particulars of the violation, the period within which to comply as the case may be and the attendant penalty for the stated violation.

(4) The Director-General may, in writing, delegate to any person any of his or her powers under sub regulation (1) and (2).

PART XI – REVOCATION, SAVINGS AND TRANSITIONAL PROVISIONS

74. Revocation of LN. No. 114/2009.

(1) The Civil Aviation (Licensing of Air Services) Regulations, 2009 are revoked.

(2) Notwithstanding the provisions of subregulation (1), any licence or approval in force at the date of entry into force of these Regulations shall remain valid.

FIRST SCHEDULE

[rr. 4, 5, 11, 12, 29 &3 7]

CATEGORIES OF AIR SERVICE

Part A - Scheduled Air Service

a) Transport of passengers or cargo or mail or a combination thereof;

b) Transport of cargo or mail or both.

Domestic

a) Transport of passengers, cargo or mail or a combination thereof;

b) Transport of cargo or mail or both.

PART B – Non-Scheduled Air Services (Return flights)

International

a) Transport of passengers or cargo or mail or combination thereof;

b) Transport of cargo or mail or both;

c) Transport of passengers of an inclusive tour nature (inbound and outbound) with a limit of four flights in a programme;

d) Emergency medical service;

e) Self-fly hire.

Domestic

a) Transport of passengers, cargo and mail or combination thereof;

b) Transport of cargo or mail or both;

c) Transport of passengers of an inclusive tour nature;

d) Emergency medical service;

e) Self-fly hire.

PART C – Aerial Work Services (Domestic/International)

a) acrobatic operations;

b) advertising operations;

c) aerial patrol/observation/surveys;

d) aerial photography/sightseeing;

e) agricultural spraying/seeding/dusting;

f) cloud spraying;

g) fire spotting/control/fighting;

h) game and livestock selection/culling/counting/herding; and

i) parachute jumping/tag operations.

PART D – Flying instruction

PART E – Recreational Flying

a) Micro lights

b) Balloons

SECOND SCHEDULE

[rr. 4, 11]

PARTICULARS TO BE FURNISHED IN CONNECTION WITH AN APPLICATION FOR A LICENCE

1. *Scheduled Air Services*

a) Name and address of applicant;

b) Names of places between which the air service is to be operated;

c) Proposed base of operation for the service;

d) Names of the regular stage stopping places for the purpose of taking on or setting down passengers, cargo or mail;

e) Times and frequencies of air service;

f) Number and type(s) of aircraft to be used;

g) Type of load to be carried;

h) Maximum and minimum fares to be charged to passengers, cargo or mail in respect of the total journey or any portion of the journey thereof;

i) Date of commencement of air service;

j) Period for which the licence is required;

k) If already providing air service—

(i) period for which the air service has been operated; and

(ii) details of monthly returns for the period of operation or the last twelve months, whichever is the less.

l) List of other air services operated by the Applicant at the time of application;

m) Particulars of any working arrangements the Applicant may have with any other company providing air service;

n) Particulars of any financial interest which the Applicant has in any other undertaking providing passenger, cargo or mail transport facilities or controlling the business of any person who provides such facilities;

o) The nature of the person making the application, whether individual, partnership firm or corporate body, public or private, with or without limited liability, and if a company, public or private—

(i) the nominal and issued capital;

(ii) the names and nationalities of the directors;

(iii) the names and Country of incorporation of any other companies holding shares in the applicant's business and the names and nationalities of the directors;

(iv) the names and Country of incorporation of any other subsidiary companies of the Applicant and the names and nationalities of the directors.

2. *Non-scheduled Air Services and Aerial Work*

(a) Name and address of applicant;

(b) Number and type(s) of aircraft to be used;

(c) Proposed base of operation for the service;

(d) Type of services to be carried out and the areas in which it is proposed to operate each type of service;

(e) Maximum charges to be made for each type of service;

(f) Date of commencement of air service;

(g) Period for which licence is required;

(h) If already providing air service—

(i) the period for which the air service has been operated; and

(ii) details of monthly returns for the period of operation or the last 12 months whichever is the less;

(i) List of other air services operated by the Applicant at the time of application;

(j) Particulars of any working arrangements the Applicant may have with other companies providing air services;

(k) Particulars of any financial interest which the applicant has in any other undertaking providing air service, facilities or controlling the business of any person who provides such facilities;

(l) The nature of the person making the application, whether individual, partnership firm or corporate body, public or private, with or without limited liability, and if a company, public or private—

(i) the nominal and issued capital;

(ii) the names and nationalities of the directors;

(iii) the names and Country of incorporation of any other companies holding shares in the applicant's business and the names and nationalities of the directors;

(iv) the names and Country of incorporation of any other subsidiary companies of the applicant and the names and nationalities of the directors.

3. *Flying Instructions*

(a) Name and address of the Applicant;

(b) Number and type(s) of aircraft to be used;

(c) Proposed base of operation for the service;

(d) Type of instructions to be carried out and place where it is proposed to be operated;

(e) Maximum charges to be made for each type of instruction;

(f) Date of commencement of air service;

(g) Period for which the licence is required;

(h) If already providing air service—

(i) period for which the air service has been operated;

(ii) details of monthly returns for period of operation or the last twelve months, whichever is the less;

(i) List of other air services operated by the applicant at the time of application;

(j) Particulars of any working arrangements the Applicant may have with other companies providing air services;

(k) Particulars of any financial interest which the Applicant has in any other undertaking providing instructional facilities or controlling the business of any person who provides such facilities;

(l) The nature of the person making the application, whether an individual, partnership firm or corporate body, public or private, with or without limited liability, and if a company, public or private—

(i) the nominal and issued capital;

(ii) the names and nationalities of the directors;

(iii) the names and Country of incorporation of any other companies holding shares in the applicant's business and names and nationalities of the directors;

(iv) the names and Country of incorporation of any subsidiary companies of the applicant and names and nationalities of the directors.

4. *Documents to be submitted with Application*

PART A – New Application for Licence – Local

a) Certified true copy of certificate of incorporation;

b) Certified true copy of memorandum and articles of association or any other founding document of the Applicant;

c) A copy or copies of the applicant's aircraft certificate(s) of registration intended for the operation or an initialed or duly executed dry lease agreement;

d) Certified true copy of the insurance policy or insurance arrangements in place;

e) A business plan for a period of two years;

f) Certified true copy of national identity card or passport and

two passport size photographs in respect of each of the directors of the company;

g) Any other document in support of the application for the air service.

PART B – New Application for Licence-Foreign

a) A copy of Air Operator Certificate issued by the State of the applicant;

b) Audited financial accounts for twelve months preceding the application;

c) Certified true copy of the insurance policy in place;

d) A copy or copies of certificate(s) of registration of aircraft;

e) For inclusive tour charter applicants, also a copy of the charter agreement;

f) Any other document in support of the application for the air service.

PART C – Renewal or Variation Application

a) Audited financial accounts for twelve months preceding the application;

b) Monthly returns specified in the Fifth Schedule;

c) Certified true copy of the insurance policy in place;

d) A copy of Air Operator Certificate issued by the State of the applicant;

e) A copy or copies of certificate(s) of registration of aircraft;

f) For inclusive tour charter applicants, also a copy of the charter agreement.

THIRD SCHEDULE [rr. 5, 12 & 37]

CATEGORIES OF AIRCRAFT

PART A – Aircraft (fixed wing)

Category	Maximum Certificated weight
1 (LIGHT)	Less than -5700kg – (including microlights)
2 (MEDIUM LIGHT)	5701 - 13000kg
3 (MEDIUM)	13001 - 20000kg
4 (HEAVY)	20,001kg and above

Part B – Helicopter Category 5

Part C - Balloons Category 6

FOURTH SCHEDULE [r. 19]

INFORMATION FOR ASSESSMENT OF FINANCIAL FITNESS OF NEW APPLICANT FOR AIR SERVICE LICENCE OR EXISTING AIR CARRIERS

PART A – Information to be provided by a New Applicant

a) The most recent internal management accounts and, if available, audited accounts for the previous financial year;

b) A two year projected balance sheet, including profit and loss account;

c) Route viability analysis including detailed projected expenditure, traffic and revenue forecasts based on such operating costs items such as fuel, airport charges, handling charges, aircraft lease, personnel, aircraft maintenance, catering depreciation, exchange rate fluctuations, insurance, etc.;

d) Details of the start-up costs expected to be incurred in the period from submission of application to commencement of operations and an explanation of how it is proposed to finance these costs;

e) Documentary evidence of existing and projected sources of funds for the proposed operations, as appropriate;

f) Details of shareholders, including nationality and type of shares held, and the Memorandum and Articles of Association;

g) Projected cash-flow statements and liquidity plans for the first two years of operation;

h) Details of the financing of aircraft purchase, leasing including, in the case of leasing, the terms and conditions of contract.

PART B – Information to be provided by existing licence holders

a) If necessary, the most recent internal management accounts and audited accounts for the previous financial year;

b) Precise details of all proposed changes such as change of type of service, proposed takeover or merger, modifications in share capital or changes in shareholders;

c) A balance sheet, with a profit and loss account, for the preceding financial year, including all proposed changes in structure or activities with a significant bearing on finances;

d) Past and projected expenditure and income figures on such items as fuel, fares and rates, salaries, maintenance, depreciation, exchange rate fluctuations, airport charges and insurance;

e) Cash-flow statements and liquidity plans for the following year, including all proposed changes in structure or activities with a significant bearing on finances;

f) Details of financing of aircraft purchase or leasing including, in the case of leasing, the terms and conditions of contract.

FIFTH SCHEDULE [r. 19]

A FORMAT OF A BUSINESS PLAN

A business plan shall contain the following—

(a) The company's Vision and Mission;

(b) Market analysis and strategy;

(c) Company's ownership structure and personnel plan;

(d) Aircraft fleet acquisition plan;

(e) Financial plan including source(s) of funding with documentary evidence as appropriate;

(f) the applicant's financial links with any other commercial activities in which the applicant is engaged either directly or indirectly;

(g) balance sheet, break-even analysis, pro-forma income projections (profit and loss statements), cash flow analysis;

(h) proposed fares for passengers or cargo;

(i) A strategy or the manner in which the applicant will maintain safety, regularity and reliability of the service to be operated;

(j) Any other information in support of the Application.

SIXTH SCHEDULE [r. 25(1)]

PARTICULARS OF APPLICANT TO BE PUBLISHED

a) Name and address of applicant;

b) Proposed base of operation for the service;

c) If for scheduled air service—

(i) Places between which the air service is to be operated;

(ii) Names of the regular stage stopping places for the purpose of taking on or setting down passengers, cargo or mail;

(iii) Time and frequency of air service;

(iv) Type of load to be carried;

(v) Commencement date of the air service; and,

(vi) Period for which the licence is required;

d) If for non-scheduled air service or aerial work—

(i) types of service to be carried out and the areas in which it is proposed to operate each type of service;

(ii) commencement date of the air service; and,

(iii) period for which licence is required.

e) if for flying instruction—

(i) types of instruction offered and the places where it is proposed to operate;

(ii) commencement date of the air service ; and

(iii) period for which the licence is required.

SEVENTH SCHEDULE [r. 28]

PARTICULARS OF DECISIONS ON APPLICATIONS AND REVOCATION OR SUSPENSION OF LICENCE TO BE PUBLISHED

PART A – PARTICULARS OF DECISIONS ON APPLICATIONS

a) Name and address of applicant;

b) The number and date of the Gazette notice in which the application was published;

c) Such particulars as will enable the application to be identified;

d) An indication whether the licence was granted as applied for, granted with modifications, not granted, deferred or withdrawn.

PART B – PARTICULARS OF REVOCATION OR SUSPENSION OF LICENCE TO BE PUBLISHED

a) Name and address of applicant;

b) Such information as will enable the licence to be identified, and in the case of a scheduled air service, the places and regular stage stopping places to be stated;

c) The date from which revocation or suspension takes effect and, in the case of suspension, the period of suspension;

d) The grounds on which the licence has been revoked or suspended.

EIGHTH SCHEDULE [r. 41]

PARTICULARS TO BE GIVEN BY A HOLDER OF A LICENCE AND OPERATING AUTHORIZATION IN MONTHLY RETURNS (EXCEPT WHERE OTHERWISE SPECIFIED) PASSENGERS SHOULD BE STATED IN NUMBERS, DISTANCES IN KILOMETRES AND CARGO AND MAIL IN KILOGRAMS

PART A – Scheduled Air Services

(a) A list of the service numbers for all flights operated giving the names of the places between which services are operated, the names of the regular staging points on the route, the types of aircraft used and the number of flights operated by each type(s);

(b) A copy of the current flight timetable;

(c) A copy of the current tariffs;

(d) For services operated under a licence for international scheduled air service or an operating authorization for each service number—

(i) Total number of passengers, cargo and mail, terminating and in transit, arriving in Kenya by point of discharge within Kenya (showing in addition the point of discharge of passengers outside Kenya for each point of uplift);

(ii) Total number of passengers, cargo and mail, originating and in transit, departing from Kenya by point of uplift within Kenya (showing in addition the point of discharge of passengers outside Kenya for each point of uplift);

(iii) In transit passengers at each staging point in Kenya on international services not included above, i.e. those whose airports of uplift and discharge are both within Kenya;

(iv) Total number of available passenger seats offered and the number of passengers carried , on flights arriving in or departing from Kenya;

(v) Total capacity of cargo space offered and the weight of cargo carried on flights arriving in or departing from Kenya.

(vi) Total number of passengers, cargo and mail carried only within Kenya by points of uplift and discharge separately for traffic between each airport in each direction.

(e) For services operated under a licence for international scheduled air service and on sectors not wholly within Kenya—

(i) For each staging point outside Kenya, the passengers, cargo and mail in transit;

(ii) For each sector, the total number of available passenger seats offered, and the number of passengers carried; and the total capacity of cargo space offered, and the weight of cargo carried.

(f) For services operated under the local licence the following shall be submitted including the service number—

(i) the total number of available passenger seats offered and the number of passengers carried;

(ii) the total capacity of cargo space offered and the weight of cargo carried.

(g) The Passengers, cargo and mail carried in each direction, between all combinations of staging points.

(h) Point to point distances flown as the case may be.

PART B – Non-Scheduled Air Services and Aerial Works

(a) Number and type(s) of aircraft operated during the month, actual dates of any changes made to be given;

(b) Average daily serviceability of aircraft complete;

(c) Total number of kilometres flown on each class of work;

(d) Total number of flights made on each class of work;

(e) Total number of available passenger seats offered and the number of passengers carried;

(f) Total capacity of Cargo space offered and the weight of cargo carried;

(g) Number of flights commenced but not completed, giving cause;

(h) Total number of requests for air service made which were not accepted given reasons.

(i) Number of pilots, navigators, radio operators, flight engineers, stewards, photographers and any other personnel employed on flying duties, and their salaries by grade.

(j) Copy of current schedule of charges for air services.

PART C – Flying Instructions

(a) The number and type(s) of aircraft operated during the month, the actual dates of any changes to be given;

(b) The average daily serviceability of aircraft complete;

(c) The total number of hours flown—

(i) dual instruction;

(ii) Solo instruction;

(iii) total number of hours of non-flying instruction, per type of instruction.

(d) The total number of flights made; (i) dual instruction; and, (ii) Solo;

(e) The number of instructors employed and their salaries by grade;

(f) A copy of the current schedule for instructional charges;

(g) The total number of students under instruction, according to the class of pilot licence for which instruction is being given;

(h) The total number of pilot licences, per class, gained during the month;

(i) The total number of pilot licences, per class, held by students or members of the club; and,

(j) The total number of students or members.

NINTH SCHEDULE [rr. 54 & 55]

INFORMATION TO BE DISCLOSED FOR FRANCHISES

The franchisor and franchisee shall provide the following information in the disclosure document.

(a) legal name, address and the principal place of business of the franchisor and the franchisee:

(b) any name other than the legal name under which the Franchisor carries on or intends to carry on business;

(c) a description of airline experience of the franchisor including the length of time during which the franchisor has offered franchises;

(d) details of shareholding, directorship and senior management of Franchisor and Franchisee;

(e) the names, business addresses, positions held, business experience and qualifications of any person who has senior management responsibilities for the franchisor's business operations in relation to the franchise;

(f) relevant details relating to any criminal convictions or any finding of liability in a civil action involving franchises or other businesses relating to fraud, misrepresentation, or similar acts or practices of—

(i) the franchisor;

(ii) any affiliate of the franchisor who is engaged in franchising; and

(iii) any of the persons indicated in (d);

(g) relevant details concerning any bankruptcy, insolvency or comparable proceeding involving the franchisor for the previous five years;

(h) the total number of franchises in the Franchisor network;

(i) the names and business addresses of all the franchisees;

(j) information about the franchisees that have ceased to be franchisees of the franchisor during the five preceding fiscal years, with an indication of the reasons for which the franchisees have ceased to be franchisees of the franchisor. Disclosure of the following categories would fulfil the disclosure requirement: voluntarily terminated or not renewed; reacquired by purchase by the franchisor; otherwise reacquired by the franchisor; refused renewal by the franchisor; terminated by the franchisor;

(k) the following information regarding the franchisor's intellectual property relevant for the franchise, in particular trademarks, service marks, logotypes and designator codes—

(i) the registration or the application for registration, if any; and

(ii) litigation or other legal proceedings, if any, which could have a material effect on the franchisee's legal right, exclusive or non-exclusive, to use the intellectual property under the franchise agreement in the State in which the franchised business is to be operated;

(l) financial matters, including—

(i) financing offered or arranged by the franchisor, if any;

(ii) audited or otherwise independently verified financial Statements of the franchisor, including balance sheets and statements of profit and loss, for the previous three years and if the most recent audited financial statements are as of a date more than 180 days before the date of delivery of the disclosure document, then unaudited financial statements as of a date within 90 days of the date of delivery of the disclosure document;

(m) a description of the franchise to be operated by the franchises;

(n) the term and conditions of renewal of the franchise;

(o) a description of the initial and on-going training Programme;

(p) the nature and extent of exclusive rights granted, if any, including rights relating to territory or customers;

(q) the conditions under which the franchise agreement may be terminated by the franchisor or franchisee and the effects of such termination;

(r) the limitations imposed on the franchisee, if any, in relation to territory and/or to customers;

(s) in-term and post-term non-compete covenants;

(t) any reservation by the franchisor of the right—

(i) to use, or to license the use of, the trademarks covered by the franchise agreement;

(ii) to sell or distribute the goods or services authorized for sale by the franchisee directly or indirectly through the same or any other channel of distribution, whether under the trademarks covered by the agreement or any other trademark;

(u) restrictions or conditions imposed on the franchisee in relation to services that the franchisee may offer;

(v) Copies of Air Service Licence, Air Operators certificate issued to Franchisee and Franchisor.

(w) Certified copies of the current conditions of carriage for passenger baggage and mail of the prospective Franchisor and the prospective Franchisee;

(x) Certified copies of the current conditions of carriage for cargo of the prospective Franchisee and the prospective Franchisee and the prospective Franchisor;

(y) Description of the safety record of the Franchisor for the past ten years;

(z) Details of the financing of aircraft purchase and leasing of Franchisee;

(aa) A draft of the proposed Franchise Agreement (excluding financial clauses); and

(bb) Any other information, date, certification or document the authority may request.

THE CIVIL AVIATION (UNMANNED AIRCRAFT SYSTEMS) REGULATIONS, 2020

ARRANGEMENT OF SECTIONS

THE CIVIL AVIATION (UNMANNED AIRCRAFT SYSTEMS) REGULATIONS, 2020

[Legal Notice 42 of 2020]

PART I – PRELIMINARY

1. Citation

These Regulations may be cited as the Civil Aviation (Unmanned Aircraft Systems) Regulations, 2020.

2. Interpretation

In these Regulations, unless the context otherwise requires—

"aircraft" means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface;

"accident" means an occurrence associated with the operation of Unmanned Aerial System which takes place between the time such Unmanned Aerial System is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which—

(a) a person is fatally or seriously injured as a result of direct contact with any part of the Unmanned Aerial System, including parts which have become detached from the Unmanned Aerial System;

(b) a building, structure or animal comes into direct contract with any part of the Unmanned Aerial System including parts which have become detached from the Unmanned Aerial System; or

(c) the Unmanned Aerial System sustains damage or structural failure which —

(i) adversely affects the structural strength, performance or flight characteristics of the Unmanned Aerial System; and

(ii) would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, wheel, fairings, panels, landing gear doors, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the aerodrome);

"Aerodrome" means a defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

"aeronautical information product" means Aeronautical data and aeronautical information provided either as digital data sets or as a standardized presentation in paper or electronic media. Aeronautical information products include—

(a) Aeronautical Information Publication (AIP), including amendments and Supplements;

(b) Aeronautical Information Circulars (AIC);

(c) Aeronautical charts;

(d) NOTAM; and

(e) Digital data sets.

Note.—Aeronautical information products are intended primarily to satisfy international requirements for the exchange of aeronautical information.
Aeronautical Information Publication (AIP). A publication issued by or with the

authority of a State and containing aeronautical information of a lasting character essential to air navigation.

"Authority" means Kenya Civil Aviation Authority;

"Beyond Visual Line-of-Sight (BVLOS) operation" means an operation in which neither the remote pilot nor RPA observer(s) can maintain direct unaided visual contact with the remotely piloted aircraft;

"body corporate" means any legal entity registered pursuant to statutory law or established by any law in Kenya;

"controlled airspace" means an airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification;

"Command and Control (C2) link" means the data link between the remote piloted aircraft and the remote pilot station for the purposes of managing the flight;

"Contracting State" means any State which is party to the Chicago Convention;

"detect and avoid" means the capability to see, sense or detect conflicting traffic or other hazards and talce the appropriate action;

"Extended Visual Line of Sight (EVLOS) operations" means operating method whereby the remote pilot in command (PIC) relies on one or more remote observers to keep the unmanned aircraft in visual sight at all times, relaying critical flight information via radio and assisting the remote pilot in maintaining safe separation from other aircraft (manned or unmanned);

"image" means a record of thermal, infrared, ultraviolet, visible light, or other electromagnetic waves, sound waves, odors, or other physical phenomena which capture conditions existing on or about real property or an individual located on that property;

"imaging device" means a mechanical, digital, or electronic viewing device, still camera, camcorder, motion picture camera, or any other instrument, equipment, or format capable of recording, storing, or transmitting an image;

"Operator" means a person, organization or enterprise engaged in or offering to engage in an aircraft operation;

Note. - In the context of unmanned aircraft, an aircraft operation includes unmanned aircraft system

"psychoactive substances" means alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, but does not include coffee and tobacco;

"Remote Aircraft Operators Certificate (ROC)" means a certificate authorizing an operator to carry out specified UAS operations;

"Remote Piloted Aircraft (RPA)" means an unmanned aircraft which is piloted from a remote pilot station;

"Remotely Piloted Aircraft System (RPAS)" means a remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design;

"Remote Pilot in Command (RPIC)" means the remote pilot designated by the operator as being in command and charged with the safe conduct of a flight;

"Remote Pilot Station (RPS)" means the component of the remotely piloted aircraft system containing the equipment used to pilot the remotely piloted aircraft;

"resident" means a person holding a residence permit issued under the Kenya Citizenship and Immigration Act, 2011 (No. 12 of 2011);

"RPA observer" means a trained and competent person designated by the operator who, by visual observation of the remote piloted aircraft, assists the remote pilot in the safe conduct of the flight;

"Safety Management System (SMS)" means systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures;

"Secondary Surveillance Radar" means a surveillance radar system which uses transmitters or receivers (interrogators) and transponders;

"segregated airspace" means airspace, of specified dimensions allocated for exclusive use to a specific user(s);

"State aircraft" means aircraft used in military, customs and police services of Kenya or of any other State or any other civil registered aircraft at the time performing a state function and fully converted to offer services to heads of States, military service, customs or police or to any other State;

"Surveillance" means —

(a) with respect to a person, the observation of such person with sufficient visual clarity to be able to obtain information about their identity, habits, conduct, movements, or whereabouts; or

(b) with respect to privately owned real property, the observation of such property's physical improvements with sufficient visual clarity to be able to determine unique identifying features or its occupancy by one or more persons;

"type certificate" means document issued by a Contracting State to define the design of an aircraft type and to certify that this design meets the appropriate airworthiness requirements of that State;

"temporary permit" means a permit authorizing the holder to import into Kenya a UAS registered in another country without first deregistration;

"Unmanned Aircraft System (UAS)" means an aircraft and its associated systems which are operated with no pilot on board;

"unmanned free balloon" means non-power-driven, unmanned, lighter-than-air aircraft in free flight;

"Visual Line-of-Sight (VLOS) operation" means an operation in which the remote pilot or RPA observer maintains direct unaided visual contact with the remotely piloted aircraft; and

"Visual Meteorological Conditions (VMC)" means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

3. Application

(1) These Regulations shall apply to any person who imports, exports, tests, owns, operates, procures, assembles, manufactures, modifies or maintains a UAS registered in Kenya wherever they may be and any other such aircraft operating in Kenya.

(2) Notwithstanding sub regulation (1), these Regulations shall not apply to—

(a) State aircraft; or

(b) unmanned free balloons or airships.

PART II – CATEGORIZATION OF OPERATIONS AND REGISTRATION OF UAS

4. Registration and licensing considerations

In determining whether to register a UAS or issue any authorization, licence or permit under these Regulations, the Authority shall consider the following—

(a) the national security of Kenya and relevant international and regional obligations and commitments of Kenya under treaties and agreements;

(b) risk to public interest and safety;

(c) proposed use of the UAS; and

(d) whether the applicant is subject to administrative investigations by the Authority.

5. Categorization of UAS operations

(1) Unmanned Aircraft System operations shall be categorized based on the risk posed by the type of operations as follows—

(a) Category A Operations (Low risk). This category of operations poses low or minimal risk to the public, property and manned aviation. Operations under this category shall be undertaken in accordance with Part I of the First Schedule;

(b) Category B Operations (medium risk/regulated lower risk) Operations under this category pose medium risk to the public, property and manned aviation. Operations under this category shall be undertaken in accordance with Part II of the First Schedule; and

(c) Category C Operations (High Risk/Manned Aviation Approach). This Category of operations poses high risk to safety of individuals, property and manned aviation. Operations under this category shall be undertaken in accordance with Part III of the First Schedule.

(2) The Authority may from time to time determine additional requirements and specifications for operations in each category.

6. Eligibility to own UAS

(1) A person shall be eligible to own an Unmanned Aircraft System if that person is—

(a) a Kenyan Citizen or resident in Kenya of minimum age of eighteen years;

(b) a body corporate; or

(c) national government or county government.

(2) A person shall not transfer ownership of an Unmanned Aircraft System without the prior approval of the Authority.

(3) A person other than the national government shall not own, register or operate an Unmanned Aircraft System with military specifications.

7. Import and Export of UAS

(1) A person shall not import an Unmanned Aircraft System or a component thereof without a permit issued by the Authority.

(2) Before issuing a permit referred to under sub regulation (1), the Authority shall seek and obtain the necessary security clearance and approval from the Ministry for the time being responsible for matters relating to defense.

(3) A person who intends to export a Kenyan registered Unmanned Aircraft System shall notify the Authority in writing and shall obtain a deregistration certificate.

8. Manufacture, assembly and testing of UAS

Any person intending to manufacture, assemble, modify, test, sell or otherwise deal in Unmanned Aircraft System or a component thereof shall apply for authorization from the Authority.

9. Registration of UAS

(1) An operator or owner of an Unmanned Aircraft System shall register the Unmanned Aircraft System with the Authority and be issued with a certificate of registration.

(2) The Authority shall establish and implement a system for registration and identification of Unmanned Aircraft System in Kenya which shall be displayed on the Unmanned Aircraft System at all times.

10. De-registration of UAS

(1) The Authority may deregister or cancel the registration of Unmanned Aircraft System —

(a) upon application of the owner for purposes of registering the it in another State;

(b) upon its destruction;

(c) upon its permanent withdrawal from use;

(d) in the interest of national security;

(e) where the Authority determines that the owner or operator has violated these Regulations; or

(f) in any other circumstance that the Authority deems fit.

11. Temporary permit

(1) The Authority may, upon application, and in accordance with regulation 13, grant a temporary permit to an applicant for the operation of an Unmanned Aircraft System for a period not exceeding thirty (30) days, which shall be renewable once.

(2) In issuing a temporary permit referred to in sub-regulation (1), the Authority may impose such terms and conditions as it deems fit and shall have regard to—

(a) public interest and national security; and

(b) the need to provide reasonable protection for Kenyan operators.

12. Airworthiness of UAS

(1) An Unmanned Aircraft System owner or operator shall ensure that all its components are in working order and in accordance with the manufacturers' user manual.

(2) The Authority shall require an Unmanned Aircraft System with a type certificate to obtain a Certificate of Airworthiness.

13. Authorization UAS operations

(1) A person shall not operate an Unmanned Aircraft System in Kenya without authorization from the Authority.

(2) Unmanned Aircraft System operations shall be authorized in accordance with the category of operation as set out in regulation 5 of these Regulations.

(3) A person shall not operate an Unmanned Aircraft System in a category of operation other than the category for which it has been authorized to operate.

14. Remote Aircraft Operators Certificate (ROC)

(1) Any person who operates an Unmanned Aircraft System for commercial activities, reward or hire shall obtain a Remote Aircraft Operators Certificate (ROC) from the Authority.

(2) The Remote Aircraft Operators Certificate referred to in sub regulation (1) shall authorize the operator to conduct Unmanned Aircraft System operations in accordance with the conditions and limitations detailed in the operations specifications attached to that Certificate.

(3) The issuance of a Remote Aircraft Operators Certificate by the Authority is dependent upon the Unmanned Aircraft System operator demonstrating—

(a) an adequate organization;

(b) method of control and supervision of flight operations;

(c) training programme; and

(d) ground handling and maintenance arrangements.

(4) The requirements in sub regulation (3) shall be consistent with the nature and extent of the operations specified and commensurate with the size, structure and complexity of the organization.

15. Application for ROC

(1) An operator applying to the Authority for a Remote Aircraft Operators Certificate shall submit an application in a form and manner prescribed by the Authority and containing any other information the Authority may require.

(2) An operator shall make an application for an initial issue or reissue of an Remote Aircraft Operators Certificate at least ninety (90) days before the date of the intended operation.

16. Issuance of an ROC

(1) The Authority may issue a Remote Aircraft Operators Certificate to an applicant if that applicant—

(a) has its principal place of business and it is registered in Kenya;

(b) meets the applicable regulations and standards for the holder of a Remote Aircraft Operators Certificate;

(c) is properly qualified and adequately staffed and equipped to conduct safe operations in commercial operations of the Unmanned Aircraft System;

(d) holds a security clearance issued by the Ministry responsible for matters relating to defence, which the Authority shall seek in the course of processing the application; and

(e) has an aircraft operator security programme approved by the Authority and meets any other requirements as may be specified by the Authority.

17. Validity and renewal of ROC

(1) A Remote Aircraft Operators Certificate issued by the Authority shall be valid for 12 months from the date of issue or renewal unless—

(a) a shorter period is specified by the Authority;

(b) the Authority amends, suspends, revokes or otherwise terminates the Certificate;

(c) the Certificate holder surrenders it to the Authority;

(d) the Certificate holder notifies the Authority of the suspension of operations.

(2) A Remote Aircraft Operators Certificate which is suspended or revoked shall be returned to the Authority.

(3) An applicant for a Remote Aircraft Operators Certificate which has expired shall make an initial application.

18. Amendments of ROC

(1) The Authority may amend a Remote Aircraft Operators Certificate if—

(a) the Authority determines that the amendment is necessary for the safety of commercial Unmanned Aircraft System operations; or

(b) the Certificate holder applies for an amendment and the authority determines that the amendment is necessary.

(2) A Certificate holder shall operate in accordance with the amendment unless it is subsequently withdrawn.

19. Safety Management

(1) The holder of a Remote Aircraft Operators Certificate shall establish a safety management system commensurate with its size and the complexity of its operations.

(2) The safety management system established in terms of sub-regulation (1) shall include—

(a) a process to identify actual and potential safety hazards and assess the associated risks;

(b) a process to develop and implement remedial action necessary to maintain an acceptable level of safety; and

(c) provision for continuous and regular assessment of the appropriateness and effectiveness of safety management activities.

20. Licence

(1) A person shall not act as a remote pilot in command or as a remote co-pilot of an Remote Piloted Aircraft unless that person is a holder of a remote pilot licence issued by the Authority.

(2) Without prejudice to sub-regulation (1), a person shall not act as a Unmanned Aircraft System pilot for category B and C operations, as specified under regulation 5, unless that person is a holder of a remote pilot licence issued by the Authority.

(3) Remote Pilot Licence required by sub-regulations (1) and (2) shall be issued in accordance with provisions established in the Second Schedule to these Regulations.

21. Training

(1) No person shall provide training or instruction on the operation of Unmanned Aircraft System operations without an authorization issued by the Authority.

(2) The authorization granted under sub-regulation (1) shall be valid for twenty four (24) months.

22. Cancellation, suspension or variation of authorization

(1) Notwithstanding the provisions of regulation 13, the Authority may cancel, suspend or vary any authorization or approval granted under these Regulations—

(a) in the interest of public safety or national security;

(b) for violating these Regulations:

(c) for violating any requirement, restriction, term or condition imposed by the Authority; or

(d) for any other public interest.

(2) The Authority may seize any Unmanned Aircraft System or a component thereof belonging to a person who contravenes the provisions of these Regulations pending further administrative action.

(3) The Authority may apply to a competent court for an order authorizing the Authority to destroy or otherwise dispose of any item confiscated under sub regulation (2).

PART III – GENERAL REQUIREMENTS FOR OPERATIONS OF UAS

23. General obligation of a UAS owner or operator

(1) An Unmanned Aircraft System owner or operator shall—

(a) be responsible for the safe conduct of its operations;

(b) comply with all requirements, terms and conditions established by the Authority regarding its operation;

(c) be responsible for contracted services from providers including communications service providers, as necessary, to carry out its operations;

(d) be responsible for operational control of the unmanned Aircraft System;

(e) ensure that it is registered in accordance with the provisions of these Regulations; and

(f) ensure secure storage of the Unmanned Aircraft System or components thereof at all times.

(2) Unless otherwise specified by the Authority a request for authorization for operation of Unmanned Aircraft System shall include the following—

(a) name and contact information of the operator;

(b) Unmanned Aircraft System characteristics (type of aircraft, maximum certificated take-off mass, number of engines and wing span);

(c) copy of certificate of registration of the Unmanned Aircraft System;

(d) aircraft identification to be used in radiotelephony, if applicable;

(e) copy of the certificate of airworthiness if applicable;

(f) copy of the Unmanned Aircraft System operator certificate, if applicable;

(g) copy of the Remote pilot(s) licence, if applicable;

(h) copy of the aircraft radio station licence, if applicable;

(i) description of the intended operation including the type of operation or purpose, flight rules, Visual Line-of Sight (VLOS) operation, if applicable, date of intended flight(s), point of departure, destination, cruising speed(s), cruising level(s), route to be followed, duration or frequency of flight; take-off and landing requirements;

(j) Unmanned Aircraft System performance characteristics, including—

(i) operating speeds;

(ii) typical and maximum climb rates;

(iii) operating frequencies;

(iv) typical and maximum descent rates;

(v) typical and maximum turn rates;

(vi) other relevant performance data including limitations regarding wind, icing and precipitation; and

(vii) maximum aircraft endurance;

(k) communications, navigation and surveillance capabilities;

(l) aeronautical safety communications frequencies equipment, including—

(i) ATC communications, including any alternate means of communication;

(ii) command and control (C2) links;

(iii) performance parameters and designated operational coverage area;

(iv) communications between remote pilot and Remote Piloted Aircraft (RPA);

(v) Remote Piloted Aircraft observer, if applicable;

(vi) navigation equipment;

(vii) surveillance equipment, including Secondary Surveillance Radar transponder and Automatic Dependent Surveillance-Broadcast (ADSB);

(m) detect and avoid capabilities;

(n) emergency procedures, including—

(i) communications failure with Air Traffic Control (ATC);

(ii) C2 failure;

(iii) remote pilot or remote piloted aircraft observer communications failure, if applicable;

(iv) number and location of remote pilot stations as well as handover procedures between remote pilot stations, if applicable;

(v) document attesting noise certification, if applicable;

(vi) confirmation of compliance with the Civil Aviation (Security) Regulations;

(vii) payload information or description; and

(viii) proof of adequate insurance coverage.

(3) Unmanned Aircraft System shall meet the performance and equipment carriage requirements for the specific airspace in which the flight is to operate.

(4) Where documents identified in sub regulation (2) are issued in a language other than English, the Unmanned Aircraft System operator or owner shall ensure that an English translation is included and provide a certificate of translation.

24. UAS operating limitations

(1) A person shall not operate an Unmanned Aircraft System—

(a) at above 400 feet Above Ground Level (AGL) and within 50 meters of any person, vessel, vehicle or structure which is not under the control of the person in charge of the Unmanned Aircraft System;

(b) except with the authorization of the Authority;

(c) in conditions other than Visual Meteorological Conditions (VMC);

(d) at night, unless specifically cleared by the Authority on a case by case basis;

(e) where cameras, imaging devices or other sensors capture information, pictures or videos extending beyond the prescribed area of approved operation.

(2) Where cameras, imaging devices or other sensors capture information, pictures or videos referred to in sub regulation (1)(d), such information shall not be reproduced, processed, shared, distributed or published.

(3) Notwithstanding the provisions of sub regulation (1)(a), Unmanned Aircraft System operations may be conducted at such higher heights and lateral distances as the Authority may approve.

(4) Notwithstanding the provisions of sub regulation (1)(b), Unmanned Aircraft System operations may be conducted in conditions other than Visual Meteorological Conditions (VMC) provided that the pilot is duly rated, the System meets required specifications and is approved by the Authority.

25. Reporting of UAS incidents and accidents

(1) An Unmanned Aircraft System operator shall ensure that all incidents and accidents involving such a system are reported to the Authority.

(2) The Authority shall establish a mechanism for members of the public to report accidents, incidents and alleged violations of the regulation by the System operators or owners.

(3) A person who owns or operates Unmanned Aircraft System shall notify the Authority immediately of the loss or theft of the system or its components thereof.

(4) The Authority shall upon receipt of a report of the loss, theft, incident or accident involving an Unmanned Aircraft System determine the nature and type of any additional investigation or enforcement action that requires to be taken.

26. Prohibited operation of UAS

(1) A person shall not operate an Unmanned Aircraft System in a negligent or reckless manner.

(2) For the purposes of sub regulation (1), a person operates an Unmanned Aircraft System in a "negligent" or "reckless" manner where that person—

(a) in the course of operation, endangers other aircraft, persons or property;

(b) operates in a prohibited, a restricted and danger areas, the particulars of which have been duly published in the Kenya Aeronautical Information Publication (AIP), except in accordance with the conditions of the restrictions or by permission granted by the Authority; or

(c) operates in or around strategic installations, Air Navigation Service facilities, high tension cables and communication masts, prisons, police stations, courts of law, scenes of crime, schools and hospitals except in accordance with the conditions of the restrictions or by permission granted by the Authority.

(3) The Authority in consultation with the Cabinet Secretary responsible for matters relating to internal security, may by notice in the *Gazette* prohibit the use of Unmanned Aircraft System in any specific area in Kenya for any period in the interest of national security.

27. Carriage of dangerous goods

(1) A person shall not take on board or cause to be taken on board an Unmanned Aircraft System or deliver or cause to be delivered for loading thereon any goods which that person knows or has reasonable cause to know to be dangerous goods unless approved by the Authority.

(2) For the purposes of sub regulation (1), "dangerous goods" includes any substance that is classified as such in the ICAO Technical Instructions for Carriage of Dangerous Goods.

28. Operations in congested areas and crowds

A person shall not operate an Unmanned Aircraft System at lateral distance of less than 50 metres from any person, building, structure, vehicle, vessel or animal not associated with the operations of the System unless authorized by the Authority.

29. Operations in the vicinity of public roads

No person shall operate an Unmanned Aircraft System over public road, along the length of a public road of at a distance of less than 50m from a public road, unless—

(a) the operation has been approved by the Authority; or

(b) such road has been closed from public use; and

(c) reasonable care has been taken to ensure the safety of road users and pedestrians in the event of loss of control of the Remote Piloted Aircraft.

30. Landing on roads

No person shall use a public road as a place of landing or take-off of an Unmanned Aircraft System, except—

(a) where the operation has been approved by the Authority; or

(b) in the event of an emergency.

31. Collision avoidance

(1) An Unmanned Aircraft System in all airspace shall operate in accordance with the Civil Aviation (Rules of the Air) Regulations and a remote pilot shall maintain awareness so as to see and avoid other aircraft and vehicles and shall yield the right-of-way to all aircraft and vehicles.

(2) For the purposes of sub regulation (1), "yielding the right-of-way" means that the Unmanned Aircraft System shall give way to the manned aircraft or vehicle and may not pass over, under, or ahead of it unless well clear.

(3) No person shall operate an Unmanned Aircraft System so close to another aircraft as to create a collision hazard.

32. International UAS operations

A person shall not conduct an Unmanned Aircraft System flight—

(a) commencing at a place within Kenya and terminating at a place outside Kenya without authorization from the State of destination or any other State over whose airspace the Unmanned Aircraft System shall fly; or

(b) commencing at a place outside Kenya and terminating at a place within Kenya or over-flying the Kenyan airspace without authorization from the Authority.

33. Filing of flight plans

(1) All Unmanned Aircraft System flights in controlled airspace shall file flight plans.

(2) Without prejudice to the generality of sub regulation (1), all Unmanned Aircraft System flights in uncontrolled airspace shall at all times comply with the applicable rules of the air.

34. Emergency and contingency links

All Unmanned Aircraft System operators shall develop and implement emergency and contingency procedures acceptable to the Authority.

35. Command and Control

(1) An Unmanned Aircraft System owner or operator shall ensure that he or she has command and control of the System at all times during the flight.

(2) Any Unmanned Aircraft System owner or operator who loses command and control of his or her System shall report to the Authority immediately.

36. Air Traffic Control (ATC) communication

(1) An Unmanned Aircraft System pilot shall ensure that Air Traffic Control (ATC) is made aware of any operations that shall take place in areas which are likely to affect manned and controlled air traffic.

(2) The Air Navigation Service Provider (ANSP) shall establish procedures, acceptable to the Authority, for integration of the System operation into the airspace to ensure aviation safety and such procedures shall include communication and surveillance detection.

(3) Procedures referred to in sub regulation (2) shall provide for required information to be passed to Air Traffic Control by the System pilot before and during the Unmanned Aircraft System operations.

37. Operation in the vicinity of aerodromes

Except with the written permission of the owner or operator of an aerodrome, the appropriate Air Navigation Service Provider and approval from the Authority, a person shall not operate an Unmanned Aircraft System—

(a) within ten (10) kilometres of an aerodrome from the aerodrome reference point for code C, D, E and F aerodromes;

(b) within seven (7) kilometres of an aerodrome from the aerodrome reference point for code A and B aerodromes;

(c) on approach and take-off paths;

(d) within the vicinity of navigation aids;

(e) within the aerodrome traffic zone; and

(f) within terminal traffic holding patterns.

38. Operations at an aerodrome

(1) The Authority shall upon approval of an Unmanned Aircraft System operation at an aerodrome—

(a) impose operating restrictions on the approval in the interest of safety;

(b) publish details of the approval in the appropriate Aeronautical Information Product;

(c) revoke or change the conditions that apply to such approval and publish details of any revocation or change in conditions in the appropriate element of the Aeronautical Information Product.

(2) The Aeronautical Information Products referred to in sub regulation (l)(b) are—

(a) Aeronautical Information Publication (AIP), including Amendments and Supplements;

(b) Aeronautical Information Circulars (AIC);

(c) Aeronautical charts;

(d) Notice to Airmen (NOTAM); and

(e) Digital data sets.

39. Record keeping

(1) An Unmanned Aircraft System owner or operator shall establish a system of record keeping that allows adequate storage and reliable traceability of all activities developed, covering at a minimum—

(a) operator's organization;

(b) safety management systems;

(c) personnel training and competence verification;

(d) documentation of all management system key processes and products;

(e) maintenance records; and

(f) security management records.

(2) A person who deals in Unmanned Aircraft System or its components shall keep records of all transactions involving the system or any component thereof.

(3) Records shall be stored in a manner that ensures protection from damage, alteration and theft and shall comply with all data protection laws of Kenya.

(4) Records identified in this regulation shall be current and have sufficient details to determine whether the experience and qualification requirements are met for the purpose of the Unmanned Aircraft System operations.

(5) The Authority shall be entitled at any reasonable time to inspect and take copies of extracts from the records kept in accordance with sub regulation (1).

40. Insurance

(1) A person shall not operate, or cause to be operated or commit any other person to operate an Unmanned Aircraft System UAS there is in force a minimum insurance policy in respect of third party risks.

(2) The minimum sum of insurance in respect of any Unmanned Aircraft System insured in accordance with sub regulation (1) shall be notified by the Authority.

(3) An operator of an Unmanned Aircraft System shall make available third party liability insurance certificate(s), in the authentic form, at the location of the System operator's operational management or any other location specified by the Authority.

(4) Notwithstanding the provisions of sub regulation (1), the Authority may dispense with the requirement for insurance depending on the category of the Unmanned Aircraft System.

41. Privacy of persons and property and nuisance

(1) An Unmanned Aircraft System operator or owner shall not use a System equipped with an Imaging Device to conduct Surveillance on or take an Image of a person without that person's written consent.

(2) An Unmanned Aircraft System operator or owner shall not use a System equipped with an Imaging Device to record an image of privately owned or leased real property or of the owner, tenant, occupant, invitee, or licensee of such property with the intent to conduct surveillance on the individual or property captured in the image in violation of such person's reasonable expectation of privacy without his or her written consent.

(3) For purposes of sub regulation (2), a person is presumed to have a reasonable expectation of privacy on his or her privately owned real property, licensed or leased property if that person is not observable by persons located at ground level in a place where they have a legal right to be.

(4) Notwithstanding sub regulation (1) and (2), an Unmanned Aircraft System equipped with an imaging device may with the approval of the Authority be used for the purpose of—

(a) mapping and evaluating the earth's surface, including terrain and surface water bodies and other features;

(b) investigation of forests and forest management;

(c) search and rescue; or

(d) investigation of vegetation or wildlife.

(5) Without prejudice to sub regulation (I), the owner or operator of a System equipped with an imaging device shall comply with any other law relating to protection of privacy or data.

(6) An Unmanned Aircraft System operator or owner shall not operate the System in a manner that constitutes nuisance to the public, a person or to the property of another.

42. Discharge or dropping goods

(1) A person shall not cause an object to be dropped or discharged from an Unmanned Aircraft System unless the authorization granted expressly provides for such dropping or discharge.

(2) For purposes of this regulation, an object includes gases, liquids, solids, electromagnetic pulse or any other thing capable of being discharged or dropped from an Unmanned Aircraft System.

PART IV – SECURITY

43. Security of UAS

The holder of a Remote Aircraft Operators Certificate issued under these Regulations shall—

(a) conduct background checks on all personnel recruited for deployment, handing and storage of any Unmanned Aircraft System;

(b) conduct criminal record checks every 24 months on all personnel employed in the deployment, handling, and storage of an Unmanned Aircraft System;

(c) store an Unmanned Aircraft System that is not in use in a secure manner to prevent and detect unauthorized interference or use;

(d) protect an Unmanned Aircraft System from acts of unlawful interference;

(e) store and prepare for the flight of an Unmanned Aircraft System in a manner that will prevent and detect its tampering;

(f) protect the integrity of vital systems of an Unmanned Aircraft System;

(g) designate a security coordinator responsible for the implementation, application and supervision of the security controls; and

(h) train all personnel employed in the deployment, handling, and storage of an Unmanned Aircraft System as may be specified by the Authority.

44. Consumption of psychoactive substances

No Unmanned Aircraft System pilot or observer shall—

(a) consume alcohol less than 8 hours prior to reporting for duty;

(b) commence a duty period while the concentration of alcohol in any specimen of blood taken from any part of his or her body is more than 0.04 grams per 100 milliliters;

(c) consume alcohol or any psychoactive substance during the duty period or whilst on standby for duty; or

(d) commence duty period while under the influence of alcohol or any psychoactive substance having a narcotic effect.

45. Security procedures requirement

(1) A Remote Aircraft Operators Certificate holder shall not operate an Unmanned Aircraft System without operator security procedures approved by the Authority.

(2) An Unmanned Aircraft System shall be subject to security inspection at any time during its operations by the Authority without prior notification to the operator.

(3) An Unmanned Aircraft System operator shall—

(a) specify the security measures, procedures and practices to be followed by the operator to protect pilots and facilities from acts of unlawful interference;

(b) carry out and maintain security measures including identification and resolution of suspicious activity that may pose a threat to civil aviation—

(i) at a remote pilot station;

(ii) on a remote piloted aircraft system; and

(iii) any facility under the control of the remote piloted aircraft system operations.

(4) The specific security measures referred to in sub regulation (3)(a) shall provide—

(a) that the premises used for preparing, storing, parking including remote piloted aircraft system ground station shall be secured at all times against unauthorized access;

(b) for protection of critical information technology and communication systems used for operations purposes from interference that may jeopardize the security of civil aviation;

(c) for protection of flight documents;

(d) that commercial operators requesting to operate with a camera shall be required to include details of the camera usage in the application for security review and approval;

(e) requirements for checks and searches of specific areas and accessible compartments of the interior and exterior of an Unmanned Aircraft System; and

(f) that persons engaged in remote piloted aircraft system operations are subject to recurrent background checks and selection procedures and are adequately trained.

46. Security obligations for UAS operators

An operator of an Unmanned Aircraft System shall—

(a) be responsible for the security of such system operations including associated facilities, personnel and equipment;

(b) ensure that the Unmanned Aircraft System or any component thereof that is no longer in use is completely disabled or destroyed to prevent unauthorized use; and

(c) comply with any security directives or circulars issued by the Authority.

47. Acts of unlawful interference with civil aviation

An operator or owner of an Unmanned Aircraft System shall—

(a) have response procedures for operations personnel for threats and incidents involving Unmanned Aircraft System operations; and

(b) ensure that reports on acts of unlawful interference are promptly submitted to the Authority in accordance with the Civil Aviation (Security) Regulations.

48. Interference of UAS operations

(1) Except as provided in regulation 49, no person shall interfere with duly authorized operation of an Unmanned Aircraft System or intercept an Unmanned Aircraft System in any manner whatsoever.

(2) Any person who unlawfully interferes with duly authorized operation of an Unmanned Aircraft System commits an offence and shall be liable, upon conviction, to a fine not

exceeding two million shillings or to imprisonment for a term not exceeding three years, or to both.

49. Interception of UAS

(1) Where the Authority has reason to believe that an unmanned aircraft is being operated in a manner—

(a) that contravenes any provision of these Regulations;

(b) that poses a serious and an imminent risk to safety of the public; or

(c) that prejudices national security, the Authority may, exercise all or any of the powers in sub regulation (2) in relation to an Unmanned Aircraft System UAS for the purpose of—

(i) preventing further contravention of any provision of these Regulations;

(ii) preventing or stopping any actual or imminent occurrence that endangers or threatens to endanger the safety of the public; or

(iii) safeguarding national security.

(2) For the purposes of sub regulation (1), the powers that may be exercised by the Authority in relation to an Unmanned Aircraft System include the following—

(a) direct any person whom the Authority reasonably believes to be involved in the operation of an Unmanned Aircraft System —

(i) to end the flight or land it, safely in the fastest practicable way; or

(ii) to fly the aircraft in the manner specified by the Authority;

(b) with such assistance and by such force as is necessary—

(iii) to assume control of the Unmanned Aircraft System or fly it or to end the flight or land it safely in the fastest practicable way; or

(iv) to end the flight in the fastest and safest practicable way; or

(c) to confiscate the Unmanned Aircraft System and any component thereof or other thing, that the Authority believes on reasonable grounds—

(v) to be evidential material; or

(vi) needs to be seized to prevent its concealment, loss or destruction, or its use in committing, continuing or repeating an offence under the Act or these Regulations.

(3) The powers granted to the Authority under sub regulation (2) may be exercised by the national security agencies.

PART V – MISCELLANEOUS PROVISIONS

50. Protection from personal liability

(1) No matter or action taken by the Authority or by any member of staff or agent of the Authority shall, if the matter or action taken was in good faith for the purposes of performing the functions of the Authority under the Act or these regulations, render the Authority or the person liable for any action, claim or demand.

(2) Any expenses incurred or to be incurred by any person mentioned in subsection (1) in defending an action, claim or demand in any suit brought against that person in respect of any act or omission done or purported to be done by that person under these Regulations, or on the direction of the Authority, shall be reimbursed or borne by the Authority unless the act or omission was done in bad faith.

51. Offences and Penalties

(1) Any person who fails to comply with any direction given pursuant to these Regulations by the Authority or by any authorized person under any provision of the Act or these Regulations commits an offence and shall be liable upon conviction, to a fine not exceeding two million shillings or to imprisonment for a term not exceeding three years, or to both.

(2) A person who contravenes any provision specified as an "A" provision in the Third Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding one million shillings for each offence or to imprisonment for a term not exceeding one year, or to both.

(3) A person who contravenes any provision specified as a "B" provision in the Third Schedule to these Regulations commits an offence and is liable upon conviction to a fine not exceeding two million shillings for each offence or to imprisonment for a term not exceeding three years, or to both.

(4) If any provision of these Regulations is contravened in relation to an Unmanned Aircraft System, the operator of that System and the pilot, even if the operator or the pilot is not the person who contravened that provision shall, without prejudice to the liability of any other person under these Regulations for that contravention, be deemed to have contravened that provision unless he or she proves that the contravention occurred without his or her consent or connivance and that he or she exercised all due diligence to prevent the contravention.

(5) Any Unmanned Aircraft System operator who contravenes the provisions of these Regulations and whose penalty has not been specified in this Regulations commits an offence and shall be liable upon conviction, to a fine not exceeding two million shillings or to imprisonment for a term not exceeding three years, or to both.

52. Pamphlets and manuals

The Authority shall develop pamphlets and manuals to assist owners and operators in complying with these Regulations.

53. Savings and transitional provisions

An owner of an Unmanned Aircraft System already imported into Kenya at the commencement of these Regulations shall apply to the Authority for registration within six months from the date of commencement of these Regulations.

FIRST SCHEDULE

[Regulation 5(a), (b) & (c).]

CATEGORAZATION OF UNMANNED AIRCRAFT SYSTEM OPERATIONS

Part I - Category A operations (Low Risk)

1. UAS that will be operated within visual line of site and at a maximum height of 400 feet above ground level and 50 meters lateral distance from any persons, building or object not associated with the operations. All operations under this category shall be approved/ authorized by the Authority. Such operations shall only be conducted within Visual Line-of-Sight (VLOS).

2. UAS operated in this category shall not be more than 25kg maximum take-off mass together with associated payloads.

3. Such operations shall be conducted within segregated airspaces and away from any notified prohibited, restricted or danger areas unless expressly authorized by the Authority.

4. UAS operators in this category shall possess a certificate issued by the Authority permitting them to conduct operations.

Part II - Category B Operations (Medium Risk)

1. UAS operations in this category shall be operated within visual line of site (including extended visual line of site) at all time and heights above ground and distances from any persons, buildings or objects not associated with the operations as may be determined by the Authority. All operations under this category shall be approved/authorized by the Authority.

2. UAS operated under this category may be operated in non-segregated airspaces but away from controlled airspaces and shall have all such equipment as necessary to ensure the safe and secure operations.

3. Operations in category B shall be conducted away from any notified prohibited, restricted or danger areas unless expressly authorized by the Authority.

4. Personnel operating UAS in this category shall be in possession of a valid license issued by the Authority.

Part III - Category C Operations (High Risk/Manned Aviation Approach)

1. UAS operations in this category shall be conducted in any airspaces not classified as prohibited, restricted or danger and shall be subject to ATC instructions and guidance and at heights and lateral distances from any persons, buildings or objects as prescribed in the Civil Aviation (Rules of the Air) Regulations. All operations under this category shall be approved or authorized by the Authority.

2. UAS operations in this category may be conducted within BVLOS provided that the RPA has the required capabilities and is fitted with appropriate equipment and the pilot is suitably qualified and holds appropriate ratings for such an operation.

3. UAS in operated in this category shall be issued with a Certificate of Airworthiness by the Authority based on the type Certificate issued by the State of design/manufacture.

4. Personnel operating UAS in this category shall be in possession of a valid license issued by the Authority and endorsed with appropriate ratings for the type of UAS.

SECOND SCHEDULE

[Regulation 20(3).]

LICENSING OF RPAs PILOTS

Licences, Certification, Ratings and Authorizations

The authority may issue the following licences, ratings, certification and authorizations under these Regulations—

1. RPAs Pilot licence—

(a) Student Remote Pilot licence; and

(b) Remote Pilot licence;

2. Ratings issued—

(a) Beyond Visual Line of Sight (B-VLOS) Rating;

(b) Extended Visual Line of Sight (E-VLOS); and

(c) Instructor Rating.

3. Certificate—

(a) RPA Observer Certificate; and

(b) RPA Certificate (for class A operations).

Application and issue of remote pilot licences requirements

1. An applicant for Student Remote Pilot licence shall—

(a) be at least eighteen years of age;

(b) be able to demonstrate the ability to read, speak, write and understand the English language; and

(c) be in possession of a valid Class 3 Medical Certificate issued under the Civil Aviation (Personnel Licensing) Regulations.

2. A student pilot shall pass knowledge tests as may be prescribed by the Authority.

Student Remote Pilot Licence Privileges and Limitations

A student remote pilot should not act as solo remote pilot of an RPA unless—

(a) he or she is under the supervision of, or with the authority of, an authorized RPAS instructor; or

(b) in case of an international RPA flight, special or general arrangement have been made between the Member States concerned.

Validity of licence

(a) for a holder who is less than forty years of age, from the date the licence is issued or renewed by the authority for a period of the remainder of the twenty four months validity of the holder's medical certificate; or

(b) for a holder who is forty years of age or more, from the date the licence is issued or renewed by the authority for a period of the remainder of the twelve months validity of the holder's medical certificate.

3. An applicant for Remote Pilot licence shall—

(a) be at least eighteen years of age;

(b) able to demonstrate the ability to read, speak, write and understand the English language;

(c) be in possession of a valid Class 3 Medical Certificate issued under the Civil Aviation (Personnel Licensing) Regulations;

(d) receive an endorsement for a knowledge test from an authorised instructor as may be prescribed by the Authority; and

(e) comply with requirements established by the Authority for the category and rating sought.

Remote Pilot Licence Privileges and Limitations

(a) no person shall operate a remotely piloted aircraft system; under Category B and C; for purposes of flight unless that person has a remote pilot licence with a remotely piloted aircraft rating issued pursuant to these Regulations;

(b) an application should be submitted to the licensing authority in a form and manner established by the Authority.

Validity of licence

(a) For a holder who is less than forty years of age, from the date the licence is issued or renewed by the Authority for a period of the remainder of the twenty four months validity of the holder's medical certificate; or

(b) For a holder who is forty years of age or more, from the date the licence is issued or renewed by the Authority for a period of the remainder of the twelve months validity of the holder's medical certificate.

4. RPA Observer Certificate—

An applicant for Student Remote Pilot licence shall—

(a) be at least eighteen years of age;

(b) able to demonstrate the ability to read, speak, write and understand the English language;

(c) demonstrate understanding of the operations limitations for the category of operations; and

(d) be in a physical and mental condition to safely discharge the function of an observer.

An RPA Observer Certificate shall be valid for twenty four months.

5. Certificate:

RPA Certificates shall be issued by the operator and endorsed by the Authority.

Applicants for a Certificate shall—

(a) be able to demonstrate the ability to read, speak, write and understand the English language;

(b) be in a physical and mental condition to safely fly a UAS; and

(c) demonstrate understanding of the operations limitations for Category A operations.

An RPA Certificate shall be valid for twenty four months.

THIRD SCHEDULE

[(Regulation 51(2) & (3).]

PENALTIES

Reg. No	*Title*	*Part*
6	Eligibility to Ownership of UAS	B
7	Import and Export of UAS	B
8	Manufacture, Assembly and Testing of UAS	B
9	Registration of UAS	B
12	Airworthiness of UAS	A
13	Authorization of UAS operations	B
20	Licence	A
21	Training	A
24	UAS operating limitations	B
25	Reporting of UAS incidents and accidents	A
26	Prohibited operation of UAS	B
27	Carriage of dangerous goods	B
28	Operations in congested areas and crowds	A
31	Collision avoidance	B
32	International UAS operations	B
33	Filing of flight plans	A
35	Command and control	A
37	Operation in the vicinity of aerodromes	B
39	Record keeping	A
40	Insurance	A
41	Privacy of persons and property	B
42	Discharge or dropping goods	B
48	Interference of UAS operations	B

THE CIVIL AVIATION (SECURITY) REGULATIONS, 2020

ARRANGEMENT OF SECTIONS

THE CIVIL AVIATION (SECURITY) REGULATIONS, 2020

[Legal Notice 128 of 2020]

PART I – Preliminary

1. Citation

These Regulations may be cited as the Civil Aviation (Security) Regulations, 2020.

2. Interpretation

In these Regulations, unless the context requires otherwise—

"Act" means the Civil Aviation Act, 2013 (No. 21 of 2013);

"act of unlawful interference" means an act or attempted act to jeopardise the safety of civil aviation and air transport, including —

(a) unlawful seizure of an aircraft in flight or on the ground;

(b) hostage taking on board an aircraft or at an airport;

(c) forcible intrusion on board an aircraft at an airport or on the premises of an aeronautical facility;

(d) introduction on board an aircraft or at an airport of a weapon or hazardous device or material intended for criminal purposes;

(e) use of an aircraft in service for the purpose of causing death, serious bodily injury, or serious damage to property or the environment;

(f) unauthorised possession, at an airport, or unauthorised introduction on board an aircraft, of a weapon or hazardous device or material;

(g) destroying or damaging air navigation facilities or interfering with their operation, if any such act is likely to endanger the safety of aircraft in flight;

(h) violence against a person on board an aircraft in flight if that act is likely to endanger the safety of that aircraft;

(i) destroying an aircraft in service or causing damage to the aircraft which renders it incapable of flight or which is likely to endanger its safety in flight;

(j) communicating information which is known to be false, thereby endangering the safety of an aircraft in flight or on the ground, of passengers, crew, ground personnel or the general public at an airport or on the premises of a civil aviation facility;

(k) cyber-attacks carried out against Air Traffic Management systems, aircraft systems or airport systems;

(l) unlawfully and intentionally using any device, substance or weapon—

(i) to perform an act of violence against a person at an airport serving civil aviation which causes or is likely to cause serious injury or death;

(ii) to destroy or seriously damage the facilities of an airport serving civil aviation or an aircraft not in service located at the airport or disrupting the services of the airport,

if that act endangers or is likely to endanger safety at that airport;

"aerial work" means an aircraft operation in which an aircraft is used for specialized services such as agriculture, construction, photography, surveying observation and patrol, search and rescue, aerial advertisement, etc;

"aerodrome" means a defined area on land or water including any buildings, installations and equipment intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

"aircraft security check" means an inspection of the interior of an aircraft to which passengers may have had access and an inspection of the hold for the purposes of discovering suspicious objects, weapons, explosives or other dangerous devices, articles and substances;

"aircraft security search" means a thorough inspection of the interior and exterior of the aircraft for the purpose of discovering suspicious objects, weapons, explosives or other dangerous devices, articles or substances;

"airport" means any area in Kenya which is open for commercial aircraft operations;

"airport operator" includes an individual, organization or enterprise, however designated, for the time being responsible for the administration and operation of an airport;

"airport security permit" means a permit issued under regulation 26(3);

"airside" means the movement area of an airport, adjacent terrain and buildings or portions thereof, access to which is controlled;

"air navigation facility" means any facility used, available for use or designed for use, in aid of air navigation and any other structure or mechanism having a similar purpose for guiding or controlling flight in the air, or the landing and take-off of an aircraft;

"air navigation service" means—

(a) communication services, whether ground to air or ground to ground, provided for the safety of the aircraft;

(b) navigational services, that is to say radio, radar and visual aids to navigation;

(c) air traffic services provided for the safety of aircraft; and

(d) aeronautical information services;

"Air Navigation Service Provider" means a relevant authority designated by the State, responsibility for provision of air navigation services in its airspace;

"Air Traffic Management (ATM) Security" means the contribution of the ATM system to civil aviation security, national security and defence, and law enforcement; and the safeguarding of the ATM system from security threats and vulnerabilities;

"authorised person" means an aviation security inspector or person designated by the Authority under regulation 8 to be an authorised person for the purposes of these Regulations;

"Authority" means the Kenya Civil Aviation Authority established by the Civil Aviation Act;

"aviation security officer" means a person employed by an operator as defined in this regulation to carry out security controls and includes a Screener;

"aviation security service provider" means any entity or person who engages, either directly or indirectly, under an agreement, to carry out some or all aviation security duties on behalf of an operator and provides security controls to meet the requirements of the operator and/or the Authority;

"background check" means a check of a person's identity and previous experience, including criminal history and any other security related information relevant for assessing the person's suitability, in accordance with national legislation;

"behaviour detection" within an aviation security environment, means the application of techniques involving the recognition of behavioural characteristics, including but not limited to physiological or gestural signs indicative of anomalous behaviour, to identify persons who may pose a threat to civil aviation;

"baggage" means personal property of passengers or crew carried on an aircraft by agreement with the aircraft operator;

"bomb threat" means a communicated threat anonymous or otherwise, which suggests, or infers whether true or false, that the safety of an aircraft in flight or on the ground or any airport or civil aviation facility or any person may be in danger from an explosive or other item or device;

"cargo" means any property carried on an aircraft other than mail, stores and accompanied or mishandled baggage;

"catering stores" means all items, other than catering supplies, associated with passenger in-flight services, including newspapers, magazines, headphones, audio and video tapes, pillows, blankets and amenity kits;

"catering supplies" means all food, beverages, other dry stores and associated equipment used in air transport;

"certification" means a formal evaluation and confirmation by or on behalf of the Authority that a person or organization possesses the necessary competencies to perform assigned functions to an acceptable level as defined by the Authority;

"civil aviation" includes—

(a) commercial air transport operations; and

(b) general aviation operations;

"COMAIL" means an abbreviation of commercial air transport operator company mail, shipped within its network of stations;

"COMAT" means an abbreviation of commercial air transport operator company materials, shipped within its network of stations;

"commercial air transport operations" means aircraft operations involving the transport of passengers, cargo or mail for remuneration or hire;

"contingency plan" means a proactive plan to include measures and procedures addressing various threat levels, risk assessments and the associated security measures to be implemented, designed to anticipate and mitigate events as well as prepare all concerned parties having roles and responsibilities in the event of an actual act of unlawful interference and sets forth incremental security measures that may be elevated as the threat increases and may be a stand-alone plan or included as part of a Crisis Management Plan;

"dangerous goods" means articles or substances which are capable of posing a hazard to health, safety, property or the environment and which are shown in the list of dangerous goods in the Technical Instructions or which are classified according to those Instructions;

"disruptive passenger" means a passenger who fails to comply with the rules of conduct at an airport or on board an aircraft or to follow the instructions of the airport staff or aircraft crew members and thereby disturbs the good order and discipline at an airport or on board an aircraft;

"facilitation" means the efficient management of the necessary control process, with the objective of expediting the clearance of persons or goods and preventing unnecessary operational delays;

"general aviation operation" means an aircraft operation other than a commercial air transport operation or an aerial work operation;

"goods" includes cargo and mail, airport merchandize and supplies, catering supplies and stores, hold baggage and personal effects;

"Ground Handling Service Provider" means a provider of services to airport users or aircraft operators that includes passenger and baggage handling, cargo and mail handling, whether incoming, outgoing or being transferred between the airport terminals and the aircraft, and ramp handling;

"High-risk cargo or mail" Cargo or mail shall be considered high risk if—

(a) specific intelligence indicates that the cargo or mail poses a threat to civil aviation; or

(b) the cargo or mail shows anomalies or signs of tampering which give rise to suspicion;

"human factors principles" means principles which apply to design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance;

"human performance" means human capabilities and limitations which have an impact on the safety, security and efficiency of aeronautical operations;

"in-flight security officer" means a person who is authorized by the government of the State of the Operator and the government of the State of Registration to be deployed on an aircraft with the purpose of protecting that aircraft and its occupants against acts of unlawful interference. This excludes persons employed to provide exclusive personal protection for one or more specific people travelling on the aircraft, such as personal bodyguards;

"infringement notice offence" means an offence committed under any of the regulations where a penalty of fine is stipulated;

"known consignor" means a consignor who originates cargo or mail for its own account and whose procedures meet common security rules and standards sufficient to allow the carriage of cargo or mail on any aircraft;

"known stores" means catering supplies and stores delivered to an aircraft operator and that have been subjected to appropriate security controls;

"landside" means an area of an airport and buildings on it to which the non-traveling public has free access;

"MANPADS" means surface-to-air missile systems designed to be man-portable and carried and fired by a single individual;

Other surface-to-air missile systems designed to be operated and fired by more than one individual acting as a crew and portable by several individuals;

"mail" means dispatches of correspondence and other items tendered by and intended for delivery to postal services in accordance with the rules of the Universal Postal Union (UPU);

"mishandled baggage" means baggage involuntarily, or inadvertently separated from passengers or crew;

"national civil aviation security programme" means an integrated set of regulations and activities promulgated and performed by the Republic of Kenya aimed at safeguarding civil aviation against acts of unlawful interference;

"operator" includes an airport operator, an aircraft operator, a regulated agent, an air navigation service provider and a catering operator;

"prohibited item" means an item prescribed in regulation 41 and which can be used to commit an act of unlawful interference;

"regulated agent" means an agent, freight forwarder or other entity who conducts business with an operator and provides security controls that are accepted or required by the Authority in respect of cargo and mail;

"relevant national authorities" means agencies involved in conducting national aviation security threat and risk assessments and shall include, but not limited to the Authority, the Kenya Airports Authority, the National Intelligence Service and the Kenya Airports Police;

"sabotage" means an act or omission, intended to cause malicious or wanton destruction of property, endangering or resulting in unlawful interference with civil aviation and its facilities;

"screening" means the application of technical or other means which are intended to identify or detect weapons, explosives or other dangerous devices, articles or substances which may be used to commit an act of unlawful interference;

"security" means safeguarding civil aviation against acts of unlawful interference. This objective is achieved by a combination of measures and human and material resources;

"security audit" means an in-depth compliance examination of all aspects of the implementation of the National Civil Aviation Security Programme;

"security control" is a means by which the introduction of weapons explosives or other dangerous devices articles or substances which may be used to commit an act of unlawful interference can be prevented;

"security inspection" means an examination of the implementation of relevant National Civil Aviation Security Programme requirements by an airline, airport, or other entity involved in security;

"security programme" means measures and procedures adopted to safeguard civil aviation against acts of unlawful interference;

"security restricted area" means airside areas of an airport which are identified as priority risk areas where, in addition to access control, other security controls are applied and includes, *inter alia*, all passenger departure areas between the screening checkpoint and the aircraft, the ramp, baggage make-up areas, including those where aircraft are being brought into service and screened baggage and cargo are present, cargo sheds, mail centres, airside catering and aircraft cleaning premises;

"security test" means a covert or overt trial of an aviation security measure which simulates an attempt to commit an unlawful act;

"sensitive aviation security information" means information that, if accessed by or disclosed to unauthorized persons, could create or be used to exploit a vulnerability or facilitate an act of unlawful interference against civil aviation;

"supply chain assets" means cargo and mail, facilities, equipment, information and personnel;

"technical instructions" means the ICAO Technical Instructions for the Safe Transportation of Dangerous Goods by Air, Doc. 9284;

"transfer cargo and mail" means cargo and mail departing on an aircraft other than that on which it arrived;

"unidentified baggage" means baggage at an airport, with or without a baggage tag which is not picked by or identified with a passenger, and includes unattended baggage;

"unknown stores" means supplies and stores that have not have been subjected to appropriate security controls; and

"unpredictability" means the implementation of security controls in order to increase their deterrent effect and their efficiency, by applying them at irregular frequencies, different locations or with varying means, in accordance with a defined framework;

"unruly passengers" means persons who commit, on board a civil aircraft, from the moment when the aircraft door is closed prior to take-off to the moment when it is reopened after landing, an act of-

(a) assault, intimidation, menace or willful recklessness which endangers good order or the safety of property or persons;

(b) assault, intimidation, menace or interference with a crew member in the performance of duties or which lessens the ability to perform duties;

(c) willful recklessness or damage to an aircraft, its equipment, or attendant structures and equipment such as to endanger good order and the safety of the aircraft or its occupants;

(d) communication of information which is known to be false, thereby endangering the safety of an aircraft in flight; and

(e) disobedience of lawful commands or instructions for safe, orderly or efficient operations.

3. Application of regulations

(1) These Regulations shall, unless otherwise stipulated, apply to—

(a) all airports in Kenya, which includes aerodromes in categories A, B and C as provided for under the Civil Aviation (Certification, Licensing and Registration of Aerodromes) Regulations;

(b) passengers in civil aviation;

(c) persons at airports;

(d) persons working in the aviation industry;

(e) persons who occupy land or buildings forming part of an airport; and

(f) persons on land adjoining or adjacent to, or within the vicinity of airports or air navigation installations which do not form part of an airport.

(2) Despite the generality of sub-regulation (1), these Regulations apply to—

(a) operators or owners of airports;

(b) operators or owners of aircraft registered in Kenya or aircraft registered in another State and operating in Kenya;

(c) air navigation service providers;

(d) ground handling agencies and aviation security service providers, fuel suppliers, travel agents and any other entities conducting business with or at the airport;

(e) persons permitted to have access to security restricted areas at an airport;

(f) persons who offer stores and supplies for use in an aircraft and goods for transport by air; and

(g) any person whose conduct amounts to an act of unlawful interference or endangers aviation safety.

(3) Nothing in these Regulations applies to or affects—

(a) a State aircraft; or

(b) military or police aviation operations in Kenya.

4. Purpose of regulations

The purpose of these Regulations is—

(a) for the safety and security of passengers, crew, ground personnel and the general public in all matters related to safeguarding against acts of unlawful interference with civil aviation by providing for the protection of—

(i) aircraft used for civil aviation, and persons and property on board such aircraft;

(ii) airports, and persons and property at airports;

(iii) air navigation installations which are not part of airports; and

(b) to regulate the conduct of persons at airports and persons on board aircraft for the purposes of aviation security.

PART II – Organization

5. Functions of Authority in relation to aviation security

(1) The Authority shall—

(a) be the designated appropriate authority for civil aviation security and responsible for the regulation of aviation security in Kenya;

(b) develop and implement regulations, practices and procedures that enable rapid response to meet any increased security threat for purposes of safeguarding civil aviation against acts of unlawful interference, taking into account the safety, regularity and efficiency of flights;

(c) regulate the security operations of airports, aircraft, regulated agents, air navigation service providers, catering operators and other related entities, as the case may be, for the purpose of—

(i) protecting passengers, crew members, airport, the general public and other aviation facilities;

(ii) preventing unlawful interference against civil aviation; and

(iii) ensuring that appropriate action is taken when an act of unlawful interference occurs or is likely to occur;

(d) define and allocate tasks and coordinate activities under the National Civil Aviation Security Programme, between the ministries, departments, agencies, airport, aircraft operators, air navigation service providers and other organisations responsible for the various aspects of aviation security;

(e) establish a supply chain security process, which includes the certification of regulated agents or known consignors and in-flight catering operators once every two years;

(f) conduct certification of aviation security service providers and aviation security screeners, supervisors, instructors and inspectors once every two years.

(2) The Authority shall, in respect of each operator—

(a) schedule and conduct security audits, tests and inspections on a regular basis, to verify compliance with the National Civil Aviation Security Programme and to provide for the rapid and effective rectification of any deficiencies;

(b) ensure that the priorities and frequency of monitoring activities provided in paragraph (a) are determined on the basis of risk assessment carried out by the relevant authorities;

(c) evaluate and approve security programmes; and

(d) conduct investigations and enforcement to resolve any security concerns.

(3) The Authority, in respect of other States—

(a) shall ensure that requests from other Contracting States for additional security measures in respect of a specific flight(s) by operators of such other States are met, as far as may be practicable. The requesting State shall ensure appropriate consultation and give consideration to alternative measures of the Republic of Kenya that are equivalent to those requested;

(b) shall co-operate with other States in the development and exchange of information concerning National Civil Aviation Security Programme, training programme and quality control programme as necessary in accordance with the laws of Kenya;

(c) may, subject to paragraph (b), make available to other Contracting States on request a written version of the appropriate parts of the National Civil Aviation Security Programme;

(d) shall establish and implement suitable protection and handling procedures for security information shared by other States, or security information that affects the security interests of other States, in order to ensure that inappropriate use or disclosure of such information is avoided;

(e) shall share, as appropriate, and consistent with the State's sovereignty, the results of the audit carried out by ICAO and the corrective actions taken and notify ICAO where such information is shared.

(4) The Authority—

(a) shall keep under constant review the level and nature of threat to civil aviation within the Republic of Kenya and the airspace for which it is responsible, and establish and implement policies and procedures to adjust relevant elements of the national civil aviation security programme accordingly, based upon a security risk assessment carried out by the relevant national authorities;

(b) shall establish and implement procedures to share with other Contracting States threat information that applies to the aviation security interests of those States, to the extent practicable;

(c) shall establish and implement procedures to share, as appropriate, with relevant airport operators, aircraft operators, air navigation service providers or other entities concerned, in a practical and timely manner, relevant information to assist them to conduct effective security risk assessments relating to their operations;

(d) shall, in accordance with the risk assessment carried out by the relevant national or local authorities, ensure that appropriate measures on the ground or operational procedures are established to mitigate possible attacks against aircraft using Man-Portable Air Defence Systems (MANPADS) and other weapons representing a similar threat to aircraft at or near an airport;

(e) shall, where necessary, consider and engage in collaborative arrangements with other States in order to increase the sustainability of the aviation security system by avoiding unnecessary duplication of security controls and the arrangement shall be based on verification of equivalence of the security outcome ensured by the application of effective security controls at points of origin;

(f) shall establish and implement appropriate mechanisms to confirm that transfer cargo and mail entering into Kenya has been subjected to appropriate security controls;

(g) shall ensure appropriate protection of sensitive aviation security information;

(h) shall ensure that a clause related to aviation security is included in each of the bilateral agreements on air transport, taking into account the model clause developed by ICAO;

(i) shall give authorization to any entity or person desirous of undertaking any security validation, audit, inspection, tests or assessments within airports in Kenya.

6. Power to access and inspect airport, aircraft and operator's premises

The Authority shall have free and unobstructed access at all times to an airport, an aircraft operating from or within Kenya, or an aircraft registered in Kenya operating in any other State, and the premises of an operator within Kenya, for the purpose of carrying out security audits, inspections, tests and investigations.

7. Power of Authority to issue orders, circulars and directives

The Authority may make and issue orders, circulars and directives prescribing any aviation security matter which, under these Regulations, is to be prescribed, and generally for the better carrying out or enhancing of the objects and purposes of these Regulations.

8. Authorised persons

The Authority may, in writing, designate qualified persons whether by name or by title of office, to be authorised persons for the purposes of these Regulations and shall state the functions and limits of operation of the authorised persons.

PART III – Security programmes and committees

9. National civil aviation security programme

(1) The Authority shall—

(a) establish a written National Civil Aviation Security Programme and ensure its maintenance and implementation to safeguard civil aviation against acts of unlawful interference through regulations, practices and procedures which take into account the safety, regularity and efficiency of flights; and

(b) make available to airports and aircraft operators operating in Kenya, air navigation service providers, and other operators and entities concerned, a written version of the appropriate parts of the National Civil Aviation Security Programme or relevant information or guidelines enabling them to meet the requirements of the National Civil Aviation Security Programme.

(2) Without limiting the generality of sub regulation (1)(a), the National Civil Aviation Security Programme shall include, but not limited to the following matters—

(a) allocation of responsibilities for implementation of the programme;

(b) co-ordination, facilitation and communications;

(c) protection of airports, aircraft and navigation facilities;

(d) co-ordination of landside security measures between relevant departments, agencies, other organizations of the State, and other entities, and identification of appropriate responsibilities;

(e) security control of persons and items being placed on board aircraft;

(f) security equipment;

(g) personnel, including selection criteria and training;

(h) management of response to acts of unlawful interference;

(i) evaluation of effectiveness of the programme;

(j) adjustment of the programme and contingency plans;

(k) financing of security; and

(l) protection and handling procedures for security information shared by other States.

(3) The National Civil Aviation Security Programme shall be reviewed and updated as the need may arise or at least once every two years.

10. National civil aviation security committee

(1) There shall be a National Civil Aviation Security Committee for the purpose of—

(a) advising and coordinating security activities between ministries, departments, agencies and other organisations at Kenyan airports, aircraft operators, air navigation service providers and other entities concerned with or responsible for the implementation of various aspects of the National Civil Aviation Security Programme; and

(b) recommending and reviewing the effectiveness of security measures and procedures.

(2) The National Civil Aviation Security Committee shall be appointed by the Cabinet Secretary and shall consist of persons from ministries, departments, agencies, air navigation service providers and other organisations at Kenyan airports, aircraft operators and other related entities.

(3) Without limiting the generality of sub regulation (2) the Cabinet Secretary shall, in appointing members of the National Civil Aviation Security Committee, ensure that it comprises one member from each of the following departments, agencies or organisations—

(a) the Authority;

(b) the Ministry responsible for civil aviation;

(c) the Chairperson of the National Air Transport Facilitation Committee;

(d) the airports authority;

(e) the Ministry responsible for security or internal affairs;

(f) National Intelligence Service;

(g) the Kenya airports police;

(h) the Kenya Defence Forces;

(i) the department of immigration services;

(j) representative of the airlines;

(k) the Communications Authority of Kenya;

(l) the customs and border control;

(m) the Ministry responsible for foreign affairs;

(n) the Ministry responsible for health;

(o) the national agency responsible for counter-terrorism; and

(p) the Kenya Wildlife Service.

(4) The members of the National Civil Aviation Security Committee shall hold office on terms and conditions recommended by the Authority and specified in their instruments of appointment.

(5) The members of the National Civil Aviation Security Committee shall be paid such sitting and other allowances as the Authority may determine.

(6) The head of the Authority shall be the Chairperson of the Committee.

(7) The National Civil Aviation Security Committee may invite any person to attend and take part in the proceedings of the Committee and that person may participate in any discussion at the meeting but shall not have a right to vote at that meeting.

(8) The National Civil Aviation Security Committee shall meet for the discharge of its functions as often as is necessary, at a time and place specified by the Chairperson, and in any case, shall meet at least once in every three months.

(9) Subject to this regulation, the National Civil Aviation Security Committee shall regulate the procedure for its meetings.

11. National civil aviation security quality control programme

(1) The Authority shall develop, implement and maintain a National Civil Aviation Security Quality Control Programme for the purposes of—

(a) determining and monitoring compliance with and validating the effectiveness of the National Civil Aviation Security Programme;

(b) determining the adequacy and effectiveness of the National Civil Aviation Security Programme through audits, tests, inspections and security exercises;

(c) ensuring that all persons who are assigned aviation security duties or responsibilities are verifiably trained and instructed to carry out those duties;

(d) ensuring that persons implementing security controls possess all competencies required to perform their duties and are appropriately selected, trained and certified according to the requirements of the National Civil Aviation Security Programme and that appropriate records are maintained up to date;

(e) ensuring that all persons conducting aviation security training possess necessary competencies to perform their duties, are appropriately trained and certified and use training packages approved or recognized by the Authority;

(f) ensuring that each entity responsible for the implementation of relevant elements of the National Civil Aviation Security Programme periodically verifies that the implementation of security measures outsourced to external service providers is in compliance with the entity's security programme;

(g) ensuring that acts of unlawful interference and other security incidents are investigated; and

(h) reviewing and re-evaluating security measures and controls immediately following an act of unlawful interference.

(2) The Authority shall, in developing the National Civil Aviation Security Quality Control Programme, ensure the incorporation of appropriate methods, means and procedures for—

(a) ensuring that the personnel carrying out security audits, tests and inspections are trained to appropriate standards for these tasks in accordance with the National Civil Aviation Security Programme and are certified;

(b) ensuring that the personnel carrying out security audits, tests and inspections are afforded the necessary authority to obtain information to carry out those tasks, and to enforce corrective actions;

(c) supplementing the National Civil Aviation Security Quality Control Programme by establishing a confidential reporting system for analysing security information provided by sources including passengers, crew and ground personnel; and

(d) establishing a process to record and analyse the results of the National Civil Aviation Security Quality Control Programme, to contribute to the effective development and implementation of the National Civil Aviation Security Programme, including identifying the causes and patterns of non-compliance and verifying that corrective actions have been implemented and sustained.

(3) The National Civil Aviation Security Quality Control Programme shall—

(a) provide for structures, responsibilities, processes and procedures that promote and establish an environment and culture of continuing improvement and enhancement of aviation security; and the means for ensuring that persons tasked with carrying out security duties do so effectively; and

(b) provide all persons assigned aviation security duties or responsibilities with direction for the effective application of aviation security controls, to prevent acts of unlawful interference.

(4) Any entity or person desirous of undertaking any security validation, audit, inspection, test or assessments within any airport in Kenya shall seek authorization from the Authority giving at least thirty days' notice in advance. The entity or person so authorized shall furnish the Authority with a copy of the report upon conclusion of the exercise.

(5) The provisions of sub-regulation (4) above shall not apply to Kenyan registered operators who conduct validations, audits, inspections, tests or assessments as part of their internal quality control programmes. However, records of such activities shall be kept by the operators and made available to the Authority on request.

12. Independence in implementation of programme

The Authority shall ensure that the management, setting of priorities and organisation of the National Civil Aviation Security Quality Control Programme is undertaken independently from the entities and persons responsible for the implementation of the measures taken under the National Civil Aviation Security Programme.

13. Airport operator security programme

(1) A person shall not operate an airport without an Airport Operator Security Programme approved by the Authority.

(2) Every operator of an airport serving civil aviation in Kenya shall establish, implement and maintain a written Airport Operator Security Programme that meets the requirements of the National Civil Aviation Security Programme and these Regulations.

(3) An Airport Operator Security Programme shall—

(a) detail the specific security measures and procedures to be implemented at the airport that comply with the requirements of the National Civil Aviation Security Programme;

(b) provide for the appointment of a qualified and appropriately trained person as per the requirements of the National Civil Aviation Security Training Programme who shall coordinate the implementation of the approved Airport Security Programme;

(c) provide for the establishment of an Airport Security Committee in conformity with the requirements stipulated in the National Civil Aviation Security Programme;

(d) provide for background checks to be completed in respect of persons implementing security controls, persons with unescorted access to security restricted areas, and persons with access to sensitive aviation security information prior to their taking up these duties or accessing such areas or information;

(e) include recurrent background checks to be applied to such persons at least once every two years;

(f) require that persons found unsuitable following any background check are immediately denied the opportunity to implement security controls, unescorted access to security restricted areas, and access to sensitive aviation security information;

(g) require the integration of the needs of aviation security into the design and construction of new facilities and alterations to existing facilities at the airport;

(h) provide for recruitment, training, application of recurrent background checks every two years and certification of staff involved in the implementation of security controls;

(i) provide security control measures for aircraft arriving from airports where security controls are in doubt or inadequate;

(j) contain a contingency plan and resources for safeguarding civil aviation against acts of unlawful interference and provide for matters including—

(i) measures and procedures in case of hijack of aircraft and hostage-taking at the airport and on board aircraft;

(ii) access and procedures in case of sabotage, including bomb threats to aircraft and to the airport;

(iii) access and procedures in case of terrorist attacks on aircraft and the airport, including attacks using Man-portable air defence systems (MANPADS) or chemical, biological, nuclear and other weapons;

(iv) procedures when a prohibited item is found or is believed to be on board an aircraft;

(v) evacuation and search of airport facilities and aircraft on the ground;

(vi) special security measures to be enacted during periods of increased threat or for critical flights and routes;

(k) provide measures to identify their critical information and communications technology systems and data used for civil aviation purposes and, in

accordance with a risk assessment, develop and implement, as appropriate, measures to protect them from unlawful interference;

(l) ensure that the measures implemented protect, as appropriate, the confidentiality, integrity and availability of the identified critical systems and/or data. The measures should include, inter alia, security by design, supply chain security, network separation, and the protection and/or limitation of any remote access capabilities, as appropriate and in accordance with the risk assessment carried out by its relevant national authorities;

(m) contain any other matter prescribed by the Authority.

(4) An Airport Operator Security Programme shall be in accordance with the requirements prescribed in the National Civil Aviation Security Programme.

(5) The Airport Operator Security Programme shall be reviewed and updated as the need may arise and at least once every two years in coordination with all relevant stakeholders.

14. Aircraft operator security programme

(1) A person shall not operate an aircraft serving civil aviation from or within Kenya without an Aircraft Operator Security Programme approved by the Authority.

(2) Every aircraft operator providing service in or from Kenya shall establish, implement and maintain a written Aircraft Operator Security programme that meets the requirements of the National Civil Aviation Security Programme and these Regulations.

(3) An Aircraft Operator Security Programme shall specify the measures, procedures and practices to be followed by the operator to protect passengers, crew, ground personnel, aircraft and facilities from acts of unlawful interference and shall include, at a minimum—

(a) the objectives of the programme and responsibility for ensuring its implementation;

(b) the organisation of the operator's security functions and responsibilities, including the designation of the operator in charge of aviation security;

(c) provide for the appointment of a qualified and appropriately trained person as per the requirements of the National Civil Aviation Security Training Programme who shall coordinate the implementation of the approved Aircraft Operator Security Programme;

(d) provide for recruitment, training, application of recurrent background checks every two years and certification of staff involved in the implementation of security controls;

(e) specific security measures including—

(i) security checks or searches of originating aircraft and protection of the aircraft from unauthorized interference from the time the search or check has commenced until the aircraft departs;

(ii) procedures for the screening of passengers' cabin baggage and hold baggage if this function is not assigned to the airport operator;

(iii) procedures to ensure that any items left on board by disembarking passengers at transit stops are removed from the aircraft or otherwise dealt with appropriately before departure of the aircraft;

(iv) reconciliation of hold baggage with boarding persons and authorization for carriage, including those baggage for transit and transfer persons;

(v) measures and procedures to ensure safety on board the aircraft where passengers to be carried are obliged to travel because they have been the subject of judicial and administrative proceedings;

(vi) procedures for the carriage of weapons in the cabin compartment and the aircraft hold;

(vii) in-flight procedures when a prohibited item is found or is believed to be on board an aircraft;

(viii) security of, and control of access to, parked aircraft;

(ix) protection of screened hold baggage, cargo, mail and aircraft catering supplies and stores;

(x) response procedures for crew members and other staff to occurrences and threats;

(xi) protection of flight documents to include but not limited to bag tags, boarding pass stocks, passenger and cargo manifests and security tamper-evident seals;

(xii) procedures for screening, securing and control of known stores and unknown stores;

(xiii) procedures for application of security controls for COMAIL and COMAT;

(xiv) procedures to ensure that security controls are established to prevent acts of unlawful interference with aircraft when they are not in security restricted areas;

(xv) background checks to be completed in respect of persons implementing security controls, persons with unescorted access to security restricted areas, and persons with access to sensitive aviation security information prior to their taking up these duties or accessing such areas or information;

(xvi) recurrent background checks to be applied to such persons at least once every two years;

(xvii) procedures to ensure that persons found unsuitable following any background check are immediately denied the opportunity to implement security controls, unescorted access to security restricted areas, and access to sensitive aviation security information;

(xviii) identifying their critical information and communications technology systems and data used for civil aviation purposes and, in accordance with a risk assessment, develop and implement, as appropriate, measures to protect them from unlawful interference;

(xix) ensuring that the measures implemented protect, as appropriate, the confidentiality, integrity and availability of the identified critical systems and/or data. The measures should include, inter alia, security by design, supply chain security, network separation, and the protection and/or limitation of any remote access capabilities, as appropriate and in accordance with the risk assessment carried out by its relevant national authorities;

(f) measures to ensure the effectiveness of the programme, including adequate training of staff and the periodic testing and evaluation of the security programme;

(g) measures for the prevention of unauthorised persons from boarding aircraft;

(h) measures to ensure that persons, at points of embarkation, are in possession of valid documents prescribed by the State of transit and destination for control purposes; and

(i) any other matter prescribed by the Authority.

(4) An Aircraft Operator Security Programme shall be in accordance with the requirements prescribed in the National Civil Aviation Security Programme.

(5) The Aircraft Operator Security Programme shall be reviewed and updated as the need may arise and at least once every two years.

15. Regulated agent security programme

(1) A person shall not operate an enterprise or an organisation whose purpose is the movement of cargo or mail, by air within or from Kenya without a Regulated Agent Security Programme approved by the Authority and a certificate issued by the Authority—

(2) A Regulated Agent Security Programme shall contain—

(a) provisions to meet the requirements of the National Civil Aviation Security Programme and these Regulations; and

(b) provisions to respond to orders, circulars and directives issued by the Authority under regulation 7;

(c) provide for the appointment of a qualified and appropriately trained person as per the requirements of the National Civil Aviation Security Training Programme who shall coordinate the implementation of the approved Regulated Agent Security Programme;

(d) details of how the regulated agent plans to meet and maintain the requirements set out in the Regulated Agent Security Programme;

(e) procedures for—

(i) ensuring that where screening of cargo and mail is conducted, screening is carried out using an appropriate method or methods, taking into account the nature of the consignment;

(ii) ensuring that screened air cargo or mail is protected from interference and accounted for at every stage of its journey;

(iii) ensuring that enhanced security measures are applied to high-risk cargo and mail to appropriately mitigate the threats associated with it;

(iv) ensuring the security of buildings, premises, transport facilities and access control to secure cargo or mail and implementing remedial action when integrity of the consignment is interfered with;

(v) air cargo or mail acceptance, secure storage, transportation and delivery as appropriate;

(vi) recruitment, training and certification of staff involved in the implementation of security controls;

(vii) background checks to be completed in respect of persons implementing security controls, persons with unescorted access to security restricted areas, and persons with access to sensitive aviation security information prior to their taking up these duties or accessing such areas or information;

(viii) recurrent background checks to be applied to such persons at least once every two years;

(ix) ensuring that persons found unsuitable following any background check are immediately denied the opportunity to implement security controls, unescorted access to security restricted areas, and access to sensitive aviation security information;

(x) identifying their critical information and communications technology systems and data used for civil aviation purposes and, in accordance with a risk assessment, develop and implement, as appropriate, measures to protect them from unlawful interference;

(xi) ensuring that the measures implemented protect, as appropriate, the confidentiality, integrity and availability of the identified critical systems or data. The measures should include, inter alia, security by design, supply chain security, network separation, and the protection and/or limitation of any remote access capabilities, as appropriate and in accordance with the risk assessment carried out by its relevant national authorities;

(xii) incident reporting and maintenance of records;

(f) any other matter prescribed by the Authority.

(3) Approval of Regulated Agent Security Programmes shall be based on the supply chain security process, which comprises management of applicable cargo and mail policies, procedures, and technology, as stipulated in the National Civil Aviation Security Programme to protect supply chain assets from acts of unlawful interference, theft, damage, or terrorism, and to prevent the introduction of prohibited items including explosive devices, contraband, or weapons of mass destruction into the supply chain.

(4) A Regulated Agent Security Programme shall be set out in the manner prescribed in the National Civil Aviation Security Programme.

(5) The Regulated Agent Security Programme shall be reviewed and updated as the need may arise and at least once every two years.

16. Catering operator security programme

(1) A person shall not operate an enterprise or an organisation whose purpose is the direct provision of catering supplies and stores to commercial air transport operators within or from Kenya, without a Catering Operator Security Programme approved by the Authority and a certificate issued by the Authority.

(2) A Catering Operator Security Programme shall contain—

(a) provisions to meet the requirements of the National Civil Aviation Security Programme and these Regulations;

(b) details of how the catering operator intends to comply with, and maintain the requirements set out in the Catering Operator Security Programme;

(c) provide for the appointment of a qualified and appropriately trained person as per the requirements of the National Civil Aviation Security Training Programme who shall coordinate the implementation of the approved Catering Operator Security Programme;

(d) procedures for—

(i) ensuring that screening or appropriate security controls are applied to catering supplies and stores intended for carriage on commercial flights;

(ii) ensuring that secure catering supplies and stores are protected from interference until loaded onto aircraft and remedial action taken when the integrity of the supplies and stores is interfered with;

(iii) ensuring the security of buildings, premises and transport facilities;

(iv) acceptance, storage, processing, transportation and delivery of catering supplies and stores;

(v) recruitment, training and certification of staff involved in the implementation of security controls;

(vi) background checks to be completed in respect of persons implementing security controls, persons with unescorted access to security restricted areas, and persons with access to sensitive aviation security information prior to their taking up these duties or accessing such areas or information;

(vii) recurrent background checks to be applied to such persons at least once every two years;

(viii) ensuring that persons found unsuitable following any background check are immediately denied the opportunity to implement security controls, unescorted access to security restricted areas, and access to sensitive aviation security information;

(ix) identifying their critical information and communications technology systems and data used for civil aviation purposes and, in accordance

with a risk assessment, develop and implement, as appropriate, measures to protect them from unlawful interference;

(x) ensuring that the measures implemented protect, as appropriate, the confidentiality, integrity and availability of the identified critical systems and/or data. The measures should include, inter alia, security by design, supply chain security, network separation, and the protection and/or limitation of any remote access capabilities, as appropriate and in accordance with the risk assessment carried out by its relevant national authorities;

(xi) reporting of incidents and maintaining records;

(e) any other matter prescribed by the Authority.

(3) A Catering Operator Security programme shall be set out in the manner prescribed in the National Civil Aviation Security Programme.

(4) The Catering Operator Security Programme shall be reviewed and updated as the need may arise and at least once every two years.

17. Air Navigation Service Provider security programme

(1) A person shall not operate an enterprise or an organization whose purpose is the provision of air navigation services without a written Air Navigation Service Provider Security Programme approved by the Authority.

(2) An Air Navigation Service Provider Security Programme shall contain —

(a) provisions to meet the requirements of the National Civil Aviation Security Programme and these Regulations;

(b) provisions to respond to orders, circulars and directives issued by the Authority under regulation 7;

(c) provisions to comply with the relevant aspects of the Airport Security Programmes of the airport of operation;

(d) provisions for the appointment of a qualified and appropriately trained person as per the requirements of the National Civil Aviation Security Training Programme who shall coordinate the implementation of the approved Air Navigation Service Provider Security Programme;

(e) specific measures to meet and maintain the requirements set out in the Air Navigation Service Provider Security Programme;

(f) procedures for—

(i) co-ordination and communication with stakeholders at airports on security of ANS facilities;

(ii) ensuring the security of air navigation service facilities, air navigational aids including access control measures for persons and vehicles;

(iii) personnel security to include background checks and security awareness training for all air navigation service staff who have unescorted access to the airside or security restricted areas;

(iv) identifying their critical information and communications technology systems and data used for civil aviation purposes and, in accordance with a risk assessment, develop and implement, as appropriate, measures to protect them from unlawful interference;

(v) ensuring that the measures implemented protect, as appropriate, the confidentiality, integrity and availability of the identified critical systems and/or data. The measures should include, *inter alia*, security by design, supply chain security, network separation, and the protection and/or limitation of any remote access capabilities, as appropriate and in accordance with the risk assessment carried out by its relevant national authorities;

(vi) training of air navigation service provider personnel in security-related aspects of their functions;

(g) contingency planning and response for aviation security-related emergencies including—

(i) unlawful seizure of aircraft;

(ii) bomb threats on board an aircraft or air navigation facility;

(iii) sabotage of an air navigation facility;

(iv) threats of or attacks on aircraft using Man-Portable Air Defence Systems (MANPADS);

(v) cyber-attacks against Air Traffic Management systems;

(h) Air Traffic Management (ATM) support for law enforcement;

(i) Airspace management for Air Traffic Management Security;

(j) incident reporting and maintenance of records;

(k) any other matter prescribed by the Authority.

(3) An Air Navigation Service Provider Security Programme shall be set out in the manner prescribed in the National Civil Aviation Security Programme.

(4) The Air Navigation Service Provider Security Programme shall be reviewed and updated as need arises and at least once every two years.

18. Application for approval of security programme

(1) Where a security programme is required to be approved by the Authority under Regulations 13, 14, 15, 16 and 17 of these Regulations, the applicant shall —

(a) submit the programme to the Authority, ensuring that it meets the requirements of the National Aviation Security Programme, these Regulations and any other relevant law; and

(b) pay the fee prescribed by the Authority.

(2) A security programme submitted to the Authority for approval under this regulation shall be in duplicate and signed by the applicant or on behalf of the applicant.

19. Approval of security programme

(1) Where the Authority is satisfied that a security programme submitted under regulation 18, meets the requirements of these Regulations, the National Civil Aviation Security Programme and any other relevant law, the Authority shall, within thirty days after receipt of the programme, approve the security programme.

(2) Where the Authority determines that a security programme submitted under regulation 18 does not meet the requirements of these

Regulations, the National Civil Aviation Security Programme or relevant law, the Authority shall, within thirty days after receipt of the programme, direct the applicant to modify and re-submit the security programme to the Authority within thirty days after receipt of the response from the Authority.

(3) Where the Authority is satisfied that a security programme re-submitted under sub regulation (2) meets the requirements of these

Regulations, the National Civil Aviation Security Programme and any other relevant laws, the Authority shall, within fifteen days, after receipt of the programme, approve the security programme.

(4) A copy of the approved Operator Security Programme shall be kept by the Authority, the airport operator and the respective operator either in hard or electronic format.

20. Changed conditions affecting security

(1) Where a security programme has been approved under regulation 19, the operator, where applicable, shall comply with the procedure prescribed by sub regulation (2), whenever the operator determines that—

(a) any description of the area set out in the security programme is no longer accurate;

(b) any description of the operations set out in the security programme is no longer accurate, or that the procedures included, and the facilities and equipment described in the security programme are no longer adequate.

(2) Whenever a situation described in sub regulation (1) occurs, the operator, where applicable shall—

(a) immediately notify the Authority of the changed conditions, and identify each interim measure being taken to maintain adequate security until approval is granted for an appropriate amendment of the security programme; and

(b) within thirty days after notifying the Authority in accordance with paragraph (a), submit for approval, in accordance with the procedure prescribed by regulation 18, an amendment to the security programme to bring it into compliance with these Regulations.

(3) The Authority shall, where an amendment to a security programme is submitted to it under sub regulation (2)(b), approve the amendment in accordance with the procedure prescribed by regulation 19.

21. Power of Authority to direct amendment of security programme

(1) Where the Authority determines that an operator's security programme requires amendment, the Authority may direct the respective operator to amend the security programme and submit it to the Authority for approval.

(2) The Authority shall, where an amended security programme is submitted to it under sub regulation (1), approve the security programme in accordance with the procedure prescribed by regulation 19.

22. National civil aviation security training programme

(1) The Authority shall develop a National Civil Aviation Security Training Programme for personnel of all entities involved with or responsible for the implementation of various aspects of the National Civil Aviation Security Programme including security awareness training for those authorized to have unescorted access to the airside.

(2) The Authority shall co-ordinate the implementation of the National Civil Aviation Security Training Programme developed under sub regulation (1).

(3) The Authority shall notify the entities concerned of the training requirements identified in the National Aviation Security Training Programme for their implementation.

(4) A person shall not operate an aviation security training center or offer aviation security courses without a valid certificate or authorization issued by the Authority and in compliance with the requirements of the National Civil Aviation Security Training Programme.

(5) The Authority shall ensure the development and implementation of training programmes and a certification system for aviation security screeners, supervisors, instructors and inspectors in accordance with the National Civil Aviation Security Programme.

(6) The certification system referred to under sub-regulation (5) above shall ensure that instructors are qualified in the applicable subject matters in accordance with the National Civil Aviation Security Training Programme.

23. Operator aviation security training programme

(1) Every operator shall develop and implement an Aviation Security Training Programme to ensure the effective implementation of their respective security operations; and the training programme shall conform with the requirements of the National Civil Aviation Security Training Programme and these Regulations.

(2) A training programme referred to in sub regulation (1) shall include—

(a) training of appropriate employees, taking into account human factors principles and human performance;

(b) training to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage on an aircraft to enable them to contribute to the prevention of acts of sabotage, unlawful seizure of aircraft or other forms of unlawful interference and to minimise the consequences of such events should they occur;

(c) security awareness training at least once every two years for all staff or personnel involved with or responsible for the implementation of various aspects of the National Civil Aviation Security Programme and those authorized to have unescorted access to the airside; and

(d) any other training matter prescribed by the Authority.

(3) A training programme referred to in sub regulation (1) shall be submitted to the Authority for approval in accordance with the procedure prescribed in Regulations 18 and 19.

(4) Operators shall ensure that persons implementing security controls possess all competencies required to perform their duties and are appropriately trained and certified according to the requirements of the National Civil Aviation Security Programme and that appropriate records are maintained up to date.

24. Airport security committee

(1) Every airport serving civil aviation shall establish an Airport Security Committee.

(2) The functions of the Airport Security Committee are—

(a) to coordinate the implementation and maintenance of security controls and procedures as specified in the Airport Operator's Security programme referred to in regulation 13;

(b) to oversee the implementation of the decisions or directives of the National Civil Aviation Security Committee;

(c) to oversee and monitor the Airport Security Programme, including special measures introduced by the airport administration, operators and airport tenants;

(d) to coordinate the implementation of landside security measures;

(e) to draw up, maintain and review from time to time, a list of vulnerable points, and of essential equipment and facilities;

(f) to ensure that—

(i) basic minimum security measures and procedures are adequate to meet threats and are under constant review, providing for normal situations, periods of heightened tension and emergency situations;

(ii) recommendations that improve security measures and procedures are implemented;

(iii) security measures are incorporated in airport expansion or modification programmes;

(g) to prescribe and co-ordinate security education, awareness and training of airport and other staff and the general public.

(3) The Airport Security Committee shall refer to the National Civil Aviation Security Committee, any matter relating to aviation security and which is within its functions under sub regulation (2), which cannot be resolved at the airport level.

(4) The manager or person in charge of the airport shall be the chairperson of the Airport Security Committee.

(5) The Chairperson shall appoint the other members of the Airport Security Committee.

(6) The Airport Security Committee shall, where available, consist of members from all agencies engaged in the operation of the airport which contribute to the establishment and implementation of security measures including—

(a) persons in charge of airport administration;
(b) persons in charge of aviation security at the airport;
(c) Kenya Civil Aviation Authority;
(d) Kenya Defence Forces;
(e) Kenya Airports Police;
(f) Department of immigration services;
(g) respective county government security committee;
(h) Directorate of Criminal Investigations;
(i) National Intelligence Service;
(j) Port health services;
(k) Postal Corporation of Kenya;
(l) representative of fuel companies;
(m) representative of regulated agents;
(n) in-flight caterers;
(o) a representative of the airlines and/or handling agents;
(p) a representative of the airport tenants;
(q) air navigation services provider;
(r) fire and rescue services;
(s) customs and border control; and
(t) Kenya Wildlife Service.

(7) The Airport Security Committee may invite any person to attend and take part in the proceedings of the Committee and that person may participate in any discussion at the meeting but shall not have a right to vote at that meeting.

(8) The Chairperson shall convene every meeting of the Airport Security Committee and the Committee shall meet for the discharge of business at least once in every month to ensure that the airport security programme is up to date and effective and that its provisions are being effectively implemented.

PART IV – Preventive security measures

25. Airport security controls

(1) An airport operator shall be responsible for the maintenance, coordination and implementation of security controls including; identification and resolution of suspicious activity that may pose a threat to civil aviation at the airport for the purpose of protecting passengers, crew members, aircraft, airports and aviation facilities and preventing acts of unlawful interference and ensuring that appropriate action is taken when an act of unlawful interference occurs or is likely to occur.

(2) Every operator of an airport serving civil aviation shall be responsible for the security of facilities and employment of security equipment, where appropriate, to the extent operationally, technically and financially practicable, to achieve civil aviation security objectives and shall—

(a) use randomness and unpredictability in the implementation of security measures, as appropriate;
(b) ensure that—
    (i) access to airside areas at the airport is controlled in order to prevent unauthorized entry;
    (ii) security restricted areas are established at the airport, in accordance with regulation 26;

(iii) architectural and infrastructure related requirements necessary for the optimum implementation of security measures under the National Civil Aviation Security Programme are integrated into the design and construction of new facilities and alterations to existing facilities at airports;

(iv) persons engaged to implement security controls, subject to initial and recurrent background checks and selection procedures, are capable of fulfilling their duties and are adequately trained;

(v) originating passengers and crew, and their cabin baggage are screened before accessing security restricted areas and protected from unauthorized interference until boarding an aircraft engaged in commercial air transport operations. If unauthorized interference does take place, the passengers or crew concerned and their cabin baggage shall be re-screened before boarding an aircraft;

(vi) appropriate screening methods that are capable of detecting the presence of explosives and explosive devices carried by passengers on their persons or in cabin baggage are used. Where these methods are not applied continuously, they shall be used in an unpredictable manner;

(vii) originating hold baggage is screened before being loaded onto an aircraft engaged in commercial air transport operations departing from a security restricted area;

(viii) all hold baggage to be carried on aircraft engaged in commercial air transport is protected from unauthorised interference from the point it is screened or accepted into the care of the carrier, whichever is earlier, until departure of the aircraft on which it is to be carried; and that where the integrity of hold baggage is jeopardized, the hold baggage is re-screened before being placed on board an aircraft;

(ix) baggage which has been identified as unaccompanied is subjected to additional screening subsequent to it being established as unidentified;

(x) transfer hold baggage is screened before being loaded into an aircraft engaged in commercial air transport operations, unless the Authority has established a validation process and continuously implements procedures, in collaboration with the other Contracting States where appropriate, to ensure that such hold baggage has been screened at the point of origin and subsequently protected from unauthorised interference from the originating airport to the departing aircraft at the transfer airport;

(xi) transfer passengers and their cabin baggage are screened prior to boarding an aircraft, unless the Authority has established a validation process and continuously implements procedures, in collaboration with the other Contracting State where appropriate, to ensure that such passengers and their cabin baggage have been screened to an appropriate level at the point of origin and subsequently protected from unauthorized interference from the point of screening at the originating airport to the departing aircraft at the transfer airport;

(xii) measures for transit operations are established to protect transit passengers' cabin baggage from unauthorized interference and protect the integrity of the security of the airport of transit;

(xiii) there is no possibility of mixing or contact between passengers subjected to security control and other persons not subjected to such control after the security screening points at airports serving civil aviation have been passed; and that" where mixing or contact does

take place, the passengers concerned and their cabin baggage are re-screened before boarding an aircraft;

(xiv) the persons carrying out security controls are certified according to the requirements of the National Civil Aviation Security Programme;

(xv) luggage or personal belongings that are unidentified or left unattended at an airport are subjected to appropriate security controls and disposal procedures in accordance with a security risk assessment carried out by the relevant national authorities;

(xvi) measures are established and implemented to ensure that all persons other than passengers, together with items carried are screened prior to being granted access to airport security restricted areas;

(xvii) appropriate screening methods that are capable of detecting the presence of explosives and explosive devices carried by persons other than passengers on their persons or in their items carried are used. Where these methods are not applied continuously, they shall be used in an unpredictable manner;

(xviii) all vehicles being granted access to security restricted areas, together with items contained within them, are screened and subjected to other appropriate security controls in accordance with a risk assessment carried out by the relevant national authorities;

(xix) measures are established to ensure that merchandise and supplies introduced into security restricted areas are subjected to appropriate security controls, which may include a supply chain security process or screening;

(xx) landside areas are identified and designated;

(xxi) security measures in landside areas are established to mitigate the risk of and prevent possible acts of unlawful interference in accordance with risk assessments carried out by the relevant national authorities;

(xxii) where practicable, in order to improve efficiency, modern screening or examination techniques are used to facilitate the physical examination of cargo or mail to be imported or exported;

(xxiii) critical information and communications technology systems and data used for civil aviation purposes are identified, in accordance with a risk assessment, and develop and implement, as appropriate, measures to protect them from unlawful interference;

(xxiv) measures designed to safeguard against acts of unlawful interference are applied to domestic operations;

(xxv) whenever possible, arrange for the security controls and procedures to cause a minimum of interference with, or delay to the activities of civil aviation provided the effectiveness of these controls and procedures is not compromised;

(c) establish—

(i) storage areas where mishandled baggage may be held after screening until forwarded, claimed or disposed of;

(ii) bomb disposal areas where detected explosives may be disposed of;

(iii) person and vehicle identification systems;

(d) institute and implement adequate security controls, including background checks every two years on a recurrent basis on persons other than passengers granted unescorted access to security restricted areas of the airport;

(e) in accordance with the risk assessment carried out by the relevant national or local authorities, ensure that appropriate measures on the ground or operational procedures are established to mitigate possible attacks against

aircraft using Man-Portable Air Defence Systems (MANPADS) and other weapons representing a similar threat to aircraft at or near an airport;

(f) employ behaviour detection techniques to identify any suspicious persons at airports;

(g) make arrangements to investigate, render safe or dispose of, if necessary, suspected sabotage devices or other potential hazards at the airport;

(h) employ and deploy suitably trained personnel to assist in dealing with suspected or actual cases of unlawful interference with civil aviation;

(i) conduct a full scale contingency exercise that incorporates security scenarios at least once in every two years;

(j) conduct a table top contingency exercise at least once a year.

26. Security restricted areas and airport security permits

(1) The Authority, in conjunction with the airport operator d other responsible persons concerned, shall identify areas where, based on a security risk assessment carried out by the relevant national authorities, operations vital to the continued safe operation of civil aviation in Kenya are carried out, and designate those areas as security restricted areas.

(2) An area designated as a security restricted area shall—

(a) be marked and protected through physical or personnel protective measures or through a combination of these measures to prevent unauthorised access to it;

(b) be separated from public or non-security restricted areas by an appropriate physical barrier; and

(c) be inspected at regular intervals.

(3) Authorised access to a security restricted area at every airport and designated off-airport facilities serving commercial air transport operations shall be controlled through the issuance of airport security permits for persons and vehicles.

(4) The airport operator shall establish and implement identification systems in respect of persons and vehicles in order to prevent unauthorized access to airside areas and security restricted areas. Access shall be granted only to those with an operational need or other legitimate reason to be there. Identity and authorization shall be verified at designated checkpoints before access is allowed to airside areas and security restricted areas.

(5) A person issued with an airport security permit under this regulation shall, while on duty, at all times properly display the security permit on the outermost garment above the waist.

(6) Designated authorities responsible for controlling access to security restricted areas shall specify the recognised places of entry through the security restricted area barrier and ensure that the area has adequate physical protection, of at least the same quality as the barrier itself, or is enough to prevent unauthorised access.

(7) All areas at an airport to which access is restricted shall bear signage indicating the type of restriction and penalty for non-compliance.

(8) An airport operator shall keep, at the airport, a current scale map of the airport identifying security restricted areas, and security barriers and security restricted area access points.

27. Airport boundary

(1) An airport operator shall ensure that—

(a) the airport has a conspicuous physical barrier or means of indicating the airport boundary with posted signs bearing a warning to prevent incursions and trespassing; and

(b) measures are in place to ensure continuous protection and monitoring of the integrity of the perimeter to prevent incursions and trespassing.

28. Carriage of firearms, explosives or inflammable materials in airport premises

(1) Except for law enforcement officers on duty, no person shall carry or possess, in airport premises, firearms, ammunitions, explosives or inflammable materials or weapons, unless authorised in writing as appropriate.

(2) An airport operator shall ensure that no unauthorised person carries firearms, ammunitions, explosives or inflammable materials within the airport premises.

29. Control of access by tenants

(1) The airport operator shall ensure that tenants whose premises or facilities form part of the landside or airside boundary through which access can be gained to the airside are responsible for control of access through their premises, and shall carry on business in compliance with the Airport Operator Security Programme.

(2) For the purposes of this regulation, "tenants" means—

(a) individuals or businesses granted a licence or other permit by the airport operator to conduct business operations at the airport, including concessionaires, cargo handlers, caterers, tour operators, taxi and bus operators, porters, aircraft maintenance organisations and fuel companies; or

(b) Government authorities and agencies at the airport, including customs, immigration, health, agriculture and meteorology.

30. Obligation of airport operator in case of threat against facility or airport

(1) Where an airport operator is made aware of a threat against his or her facility or any part of the airport under the control of a person carrying on any activity at the airport other than the airport operator, the airport operator shall immediately—

(a) notify the Authority and other entities concerned with the nature of the threat; and

(b) determine whether the threat affects the security of the airport and coordinate the implementation of appropriate measures to counter any threat.

31. Persons authorised to screen to inform airport operator of threat against airport or aircraft

Where a person authorised to conduct any screening activity at an airport is made aware of a threat against the airport or an aircraft, that person shall—

(a) immediately notify the airport or aircraft operator of the nature of the threat; and

(b) assist the airport or aircraft operator in determining whether the threat affects the security of the airport or aircraft.

32. Airport operator to take measures in event of threat

(1) Where an airport operator determines that there is a threat that affects the security of the airport, the airport operator shall immediately take all measures necessary to ensure the safety of the airport and persons at the airport, including informing the relevant parties of the nature of the threat.

(2) Upon assessment and determination of a credible bomb threat, an airport operator shall immediately inform the Authority of the receipt of the bomb threat against an airport and its facilities, or an aircraft.

33. Discovery of weapons, incendiary devices or explosives at airport or security restricted area

(1) An airport operator shall immediately notify the Police and the Authority when there is—

(a) discovery, at the airport or other security restricted area, of a weapon other than a firearm allowed under regulation 28;

(b) discovery, at an airport or other security restricted area, of ammunition other than ammunition allowed under regulation 28;

(c) discovery, at the airport or other security restricted area, of an explosive substance or an incendiary device, other than an explosive substance or incendiary device allowed under regulation 28; or

(d) an explosion at the airport, unless the explosion is known to be the result of an excavation, a demolition, construction or the use of fireworks displays.

34. Airport operator to involve security stakeholders and submit plans before renovation and expansion works

(1) Despite regulation 25(2)(b)(iii), an airport operator shall, before the implementation of any renovation, remodeling or expansion works at the airport, or the construction of new or additional airport facilities, involve security stakeholders and submit to the Authority for its approval, the plans for the renovation and expansion works.

(2) The Authority shall, in approving the plans submitted to it under sub regulation (1), assess the plans to ensure that security considerations are properly addressed and that the needs of aviation security are integrated in the configuration of the works.

35. Operators to conduct security awareness training

Every operator shall ensure that personnel involved with or responsible for the implementation of security controls under the national civil aviation security programme and those authorized to have unescorted access to the airside receive security awareness training at least once in every two years.

36. Operators to conduct internal quality control

Every operator shall conduct internal quality control to include verification of the implementation of security measures outsourced to external service providers to ensure compliance with the operator's security programme.

37. Operators to implement unpredictability

Every operator shall use randomness and unpredictability in the implementation of security measures as appropriate.

38. Operators to keep records

(1) Every operator shall keep a record of every security incident occurring in the course of their operations.

(2) A record required to be kept under sub regulation (1), shall—

(a) be kept for a minimum of ninety days;

(b) be submitted to the Authority within thirty days after the occurrence of the incident; and

(c) where relevant, include—

(i) the number and type of weapons and incendiary devices discovered during any passenger screening process and the method of detection of each;

(ii) the number of acts and attempted acts of unlawful interference;

(iii) the number of bomb threats received, real and simulated bombs found and actual bombings or explosions at the airport; and

(iv) the number of detentions and arrests and the immediate disposition of each person detained or arrested.

39. Responsibilities of aircraft operators

(1) An aircraft operator registered in or providing service from Kenya and participating in code-sharing or other collaborative arrangements with other operators shall notify the Authority of the nature of these arrangements, including the identity of the other operators.

(2) An aircraft operator registered in or providing service from Kenya shall not—

(a) transport the baggage of a person who is not on board the aircraft unless that baggage is identified as unaccompanied and subjected to appropriate screening;

(b) transport items of hold baggage which have not been individually identified as accompanied or unaccompanied, or screened to the appropriate standard and accepted for carriage on that flight by the air carrier. All such baggage shall be recorded as meeting these criteria and authorized for carriage on that flight;

(c) accept consignments of cargo or mail, in-flight catering supplies and stores, company mail and materials for carriage on aircraft engaged in commercial air transport operations, unless the security of the consignments is confirmed and accounted for by an entity certified by the Authority, or the consignments are subjected to security controls to meet the appropriate security requirements.

(3) An aircraft operator providing service in or from Kenya shall—

(a) carry out and maintain, at an airport, on an aircraft and at any aviation facility under the control of the operator, security measures including identification and resolution of suspicious activity that may pose a threat to civil aviation, and any other measures prescribed in the National Civil Aviation Security Programme and the Airport Security Programme;

(b) provide adequate supervision over the movement of persons and vehicles to and from the aircraft in security restricted areas in order to prevent unauthorised access to aircraft;

(c) ensure that—

(i) all its security personnel and security service providers are familiar with, and comply with the requirements of the Aircraft Operator Security Programme;

(ii) necessary precautions are taken at the point of embarkation to ensure that passengers are in possession of valid documents prescribed by the State of transit and destination for control purposes.

(iii) all its aircraft carry a checklist of the procedures to be complied with for that type of aircraft in searching for concealed weapons, explosives or other dangerous devices;

(iv) persons conducting screening functions are certified by the Authority;

(d) be responsible for the security of his or her aircraft;

(e) ensure that persons engaged to implement security controls are subject to initial and recurrent background checks and selection procedures, are capable of fulfilling their duties and are adequately trained;

(f) institute and implement adequate security controls, including background checks every two years on a recurrent basis on persons other than passengers granted unescorted access to security restricted areas of the airport;

(g) employ behaviour detection techniques to identify any suspicious persons at airports;

(h) where practicable, ensure that appropriate screening methods that are capable of detecting the presence of explosives and explosive devices carried by passengers on their persons or in cabin baggage are used, and that where these methods are not applied continuously, they shall be used in an unpredictable manner;

(i) institute measures to identify and remove any prohibited or unaccounted for items—

(i) before departure of an aircraft engaged in commercial flights;

(ii) after passengers have disembarked from an aircraft engaged in commercial flights;

(iii) left behind by passengers disembarking from transit flights;

(j) identify their critical information and communications technology systems and data used for civil aviation purposes and, in accordance with a risk assessment, develop and implement, as appropriate, measures to protect them from unlawful interference.

40. Special protection for aircraft

(1) An aircraft operator may, notwithstanding regulation 39(3)(d), request for special protection of an aircraft from an airport operator.

(2) Where special protection is offered to an aircraft operator under sub regulation (1), the protection shall be on terms and conditions determined by the airport operator.

41. Control of prohibited items

(1) No person shall, subject to regulation 28, possess or have with him or her a prohibited item while-

(a) in a security restricted area;

(b) on board an aircraft; or

(c) in an air navigation installation.

(2) The prohibited items referred to in sub regulation (1) include—

(a) firearms or articles appearing to be firearms, whether or not they can be discharged;

(b) nuclear, chemical or biological agents adapted, or capable of being used for causing injury to or incapacitating persons or damaging or destroying property;

(c) ammunition and explosives;

(d) articles manufactured or adapted to have the appearance of explosives, whether in the form of a missile, bomb, grenade or otherwise;

(e) articles made or adapted for causing injury to or incapacitating persons or damaging or destroying property; and

(f) any other dangerous article or substance or other item prescribed by the Authority from time to time.

42. Control of access to flight crew compartment

An aircraft operator engaged in commercial air transport shall—

(a) where an aircraft is equipped with a flight crew compartment door, ensure that the door is lockable from the flight crew compartment only and remains locked during flight, except to permit access and exit by authorised persons; and

(b) where an aircraft is not equipped with a flight crew compartment door, ensure the implementation of measures as appropriate to prevent unauthorised persons from entering the flight crew compartment during flight.

43. Control of special categories of passengers

(1) Law enforcement officers shall inform the aircraft operator and the pilot in command, not less than twenty four hours prior to departure when passengers are obliged to travel because they have been the subject of judicial or administrative proceedings, in order that appropriate security controls can be applied.

(2) The aircraft operator shall inform the pilot in command of the number of armed or unarmed escort persons, the individuals whom they are escorting and their seat locations in the aircraft.

44. Authorised carriage of weapons on board aircraft

(1) The carriage of weapons on board aircraft by law enforcement officers and other authorised persons, acting in the performance of their duties, shall be in accordance with the laws of Kenya.

(2) Subject to sub regulation (3), the Authority may—

(a) approve, in writing, the carriage of weapons on board aircraft by law enforcement officers and other authorised persons acting in the performance of their duties;

(b) consider requests by any other State to allow the travel of armed personnel, including inflight security officers on board aircraft of operators of the requesting State. Only after agreements by all States involved shall such travel be allowed.

(3) Notwithstanding sub-regulation (2), an aircraft operator may allow or refuse the carriage of weapons on board an aircraft in accordance with conditions issued by the Authority.

(4) Where an aircraft operator accepts the carriage of weapons removed from passengers, the aircraft shall have provision for stowing the weapons so that they are inaccessible to any person during flight time and, in the case of a firearm, to ensure that it is not loaded, an authorized and duly qualified person has determined that it is not loaded.

(5) Where Kenya decides to deploy in-flight security officers—

(a) the officers shall be government personnel who are especially selected and trained, taking into account the safety and security aspects on board an aircraft; and

(b) the officers shall be deployed according to the threat assessment conducted by the relevant authority.

(6) The deployment under sub-regulation (5) shall be done in coordination with concerned States and shall be kept strictly confidential.

45. Conditions for acceptance of cargo or mail for air transportation

(1) A regulated agent shall, before accepting cargo or mail for transport in an aircraft—

(a) establish and register the name and address of the known consignor;

(b) establish the credentials of the person who delivers the cargo or mail as an agent of the known consignor;

(c) ensure, on the basis of appropriate security controls or security screening, that such cargo or mail do not contain any prohibited items;

(d) ensure the safeguarding of such cargo or mail from unauthorised interference after acceptance;

(e) ensure the cargo or mail are received by staff who are properly recruited and trained;

(f) designate a person to implement and supervise the screening process and applicable security controls;

(g) ensure that the following categories of cargo or mail are not carried by air unless they have been subjected to screening—

(i) unaccompanied baggage;

(ii) cargo or mail from unknown consignors;

(iii) cargo or mail for which the contents do not coincide with the description delivered;

(iv) high-risk cargo or mail; and

(h) ensure that known cargo and mail that has been confirmed and accounted for is issued with a security status, either in an electronic format or in writing, which shall accompany the cargo and mail throughout the secure supply

chain and in the event of unlawful interference, the consignment shall be re-screened or subjected to appropriate security control and a fresh security status issued.

(2) A regulated agent who offers cargo or mail to an aircraft operator for transport by aircraft shall produce and make available to the aircraft operator, and the Authority on demand, shipping documents, records of cargo or mail accepted and offered for air transport, employee training records and air waybills.

(3) A regulated agent shall make available to the Authority, a report of any incident where a shipping document did not provide an accurate record of the cargo and/or mail being offered for air transport.

(4) All cargo and mail intended for carriage on an aircraft engaged in commercial air transport operations shall be subjected to appropriate security controls including screening where practicable by airport operators, aircraft operators and regulated agents as applicable, before being placed on board an aircraft.

46. Conditions for acceptance of cargo or mail, COMAT and COMAIL for transportation

For the purpose of protecting passengers, crewmembers, aircraft and airports from acts of unlawful interference with civil aviation, every regulated agent shall establish measures to ensure that —

(a) only screened and secure cargo or mail is loaded into aircraft engaged in civil aviation;

(b) persons engaged to implement security controls are subject to initial and recurrent background checks and selection procedures, are capable of fulfilling their duties and are adequately trained;

(c) persons conducting screening functions are certified by the Authority as appropriate;

(d) the regulated agent institutes and implements adequate security controls, including recurrent background checks every two years on persons other than passengers granted unescorted access to security restricted areas;

(e) all cargo and mail to be carried on a commercial aircraft is protected from unauthorized interference from the point of screening or other security controls are applied until tendered to another regulated agent, aircraft operator until departure. If there are grounds to suspect that the integrity of the cargo and mail may be jeopardized, the cargo is re-screened and secured as appropriate;

(f) where screening of cargo and mail is conducted, the screening is carried out using an appropriate method or methods, taking into account the nature of the consignment;

(g) enhanced security measures are identified and applied to high-risk cargo and mail to appropriately mitigate the threats associated with it;

(h) known cargo and mail that has been confirmed and accounted for is issued with a security status which shall accompany, either in an electronic format or in writing, the cargo and mail throughout the secure supply chain; and

(i) where handled, transfer cargo and mail is subjected to appropriate security controls prior to being loaded on another aircraft engaged in commercial air transport operations.

47. Security measures to be taken by aircraft operators

(1) The aircraft operator is responsible for ensuring that appropriate security controls have been carried out, and in so doing, the aircraft operator shall—

(a) not accept cargo or mail for carriage on an aircraft engaged in commercial air transport operations unless the application of screening or other security

controls is confirmed and accounted for by a regulated agent, a known consignor, or an entity that is approved by the Authority. Cargo and mail which cannot be confirmed and accounted for by a regulated agent, a known consignor, or an entity that is approved by the Authority shall be subjected to screening;

(b) protect the consignment from unlawful interference while it is in the custody of the aircraft operator, and that if there are grounds to suspect that the integrity of the consignment may be jeopardised, the said consignment is re-screened before being placed on board an aircraft;

(c) protect the consignment from unlawful interference while it is in the custody of the aircraft operator, and that if there are grounds to suspect that the integrity of the consignment may be jeopardised, the said consignment is re-screened before being placed on board an aircraft;

(d) COMAT and COMAIL are subjected to appropriate security controls prior to placement on board an aircraft engaged in commercial air transport operation;

(e) ensure that all consignments placed on board the aircraft are recorded on the aircraft manifest;

(f) ensure that enhanced security measures apply to high-risk cargo and mail to appropriately mitigate the threats associated with it; and

(g) ensure that transfer cargo and mail is subjected to appropriate security controls and protected from unauthorized access prior to being loaded onto another aircraft engaged in commercial air transport operations unless the Authority has established a validation process and continuously implements procedures, in collaboration with the other Contracting State where appropriate, to ensure that such consignment has been screened at the point of origin and subsequently protected from unauthorized interference from the originating airport to the departing aircraft at the transfer point.

(2) The aircraft operator may delegate any of the functions under sub regulation (1) to a regulated agent.

(3) For the avoidance of doubt, notwithstanding the delegation of any functions to a regulated agent under sub regulation (2), the aircraft operator shall remain responsible for ensuring that the appropriate security controls have been carried out.

(4) The aircraft operator or the regulated agent shall ensure that all consignments due to be loaded into an aircraft are —

(a) delivered by an established employee of a handling agent, aircraft operator or regulated agent;

(b) covered by valid documentation that has been checked for inconsistencies and fully describes the contents;

(c) covered by a valid consignment security declaration;

(d) checked to establish that there is no evidence of having been tampered with;

(e) kept secure at all times while in their custody; or

(f) screened using an appropriate method or methods, taking into account the nature of the consignment.

(5) An aircraft operator shall make available to the Authority, a report of any incident where an airway bill or equivalent document did not provide an accurate record of the cargo or mail being offered for air transport.

(6) An aircraft operator shall require a regulated agent operator to comply with the ICAO Technical Instructions for the Safe Transportation of Dangerous Goods by Air, Doc. 9284 in all cases where such agent handles dangerous goods.

(7) Appropriate security controls referred to in this regulation shall be as prescribed by the Authority.

48. Aviation security responsibilities of catering operator

(1) A catering operator shall, before accepting catering stores and supplies for preparation as catering supplies for transport in an aircraft—

(a) establish and register the name and address of the supplier of the catering stores and supplies;

(b) establish the credentials of the person who delivers the catering stores and supplies as an agent of the supplier;

(c) ensure, on the basis of appropriate security controls or security screening, that the catering stores and supplies do not contain any prohibited items;

(d) ensure the safeguarding of the catering stores and supplies from unauthorised interference after acceptance;

(e) ensure the catering stores and supplies are received by staff who are properly recruited and trained by the operator;

(f) designate a person to implement and supervise the screening process;

(g) ensure that catering stores and supplies are not carried by air unless they have been subjected to screening and protected from unauthorized interference until loaded onto aircraft;

(h) ensure that each shipment of catering stores and supplies is accompanied by documentation providing the statement of the security status of the shipment;

(i) ensure that persons engaged to implement security controls are subject to recurrent background checks every two years and selection procedures, are capable of fulfilling their duties and are adequately trained;

(j) ensure that persons conducting screening are certified by the Authority as appropriate;

(k) institute and implement adequate security controls, including recurrent background checks every two years on persons other than passengers granted unescorted access to security restricted areas of the airport.

(2) A catering operator who offers catering stores and supplies to an aircraft operator for transport by aircraft shall produce and make available to the aircraft operator, and the Authority on demand, shipping documents, records of supplies and equipment accepted and catering stores and supplies offered for air transport, employee training records and other accountable catering documents.

(3) A catering operator shall identify their critical information and communications technology systems and data used for civil aviation purposes and, in accordance with a risk assessment, develop and implement, as appropriate, measures to protect them from unlawful interference.

49. Conditions for acceptance of catering stores and supplies for air transportation

(1) A catering operator or aircraft operator shall offer or accept catering stores and supplies for transport on an aircraft based on the provisions of sub regulation (2) of this regulation.

(2) A catering operator or aircraft operator shall, before offering or accepting catering stores and supplies for carriage on commercial flights, ensure—

(a) that the catering stores and supplies have been subjected to appropriate security controls, which may include a supply chain security process or screening, and thereafter protected until loaded onto the aircraft;

(b) the safeguarding of the catering supplies and stores against unlawful interference from the time of reception until the catering supplies and stores have been placed in the aircraft;

(c) that the shipments of catering supplies and stores are recorded; and

(d) that whenever the catering supplies and stores are received, those catering supplies and stores are delivered by an authorised employee of the catering operator or aircraft operator.

(3) An aircraft operator shall not accept any catering supplies and stores for transport by aircraft unless the documentation for those catering supplies and stores is examined for inconsistencies and is accompanied by a valid security declaration.

(4) An aircraft operator shall require a catering operator to comply with the ICAO Technical Instructions for the Safe Transportation of Dangerous Goods by Air, Doc. 9284 whenever such goods are handled.

(5) An aircraft operator shall make available to the Authority, a report of any incident where a catering or equivalent document did not provide an accurate record of the catering supplies and stores being offered for air transport.

(6) An aircraft operator shall preserve, for not less than ninety days, a record of acceptance checklists and inspections carried out under this Part.

50. Aviation security responsibilities of ground handling service providers

(1) A person shall not operate an enterprise or an organization whose purpose is the provision of aviation security services as part of ground handling services at an airport within Kenya without a written Ground Handling Service Provider Security Programme and a certificate issued by the Authority.

(2) Ground handling service providers shall develop written security programmes in accordance with the requirements of the National Civil Aviation Security Programme, the security programme of the airport of operation and the security programmes of the airlines they handle as appropriate.

(3) A ground handling service provider's security programme shall include, at a minimum —

(a) the objectives of the procedures and responsibility for ensuring their implementation;

(b) the organization of the ground handling service provider's security functions and responsibilities, including the designation of the person in charge of security;

(c) all measures and procedures to ensure implementation of the relevant aspects of the national civil aviation security programme, the security programme of the airport of operation and customer airline's security programme;

(d) provisions to respond to orders, circulars and directives issued by the Authority under regulation 7 of these regulations;

(e) recruitment and selection procedures including background checks for staff involved in the implementation of security controls;

(f) requirements for background checks to be completed in respect of persons implementing security controls, persons with unescorted access to security restricted areas, and persons with access to sensitive aviation security information prior to their taking up these duties or accessing such areas or information;

(g) procedures for recurrent background checks to be applied to such persons at least once every two years;

(h) procedures to ensure that persons found unsuitable following any background check are immediately denied the opportunity to implement security controls, unescorted access to security restricted areas, and access to sensitive aviation security information;

(i) measures to ensure that where screening is to be conducted by the ground handling service provider to any persons or goods for carriage on commercial flights, or for persons or goods accessing aircraft or security restricted areas

at airports and for conducting aircraft security searches and checks, such service is carried out by screeners who have been appropriately trained pursuant to the requirements of the National Civil Aviation Security Training Programme and subsequently certified by the Authority;

(j) such other matter as the Authority may prescribe.

(4) A ground handling service provider shall ensure that—

(a) the requirements for handling of passengers, baggage, cargo, mail or aircraft security as stipulated in the customer airline's security programme, airport security programme or the National Civil Aviation Security Programme, are implemented as appropriate;

(b) only screened passengers, baggage, cargo or mail, catering supplies or stores, COMAT and COMAIL is loaded onto aircraft engaged in civil aviation as appropriate;

(c) baggage, cargo, mail and catering supplies or stores to be carried on aircraft is protected from unauthorized interference from the point it is screened or accepted into the care of the ground handler or customer air carrier, whichever is earlier, until departure of the aircraft on which it is to be carried, and that if there are grounds to suspect that the integrity of the baggage, cargo, mail, catering supplies or stores has been jeopardized, the baggage, cargo, mail, catering supplies or stores are re-screened before being placed on board an aircraft;

(d) all consignments placed on board the aircraft are recorded on the aircraft manifest;

(e) consignments are covered by valid documentation that has been checked for inconsistencies and fully describes the contents;

(f) all catering supplies and stores, cargo and mail consignments are covered by a valid consignment security declaration in electronic or paper format before acceptance;

(g) all incidents occurring during the handling of aircraft, baggage, catering supplies and stores, cargo or mail are reported and dealt with as appropriate.

(5) The ground handling service provider's security programme shall be subordinate to the security programme of the customer aircraft operator and of the airport of operation, and where there's conflict between the procedures of the ground handling service provider and that of the aircraft operator or airport, the provisions of the latter shall prevail.

(6) The ground handling agent's security programme shall be set out in the manner prescribed in the National Civil Aviation Security Programme.

(7) Security programmes for ground handling agents shall be submitted to the Authority for approval in accordance with the procedures prescribed in regulations 18 and 19 of these Regulations.

(8) A Ground Handling Service Provider Security Programme shall be reviewed and updated as often as need arises or at least once every two years.

51. Responsibilities of aviation security service providers

(1) A person shall not operate an enterprise or an organization whose purpose is the provision of aviation security service at an airport within Kenya without a written Aviation Security Service Provider Programme approved by the Authority and a certificate issued by the Authority.

(2) An Aviation Security Service Provider shall develop a written security programme that implements the relevant provisions of the National Civil Aviation Security Programme, or client's security programme.

(3) A Security programme for an aviation security service provider shall include, at a minimum—

(a) the objectives of the programme and responsibility for ensuring its implementation;

(b) the organization of the aviation security service provider's security functions and responsibilities, including the designation of the person in charge of aviation security who is appropriately trained pursuant to the requirements of the National Civil Aviation Security Training Programme;

(c) all measures and procedures to ensure implementation of the relevant aspects of the client operator's security programme as contracted out in order to safeguard civil aviation against acts of unlawful interference;

(d) provisions to respond to orders, circulars and directives issued by the Authority under regulation 7 or the airport of operation, all other applicable laws and security service industry best practices;

(e) provisions to comply with the relevant aspects of the Airport Security Programmes of the airports from which the aviation security service provider operates;

(f) recruitment and selection procedures including recurrent background checks for staff involved in the implementation of security controls;

(g) requirements for completion of initial and recurrent background checks every two years in respect of persons implementing aviation security controls, persons with unescorted access to security restricted areas, and persons with access to sensitive aviation security information prior to their taking up these duties or accessing such areas or information;

(h) procedures to ensure that persons found unsuitable following any background check are immediately denied the opportunity to implement aviation security controls, unescorted access to security restricted areas, and access to sensitive aviation security information;

(i) measures to ensure that where screening is to be conducted by the aviation security service provider to any persons or goods accessing security restricted areas at airports or for carriage on commercial flights, such service is carried out by screeners who have been appropriately trained pursuant to the requirements of the National Civil Aviation Security Training Programme and subsequently certified by the Authority;

(j) such other matter as the client or the Authority may prescribe.

(4) The security programme for the aviation security service provider shall be subordinate to the security programme of the client operator and of the airport of operation, and where there's conflict between the provisions of the security programme of the aviation security service provider and that of the client operator or of the airport of operation, the provisions of the latter shall prevail.

(5) Security programmes for aviation security service providers shall be set out in a manner that meets the client's requirements with the objective of safeguarding civil aviation against acts of unlawful interference.

(6) Security programmes for aviation security service providers shall be reviewed and updated as often as need arises or as directed by the client or the Authority and at least once every two years.

PART V – Management of response to acts of unlawful interference

52. Prevention of acts of unlawful interference

(1) Adequate measures shall be taken, when reliable information exists that an aircraft may be subjected to an act of unlawful interference—

(a) if the aircraft is on the ground, the Police shall safeguard the aircraft and search it in coordination with the aircraft operator for concealed weapons, explosives or other dangerous devices, articles or substances; and prior

notification of the search shall be provided to the aircraft operator concerned by the airport operator;

(b) if the aircraft is in flight, the Authority shall provide as much prior notification as possible of the arrival of that aircraft to relevant airport authorities and air traffic services of the States concerned;

(2) The airport operator shall ensure that arrangements are made to investigate, render safe or dispose of, if necessary, suspected dangerous devices or other potential hazards at airports.

(3) The airport operator shall ensure that authorized and suitably trained personnel are readily available for deployment at every airport serving civil aviation to assist in dealing with suspected or actual cases of unlawful interference.

53. Authority's response to acts of unlawful interference

The Authority shall—

(a) take adequate measures for the safety of passengers and crew of an aircraft which is subjected to an act of unlawful interference while on the ground until their journey can be continued;

(b) collect all pertinent information on the flight which is the subject of an act of unlawful interference and transmit that information to all other States responsible or the Air Traffic Services units concerned, including those at the airport of known or presumed destination, so that timely and appropriate safeguarding action may be taken en-route and at the aircraft's known, likely or possible destination;

(c) provide such assistance to an aircraft subjected to an act of unlawful seizure, including the provision of navigation aids, air traffic services and permission to land as may be necessitated by the circumstances;

(d) to the extent practicable, ensure that an aircraft subjected to an act of unlawful seizure which has landed in Kenya is detained on the ground unless its departure is necessitated by the overriding duty to protect human life. These measures shall recognize the grave hazard attending further flight and the importance of consultations, wherever practicable, with the State of the Operator of the aircraft, and notification to the States of assumed or stated destination;

(e) notify the State of registry of an aircraft and the State of the operator of the landing aircraft subjected to an act of unlawful interference, and shall similarly transmit, by the most expeditious means, all other relevant information to—

(i) the State of registry and the State of the operator;

(ii) each State whose citizens suffered fatalities or injuries;

(iii) each State whose citizens were detained as hostages;

(iv) each State whose citizens are known to be on board the aircraft; and

(v) the International Civil Aviation Organisation.

(f) re-evaluate security controls and procedures after an act of unlawful interference and in a timely manner, take action necessary to remedy weaknesses so as to prevent recurrence. These actions shall be shared with ICAO.

54. Mandatory reporting

(1) Every operator shall, where an act of unlawful interference occurs, immediately notify the Authority.

(2) Every operator or service provider shall submit to the Authority—

(a) a preliminary written report, within fifteen;

(b) days after the occurrence of an act of unlawful interference, including threats, incidents, disruptive and unruly passengers; and

(c) a final written report, upon completion of investigations, but within thirty days after the occurrence of an act of unlawful interference, including threats, incidents, disruptive and unruly passengers.

55. Notification to the international civil aviation organisation

(1) The Authority shall, where an act of unlawful interference has occurred, provide the International Civil Aviation Organisation with a report on each act, whether successful or unsuccessful as follows-

(a) a preliminary report, within thirty days after the occurrence of the act, containing all pertinent information concerning the security aspects of the occurrence; and

(b) a final report, within sixty days after completion of investigations.

(2) The Authority shall provide copies of reports submitted to the International Civil Aviation Organisation under this regulation to other States, which may have an interest.

(3) The Authority shall exchange information with other Contracting States as considered appropriate on the management of response to an act of unlawful interference, at the same time supplying such information to ICAO.

PART VI – Offences and penalties

56. Offences committed at airports

(1) Any person who engages in any of the following acts at an airport or its related facilities, commits an offence—

(a) assault, intimidation or threat, whether physical or verbal, against an aviation security officer or authorised person if the act interferes with the performance of the duties of the aviation security officer or authorised person or lessens the ability of the aviation security officer or authorised person to perform those duties;

(b) refusal to follow a lawful instruction given by the airport operator or on behalf of the Authority by an aviation security officer or authorised person for the purpose of ensuring order and safety at the airport or of any person or property at the airport or for the purpose of maintaining good order and discipline at the airport;

(c) an act of physical violence against an aviation security officer, inspector or authorised person on duty;

(d) intentionally causing damage to, or destruction of, property;

(e) carriage or possession of firearms, ammunitions, explosives or inflammable materials or weapons, unless authorised as appropriate.

(2) A person who commits an offence under sub-regulation (1) is liable, on conviction, to a fine not exceeding one million shillings or to imprisonment not exceeding one year, or to both.

(3) An airport operator who fails to notify the Authority or other party concerned of a threat under regulation 30 commits an offence and is liable, on conviction, to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year, or to both.

57. Offences committed against crew on board aircraft

(1) Any person who engages in any of the following acts on board a civil aircraft commits an offence—

(a) assault, intimidation or threat, whether physical or verbal, against a crew member if the act interferes with the performance of the duties of the crew member or lessens the ability of the crew member to perform his or her duties;

(b) refusal to follow a lawful instruction given by the aircraft commander or on behalf of the aircraft commander by a crew member, for the purpose of ensuring the safety of the aircraft or of any person or property on board or for the purpose of maintaining good order and discipline on board.

(2) A person who commits an offence under this regulation is liable, on conviction, to a fine not exceeding one million shillings or to imprisonment not exceeding one year, or to both.

58. Offences jeopardising good order and discipline on board aircraft

(1) Any person who engages in an act of physical violence against a person or of sexual assault or child molestation on board a civil aircraft commits an offence.

(2) Any person who engages in any of the following acts that is likely to endanger the safety of the aircraft or of any person on board or if such an act jeopardises the good order and discipline on board the aircraft, on board a civil aircraft, commits an offence—

(a) assault, intimidation or threat, whether physical or verbal, against another person;

(b) intentionally causing damage to, or destruction of, property;

(c) consuming alcoholic beverages or drugs resulting in intoxication.

(3) A person who commits an offence under this regulation is liable, on conviction, to a fine not exceeding one million shillings or to imprisonment not exceeding one year, or to both.

59. Other offences committed on board aircraft

(1) A person who engages in any of the following acts, on board a civil aircraft, commits an offence—

(a) smoking in a lavatory, or elsewhere in an aircraft;

(b) tampering with a smoke detector or any other safety- related device on board the aircraft; or

(c) operating a portable electronic device when such act is prohibited.

(2) A person who commits an offence under this regulation is liable, on conviction, to a fine not exceeding five hundred thousand shillings or to imprisonment not exceeding six months, or to both.

60. Possession of prohibited items

A person who is in unlawful possession of a prohibited item at an airport, in a security restricted area, on board an aircraft or at an airport navigation installation or has with him or her a prohibited item contrary to regulation 41 commits an offence and is liable, on conviction, to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year or to both.

61. Entering security restricted areas

A person who, without lawful authority, enters a security restricted area commits an offence and is liable, on conviction, to a fine not exceeding one million shillings or to imprisonment not exceeding one year, or to both.

62. Offences relating to airport security permits

(1) A person who—

(a) for the purpose of, or in connection with, an application for the issue of an airport security permit; or

(b) in connection with continuing to hold an existing airport security permit,

makes a statement which he or she knows to be false, commits an offence.

(2) A person who uses an airport security permit to gain access to an aircraft, an area of an airport or an air navigation installation when he or she is not entitled to such access commits an offence.

(3) A person who uses a false or unauthorised airport security permit for the purpose of gaining access to a security restricted area or to an air navigation installation commits an offence.

(4) A person commits an offence when he or she—

(a) fails to comply with any conditions applying to an airport security permit;

(b) fails to display an airport security permit while within a security restricted area or upon being required to do so by an Aviation Security Officer or Authorized Person;

(c) being a holder of a visitor's permit, accesses or operates from a security restricted area without escort by an authorized person or holder of a permanent airport security permit;

(d) being an escort to a holder of a visitor's permit, aids the visitor to gain access to an aircraft, a security restricted area or an air navigation facility when he or she is not authorized to gain such access;

(e) uses an airport security permit for purposes other than official duty or authorized functions;

(f) fails to return an airport security permit promptly following its expiry or upon his or her becoming no longer authorised to possess it; or

(g) continues using an airport security permit after it has expired, or uses a valid permit after he or she is no longer authorised to possess it.

(5) A holder of a security permit who transfers, lends, gives or sells his or her permit to another person with the intention of enabling that other person to gain access to an aircraft, a security restricted area or an air navigation installation when he or she is not authorised to gain such access, commits an offence.

(6) A person who, being a person authorised by the airport operator to issue security permits, issues a security permit to a person who is not authorised to be issued with such a permit, with the intention of enabling that other person to gain access to an aircraft, a security restricted area or an air navigation installation commits an offence.

(7) A person who commits an offence under this regulation is liable, on conviction, to a fine not exceeding five hundred thousand shillings or to imprisonment for a term not exceeding six months, or to both.

63. Failure to establish and implement security programmes

A person who operates without a security programme referred to in Regulations 13, 14, 15, 16, 17, 23, 50 and 51 or who fails to implement a security programme, or a training programme, commits an offence and is liable, on conviction, to a fine not exceeding one million shillings or to a term of imprisonment not exceeding one year, or to both.

64. Operating without valid certificate or authorization

(1) A person commits an offence who operates without a valid authorization or certificate from the Authority referred to in Regulations 15 (1), 16 (1), 22 (4), 50 (1) and 51 (1), and shall be liable, upon conviction, to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year, or to both.

(2) An aviation security screener, supervisor, instructor or inspector who operates without a valid authorization or certificate from the Authority commits an offence and shall be liable, upon conviction, to a fine not exceeding one hundred thousand shillings or to imprisonment for a term not exceeding three months, or to both.

65. Utilizing services of unauthorized persons or entities

(1) An operator or organization who utilizes the services of an aviation security screener, supervisor, instructor or inspector without a valid certificate or authorization from the Authority, commits an offence, and shall be liable, upon conviction, to a fine not exceeding five hundred thousand shillings or to imprisonment for a term not exceeding six months, or to both.

(2) An operator who utilizes the services of a regulated agent, catering operator, ground handling agent or aviation security service provider that does not possess a valid certificate or authorization from the Authority, commits an offence, and shall be liable, upon conviction, to a fine not exceeding five hundred thousand shillings or to a term of imprisonment not exceeding six months, or to both;

(3) An operator or organization who utilizes the services of an aviation security officer without conducting necessary background checks including requiring a valid police clearance certificate, commits an offence, and shall be liable, upon conviction, to a fine not exceeding five hundred thousand shillings or to a term of imprisonment not exceeding six months, or to both.

66. Failure to take corrective action and to submit plans before renovation or expansion works

(1) An airport operator who fails to involve security stakeholders and submit plans before renovation or expansion works as provided under regulation 34, commits an offence and shall be liable, upon conviction, to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year, or to both.

(2) An operator who fails to implement written directives, orders or recommendations issued by the Authority or fails to submit corrective action plans within the given timelines, commits an offence and shall be liable, upon conviction, to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year, or to both.

67. Obstructing authorised persons

(1) A person commits an offence when he or she—

(a) intentionally obstructs a person acting under a power conferred by these Regulations;

(b) falsely pretends to be a person acting under a power conferred by these Regulations; or

(c) refuses to obey any order or a reasonable request made by a police officer, an aviation security officer or authorized person, acting in the execution of his or her duty.

(2) A person who commits an offence under sub-regulation (1) is liable, on conviction, to a fine not exceeding five hundred thousand shillings or to a term of imprisonment not exceeding six months, or to both.

68. False declarations and falsified documents

(1) A person commits an offence who, in connection with handling or conveyance of any cargo and/or mail, catering supplies and stores, airport merchandize or any prohibited item to a security restricted area or for transportation by air—

(a) makes a statement or declaration which he knows to be false;

(b) uses falsified documents; or

(c) provides wrong or misleading information as to the nature of the cargo or mail, catering supplies and stores, airport merchandize or item.

(2) A person who commits an offence prescribed under sub-regulation (1) shall be liable, upon conviction, to a fine not exceeding five hundred thousand shillings or to imprisonment for a term not exceeding six months, or both.

69. Offences by body corporate

Where an offence under these Regulations is committed by a body corporate and is proved to have been committed with the consent or connivance of, or is attributable to any neglect on the part of—

(a) any director, manager, secretary or similar officer of the body corporate; or

(b) any person who was purporting to act in any such capacity,

that person, as well as the body corporate, commits the offence and is liable to be prosecuted and punished accordingly.

70. General penalty

(1) Any person who contravenes any provision of any regulation, notice, circular or order made under it, commits an offence under these Regulations.

(2) Any person who commits an act of unlawful interference or other offence under these Regulations where no specific penalty is provided, shall upon conviction, be liable to a fine not exceeding one million shillings or to imprisonment for a term not exceeding one year, or to both.

71. Jurisdiction

(1) Kenya shall have jurisdiction over any act constituting an offence under regulations 57, 58 and 59 if the act took place against or on board—

(a) any aircraft registered in Kenya;

(b) any aircraft leased with or without crew to a lessee whose principal place of business is in Kenya or, if the lessee does not have a principal place of business, whose permanent residence is in Kenya;

(c) any aircraft on or over the territory of Kenya; or

(d) any other aircraft in flight outside Kenya, if the next landing of the aircraft is in Kenya, and the pilot in command has—

(i) delivered the suspected offender to the competent authorities in accordance with regulation 74(3);

(ii) requested Kenya to prosecute the suspected offender; and

(iii) affirmed that no similar request has been or will be made by the pilot in command or the aircraft operator to any other contracting State.

(2) For the purposes of this regulation, an aircraft is deemed to be "in flight" at any time from the moment when all its external doors are closed following embarkation until the moment when any such door is opened for disembarkation, and in the case of forced landing, the flight shall be deemed to continue until the competent authorities take over the responsibility for the aircraft and for persons and property on board.

(3) For the purposes of this regulation, an aircraft is considered to be "in service" from the beginning of the preflight preparation of the aircraft by ground personnel or by the crew for a specific flight until twenty-four hours after any landing; the period of service shall, in any event, extend for the entire period during which the aircraft is in flight as defined in sub regulation 2.

PART VII – Enforcement of regulations

72. Unidentified baggage

Where a police officer or an aviation security officer has reasonable cause to suspect that an item of baggage or any other object may constitute a security risk, whether because it is unidentified, unattended or for any other reason, that officer may, after subjecting the baggage to security controls, including investigation and evaluation to ascertain explosives or other prohibited items, remove the item of baggage or object and destroy it or dispose it as appropriate.

73. Power to stop passengers travelling

Where a police officer or an aviation security officer has reasonable cause to suspect that a person—

(a) is about to embark on an aircraft in Kenya; or

(b) is on board an aircraft in Kenya,

and that that person poses a serious threat or intends to commit an offence that amounts to an act of unlawful interference, the police officer may, with the approval of the police

officer in charge at the airport or in case of an aviation security officer, with the approval of the officer in charge of the airport, prohibit that person using all reasonable means from travelling on board the aircraft by—

(i) preventing him or her from embarking on the aircraft;

(ii) removing him or her from the aircraft;

(iii) in case of aviation security officer, arresting him or her without warrant and immediately handing him or her to police for appropriate action; or

(iv) if the aircraft is in motion, recall the aircraft.

74. Powers and responsibilities of pilot in command

(1) The pilot in command shall, while the aircraft is in flight, have the power and responsibility to—

(a) protect the safety of persons and property on board;

(b) restrain persons on board who may be a threat to safety or security;

(c) disembark persons who may be a threat to safety or security;

(d) search persons and baggage on an aircraft and take possession of items which could be used in connection with any act of unlawful interference;

(e) notify authorities of Kenya as soon as practicable and, before landing in the territory of Kenya;

(f) provide the authorities of Kenya with evidence and information regarding the incident that necessitated the restraint or disembarkation of a passenger.

(2) In case of severe threat to safety by a disruptive or unruly passenger on board, the pilot in command shall have the mandate to land at the nearest suitable airport and disembark the passenger in consultation with the local authorities.

(3) The police or person in charge of the airport shall accept delivery of persons disembarked in accordance with sub-regulation (2) for appropriate action.

75. Powers of aviation security officers

An aviation security officer shall have powers to—

(a) screen cargo or mail, persons and their personal effects, hold baggage, cabin baggage, vehicles, airport merchandize, catering supplies and stores;

(b) prevent unauthorised persons or vehicles from accessing a security restricted area or air navigation facility;

(c) prevent unauthorised persons from accessing aircraft;

(d) deny transportation by air to those persons or goods deemed to be a threat to the safety of any flight;

(e) deny access to security restricted areas or to aircraft, any person who refuses to undergo screening;

(f) impound any vehicle or property at the airport that poses a threat to civil aviation or is suspected to be involved in or attempting to commit an act of unlawful interference; and

(g) arrest any person who commits or attempts to commit an act of unlawful interference or offence under these Regulations.

76. Power to exempt

(1) The Authority may exempt any person to whom these Regulations apply from the application of these Regulations or any provision of these Regulations, except that the exemption shall not violate the Standards prescribed by the International Civil Aviation Organisation or other civil aviation regulations issued under the Act.

(2) The Authority may exempt any airport or category of airports to which these Regulations apply from the application of these Regulations or any provision of these

Regulations, and may impose conditions for such exemptions based on the merits of the application.

(3) An exemption granted under sub-regulation (1) or (2) shall be based on valid and proper reasons considering the circumstances of each case.

77. Power to enforce compliance

(1) The Authority or any authorised person may, for purposes of ensuring the implementation of the National Aviation Security Quality Control Programme, or the requirements of the National Civil Aviation Security Programme, or any other operator security programme, or requirements set out under these Regulations, and without prejudice to the provisions of this part, adopt procedures for aviation security monitoring and enforcement approved by the National Civil Aviation Security Committee.

(2) The procedures referred to in sub-regulation (1) shall establish enforcement to ensure rectification of any matter, including the following—

(a) failure to comply with any order, circular or directive issued under these Regulations;

(b) failure to comply with any requirement set out under the National Civil Aviation Security Programme or the respective operator security programme;

(c) failure to comply with an oversight recommendation made by the Authority;

(d) failure to take into account unique or exceptional circumstances which, although not expressly provided under the National Civil Aviation Security Programme, or the respective operator security programme but may expose an airport, aircraft, air navigation facility, regulated agent or catering facility to risk.

(3) The Authority or any authorised person may, without limiting the generality of this regulation, issue infringement notices set out in the Act on serious or prolonged breaches of security or failure to rectify security lapses that may endanger the safety of civil aviation.

(4) An infringement notice may require that the operations of a particular operator be halted until the breach has been rectified.

78. Infringement notice

Infringement notices shall be designed by the Authority and issued by authorized persons for infringement notice offences as provided in the Second Schedule of the Act.

79. Powers of aviation security inspectors

Subject to the provisions of section 39 of the Act as read together with sections 20, 21 and 22 thereof, the Authority's aviation security inspectors shall have powers to—

(a) inspect any part of any airport in Kenya;

(b) inspect any land or area outside the airport which is used by an operator, aviation service providers or businesses that operate at the airport or that are in security restricted areas;

(c) inspect any aircraft registered or operating in Kenya for the purpose of assessing security procedures;

(d) test the effectiveness of security practices and procedures applied by any operator or persons implementing aviation security measures;

(e) take into an airport, airside area or any designated security restricted area, and use, any equipment necessary to carry out their duties and tests, including for example, radios, cameras, recording devices both audio and video, authorized weapons, replicas of guns or simulated explosive devices;

(f) interview any person for the purpose of assessing the level of security or the implementation of security procedures;

(g) issue infringement notices for any infringement notice offences under these regulations;

(h) require rectification of any deficiencies or apply enforcement measures as appropriate; and

(i) access any records or information and require explanation on any matter that may assist them in assessing the standard of aviation security or the implementation of security procedures; and

(j) undertake investigations for possible violations including collection of relevant information and evidence to support enforcement of these Regulations.

80. Protection from personal liability

An authorized person, aviation security officer or police officer charged with the execution of their mandate shall not be personally liable to be sued in a civil court, claim or demand whatsoever arising from an action or thing done or omitted to be done or ordered to be done by them in the discharge of their duties, functions and powers under the Civil Aviation Act and these Regulations, provided that they, at the time in issue, acted in good faith.

PART VIII – Revocation, savings and transitional provisions

81. L.n. no. 190/2015

(1) The Civil Aviation (Security) Regulations, 2015 (L.N. 190/2015) are revoked.

(2) Despite sub-regulation (1) —

(a) every person who, immediately before the commencement of these Regulations, was operating as an airport operator, an aircraft operator, a regulated agent, a ground handling service provider, air navigation service provider, catering operator, or an aviation security service provider may, on the commencement of these Regulations, continue their operations but shall, within ninety days after the commencement of these Regulations, submit to the Authority a security programme for approval in accordance with regulation 18 or apply for certification as appropriate; and

(b) an authorization or certificate issued by the Authority and an airport security permit in force at the commencement of these Regulations shall, until its expiry, have effect as if issued under these Regulations.