

THE UNITED REPUBLIC OF TANZANIA

CHAPTER 80

THE CIVIL AVIATION ACT

**THE CIVIL AVIATION (INSTRUMENTS AND EQUIPMENT)
REGULATIONS**

[SUBSIDIARY]

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Dodoma,
31st July, 2026

HAMZA SAID JOHARI
Attorney General

CHAPTER 80

THE CIVIL AVIATION ACT

**THE CIVIL AVIATION (INSTRUMENTS AND EQUIPMENT)
REGULATIONS**

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CHAPTER 80

THE CIVIL AVIATION ACT

REGULATIONS

(Made under section 5)

**THE CIVIL AVIATION (INSTRUMENTS AND EQUIPMENT)
REGULATIONS**

[5th January, 2024]
[DPG]

GNs. Nos.
6 of 2024
831 of 2024

PART I
PRELIMINARY PROVISIONS

Citation

1. These Regulations may be cited as the Civil Aviation (Instruments and Equipment) Regulations.

Application

2. These Regulations prescribe the minimum instruments and equipment requirements for all aircraft in all operations as classified in these Regulations.

Interpretation

3. In these Regulations, unless the context otherwise requires-

Cap. 80

“Act” means the Civil Aviation Act;
“aerial work” has the meaning ascribed to it under the Act;
“aerodrome” has the meaning ascribed to it under the Act;
“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;

- “agreement summary” means, when an aircraft is operating under an Article 83 *bis* agreement between the State of Registry and another State, the document transmitted with the Article 83 *bis* Agreement registered with the ICAO Council that identifies succinctly and clearly which functions and duties are transferred by the State of Registry to that other State;
- “aircraft” has the meaning ascribed to it under the Act;
- “aircraft operating manual” means a manual, acceptable to the State of the operator, 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 and the aircraft operating manual is part of the operations manual;
- “air traffic service or ATS” 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 operator certificate or AOC” means a certificate authorising an operator to carry out specified commercial air transport operations;
- “altimetry system error or 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;
- “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, and includes take-off alternate, en-route alternate and destination alternate;
- “alternate heliport” means a heliport to which a helicopter may proceed when it becomes either impossible or inadvisable to proceed to or to land at the heliport

- 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, and includes take-off alternate, en-route alternate and destination alternate;
- “approach and landing phase helicopters” means that part of the flight from 300 m or 1000 ft above the elevation of the FATO, where the flight is planned to exceed this height, or from the commencement of the descent in the other cases, to landing or to the balked landing point;
- “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;
- “appropriate authority” means:
- (a) in relation to an aircraft, the Authority which is responsible for approval of design and issuance of a type certificate;
 - (b) in relation to the content of a medical kit, the State of registry; and
 - (c) in relation to the Republic of (State), the Director General/Chief Executive Officer/Director of the Authority;
- “approved standard” means a manufacturing, design, maintenance, or quality standard approved by the Authority;
- “area navigation or 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 or RNAV specification” means a navigation specification based on area navigation that does not include the requirements for performance monitoring and alerting, designated by the prefix RNAV, such RNAV 5, RNAV 1;

- “Authority” means the Tanzania Civil Aviation Authority established under the Act;
- “automatic deployable flight recorder or ADFR” means a combination flight recorder installed on the aircraft which is capable of automatically deploying from the aircraft;
- “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;
- “calibration” means a set of operations, performed in accordance with a definite documented procedure, that compares the measurement performed by a measurement device or working standard for the purpose of detecting and reporting or eliminating by adjustment errors in the measurement device, working standard, or aircraft component tested;
- “cargo compartment classifications” means:
- (a) Class A where is one in which a presence of a fire would be easily discovered by a crew member while at station and to which each part of the compartment is easily accessible in flight;
 - (b) Class B where is one in which-
 - (i) there is sufficient access in flight to enable a crew member to effectively reach any part of the compartment with the contents of a hand fire extinguisher;
 - (ii) when the access provisions are being used, no hazardous quantity of smoke, flames, or extinguishing agent, will enter any compartment occupied by the crew or passengers; and
 - (iii) there is a separate approved smoke detector or fire detector system to give warning at the pilot or flight engineer station;
 - (c) Class C where is one in which-

- (i) there is a separate approved smoke detector or fire detector system to give warning at the pilot or flight engineer station;
 - (ii) there is an approved built-in fire extinguishing or suppression system controllable from the cockpit;
 - (iii) there is means to exclude hazardous quantities of smoke, flames, or extinguishing agent, from any compartment occupied by the crew or passengers; and
 - (iv) there are means to control ventilation and drafts within the compartment so that the extinguishing agent used can control any fire that may start within the compartment;
- (d) Class E where is one on airplanes used only for the carriage of cargo and in which-
- (i) there is a separate approved smoke or fire detector system to give warning at the pilot or flight engineer station;
 - (ii) there are means to shut off the ventilating airflow to, or within, the compartment, and the controls for these means are accessible to the flight crew in the crew compartment;
 - (iii) there are means to exclude hazardous quantities of smoke, flames, or noxious gases, from the flight crew compartment; and
 - (iv) the required crew emergency exits are accessible under any cargo loading condition;

“Category II or CAT II operations” means a precision instrument approach and landing with a decision height lower than 60m or 200ft, but not lower than 30m or 10 ft, and a runway visual range not less than 350m;

“Category IIIA or CAT IIIA operations” means a precision instrument approach and landing with:

- (a) a decision height lower than 30m or 100ft or no decision; and
 - (b) a runway visual range not less than 200m;
- “Category IIIB or CAT IIIB operations” means, a precision instrument approach and landing with:
- (a) a decision height lower than 15m or 50ft or no decision height; and
 - (b) a runway visual range less than 200m but not less than 50m;
- “Category IIIC or CAT IIIC operations” means a precision instrument approach and landing with no decision height and no runway visual range limitations;
- “Class 1 helicopter” means a helicopter with performance such that, in case of critical engine failure, it is able to land on the rejected take-off area or safely continue the flight to an appropriate landing area, depending on when the failure occurs;
- “Class 2 helicopter” means a helicopter with performance such that, in case of critical 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 case a forced landing may be required;
- “Class 3 helicopter” means a helicopter with performance such that, in case of engine failure at any point in the flight profile, a forced landing shall be performed;
- “combined vision system or CVS” means a system to display images from a combination of an enhanced vision system or 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;
- “contracting States” means all States that are signatories to the Convention on International Civil Aviation or Chicago Convention;
- “controlled flight” means any flight which is subject to an air traffic control clearance;
- “congested hostile environment” means a hostile environment within a congested area;

- “contaminated runway” means a runway is contaminated when a significant portion of the runway surface area, whether in isolated areas or not within the length and width being used is covered by one or more of the substances listed in the runway surface condition descriptors;
- “continuing airworthiness” means a set of processes by which an aircraft, engine, rotor or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life;
- “continuing airworthiness records” means records which are related to the continuing airworthiness status of an aircraft, engine, rotor or associated part;
- “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 or pilots employed to fly the aircraft;
- “continuous descent final approach or CDFA” means a technique, consistent with stabilized approach procedures, for flying the final approach segment or FAS of an instrument non-precision approach or NPA procedure as a continuous descent, without level-off, from an altitude or height at or above the final approach fix altitude or height to a point approximately 15m or 50ft above the landing runway threshold or the point where the flare maneuver begins for the type of aircraft flown; for the FAS of an NPA procedure followed by a circling approach, the CDFA technique applies until circling approach minima circling OCA or H or visual flight manoeuvre altitude or height are reached;
- “crew member” means a person assigned by an operator to duty on an aircraft during a flight duty period;
- “critical engine” means the engine whose failure would most adversely affect the performance or handling qualities of an aircraft;

“decision altitude or DA, or decision height or D” means a specified altitude or height in a 3D instrument approach operation at which a missed approach shall be initiated where the required visual reference to continue the approach has not been established:

- (a) decision altitude or DA is referenced to mean sea level and decision height or DH is referenced to the threshold elevation;
- (b) the required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have assessed the aircraft position and rate of change of position, in relation to the desired flight path. In Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation; and
- (c) for convenience where both expressions are used, they may be written in the form “decision altitude or height” and abbreviated “DA or H”;

“defined point after take-off or DPATO” means a point, within the take-off and initial climb phase, before which the helicopter’s ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required;

“defined point before landing or DPBL” means a point, within the approach and landing phase, after which the helicopter’s ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required;

“dry runway” means a runway surface free of visible moisture and not contaminated within the area intended to be used;

“duty” means any task that flight or cabin crew members are required by the operator to perform, including 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;
- “electronic flight bag or 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;
- “elevated heliport” means a heliport located on a raised structure on land;
- “emergency locator transmitter or 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;
- “engine” means a unit used or intended to be used for aircraft propulsion and consists of at least those components and equipment necessary for functioning and control, but excludes the propeller or rotors where applicable;
- “enhanced vision system or 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 93km or 50NM, or 30 minutes at normal cruising speed, whichever is the lesser, away from land suitable for making an emergency landing;
- “final approach segment or FAS” means that segment of an instrument approach procedure in which alignment and descent for landing are accomplished;
- “flight crew member” means a licensed crewmember charged with duties essential to the operation of an aircraft during a flight duty period;
- “flight data analysis” means a process of analysing recorded flight data in order to improve the safety of flight operations;
- “flight duty period” means the 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 which finishes when the aircraft finally comes to rest and the engine or 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 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 the aircraft for the purpose of complementing accident or incident investigation;

“flight time - aeroplanes” means the total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally 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;

“head-up display or HUD” means a display system that presents flight information into the pilot’s forward external field of view;

“helicopter or rotorcraft” 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 axes;

“heliport” means an aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters;

“hostile environment” means an environment in which-

- (a) a safe forced landing cannot be accomplished because the surface and surrounding environment are inadequate;
- (b) the helicopter occupants cannot be adequately protected from the elements;

- (c) search and rescue response or capability is not provided consistent with anticipated exposure; or
 - (d) there is an unacceptable risk of endangering persons or property on the ground;
- “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;
- “instrument approach operations” means an approach and landing using instruments for navigation guidance based on an instrument approach procedure; and includes:
- (a) a two-dimensional or 2D instrument approach operation, using lateral navigation guidance only; and
 - (b) a three-dimensional or 3D instrument approach operation, using both lateral and vertical navigation guidance;
- “instrument approach procedure or 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, where a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply;
- “instrument meteorological conditions or IMC” means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling as defined in the Civil Aviation (Rules of the Air) Regulations, less than the minima specified for visual meteorological conditions;

- “inspection” means the examination of an aircraft or aircraft component to establish conformity with a standard approved by the Authority;
- “integrated survival suit” means a survival suit which meets the combined requirements of the survival suit and life jacket;
- “large aeroplane” means an aeroplane of a maximum certificated take-off mass of over 5700kg;
- “lateral and vertical navigation guidance” refers to the guidance provided either by-
- (a) a ground-based radio navigation aid; or
 - (b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of the any of;
- “low-visibility operations or LVO” means approach operations in RVRs less than 550m or with a DH less than 60m or 200 ft or take-off operations in RVRs less than 400m;
- “maintenance” means the performance of tasks on an aircraft, engine, propeller or associated part required to ensure the continuing airworthiness of an aircraft, engine, propeller or associated part including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair;
- “maintenance release” means a document which contains a certification confirming that the maintenance work to which it relates has been completed in a satisfactory manner in accordance with appropriate airworthiness requirements;
- “master minimum equipment list or 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 at the commencement of a flight and the MMEL may be associated with special operating conditions, limitations or procedures;
- “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 equipment list or MEL” means a list which provides for the operation of an aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type;
- “modification” means a change to the type design of an aircraft, engine or propeller;
- “navigation specification” means a set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace and there are two kinds of navigation specifications;
- “required navigation performance or RNP specification” means a navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP;
- “night” means the hours between the end of evening civil twilight and the beginning of morning civil twilight or such other period between sunset and sunrise, as may be prescribed by the appropriate authority;
- “non-congested hostile environment” means a hostile environment outside a congested area;
- “non-hostile environment” means an environment in which-
- (a) a safe forced landing can be accomplished because the surface and surrounding environment are adequate;
 - (b) the helicopter occupants can be adequately protected from the elements;
 - (c) search and rescue response and capability is provided consistent with anticipated exposure; and
 - (d) the assessed risk of endangering persons or property on the ground is acceptable;

- “offshore operations” means operations which routinely have a substantial proportion of the flight conducted over sea areas to or from offshore locations and such operations include, but are not limited to, support of offshore oil, gas and mineral exploitation and sea-pilot transfer;
- “operation” means an activity or group of activities which are subject to the same or similar hazards and which require a set of equipment to be specified, or the achievement and maintenance of a set of pilot competencies, to eliminate or mitigate the risk of such hazards and such activities could include, but would not be limited to, offshore operations, heli-hoist operations or emergency medical service;
- “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, the regularity and efficiency of the flight;
- “operational flight plan-helicopter” means the operator’s plan for the safe conduct of the flight based on considerations of helicopter performance, other operating limitations and relevant expected conditions on the route to be followed and at the heliports concerned;
- “operational flight plan-aeroplane” means the operator’s plan 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;
- “operations in performance Class 1” means operations with performance such that, in the event of a critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, unless the failure occurs prior to reaching the take-off decision point or TDP or after passing the landing decision point or LDP, in which cases the helicopter must be able to land within the rejected take-off or landing area;

- “operations in performance Class 2” means operations with performance such that, in the event of critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required;
- “operations in performance Class 3” means operations with performance such that, in the event of an engine failure at any time during the flight, a forced landing will be required;
- “operations manual” means a manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties;
- “operations specifications” means the authorisations including specific approvals, conditions and limitations associated with the air operator certificate and subject to the conditions in the operations manual;
- “operator” means a person, organisation or enterprise engaged in or offering to engage in an aircraft operation;
- “performance-based communication or PBC” means communication based on performance specifications applied to the provision of air traffic services;
- “performance-based navigation or PBN” means area navigation based on performance requirements for aircraft operating along an airspace;
- “performance-based surveillance or PBS” means surveillance based on performance specifications applied to the provision of air traffic services;
- “pilot-in-command” means a pilot designated by the operator or the owner as being in command and charged with the safe conduct of a flight;
- “pressurised aircraft” means an aircraft fitted with means of controlling out flow of cabin air in order to maintain maximum cabin altitude of not more than

- 10,000 ft so as to enhance breathing and comfort of passengers and crew;
- “pressure-altitude” means an atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the standard atmosphere;
- “propeller” means a device for propelling an aircraft that has blades on a powerplant driven shaft and that, when rotated, produces by its action on the air, a thrust approximately perpendicular to its plane of rotation including control components normally supplied by its manufacturer, but does not include main and auxiliary rotors or rotating aerofoils of powerplants;
- “prototype” means an aircraft in respect of which an application has been made for a certificate of airworthiness and the design of which has previously been investigated in connection with any such application;
- “psychoactive substances” means alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded;
- “rating” means an authorisation entered on or associated with a licence or certificate and forming part thereof, stating special conditions, privileges or limitations pertaining to such licence or certificate;
- “repair” means the restoration of an aircraft, engine, propeller or associated part to an airworthy condition in accordance with the appropriate airworthiness requirements, after it has been damaged or subjected to wear;
- “required communication performance or 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 or 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;
- “runway visual range or 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 centreline;
- “safe forced landing” means unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface;
- “series of flights” means consecutive flights that:
- (a) begin and end within a period of 24 hours;
 - and
 - (b) are all conducted by the same pilot-in-command;
- “small aircraft” means an aircraft of a maximum certificated take-off mass of 5700 kg or less;
- “specific approval” means an approval which is documented in the operations specifications for commercial air transport operations or in the list of specific approvals for non-commercial operations;
- “State of the aerodrome” means the State in whose territory the aerodrome is located;
- “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;
- “synthetic vision system or SVS” means a system to display data-derived synthetic images of the external scene from the perspective of the flight deck;
- “threshold time” means the range, expressed in time, established by the Authority, to an en-route alternate aerodrome, whereby any time beyond requires a specific approval for EDTO from the Authority;
- “total vertical error or TVE” means the vertical geometric difference between the actual pressure altitude

- flown by an aircraft and its assigned pressure altitude or flight level;
- “overhaul” means the restoration of an aircraft or aircraft component using methods, techniques, and practices acceptable to the Authority, including disassembly, cleaning, inspection as permitted, repair as necessary, 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 Approval or Technical Standard Order;
- “VFR” means the abbreviation used to designate the visual flight rules; and
- “visual meteorological conditions or VMC” means meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

PART II

GENERAL REQUIREMENTS FOR AIRCRAFT INSTRUMENTS AND EQUIPMENT

General
instruments and
equipment
requirements

- 4.-(1) An operator shall not operate an aircraft unless-
- (a) it is equipped so as to comply with the law of the State of registry;
 - (b) registered in the United Republic without such additional or special equipment as the Authority may determine.
- (2) An operator operating an aircraft in the United Republic shall ensure that all the required emergency equipment are installed on board the aircraft, are clearly marked, and the aircraft is stowed or maintained so as to not be the source of danger on the aircraft.
- (3) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness,

the instruments, equipment and flight documents required in these Regulations shall be installed or carried, as appropriate, in all aircraft according to the aircraft use and to the circumstances under which the flight is to be conducted.

(4) The Authority shall approve or accept the instruments and equipment, including their installation.

(5) An aircraft shall be equipped with instruments to enable the flight crew to control the flight path of the aircraft, carry out any required procedural manoeuvres and observe the operating limitations of the aircraft in the expected operating conditions.

(6) The owner or operator shall ensure that instruments and equipment required by these Regulations but not installed in the aircraft are properly installed and inspected in accordance with the requirements of the State of registry prior to operation in the state of any foreign registered aircraft that uses an airworthiness inspection program approved or accepted by the State of registry.

(7) An operator shall ensure that a flight does not commence unless the required equipment-

- (a) is in operable condition for the kind of operation being conducted, except as provided for in the minimum equipment list;
- (b) is installed such that the failure of any single unit required for either communication or navigation purposes, or both, shall not result in the inability to communicate or navigate safely on the route being flown; and
- (c) meets the minimum performance standard, the operational and airworthiness requirements in accordance with the Civil Aviation (Airworthiness) Regulations.

(8) Where equipment is to be used by one flight crew member at his station during flight, that equipment shall be installed so as to be readily operable from his station.

(9) Where a single item of equipment is required to be operated by more than one flight crew member, the equipment shall be installed so as to be readily operable from any station at which it is required to be operated.

PART III
COMMERCIAL AIR TRANSPORT-AEROPLANES

(a) Aeroplane instruments, equipment and flight documents

Air operator
certificate
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5.-(1) An aeroplane registered in United Republic shall, carry a certified true copy of the air operator certificate specified in the Civil Aviation (Air Operator Certification and Administration) Regulations, and a copy of the operations specifications relevant to the aeroplane, issued in conjunction with the certificate.

(2) When the certificate and the associated operations specifications are issued by the state of operator in a language other than English, an English translation shall be included.

Minimum
equipment list

6.-(1) The operator shall include in the operations manual, a minimum equipment list, approved by the State of the operator which shall 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) Where the State of the operator is not the State of registry, the State of the operator shall ensure that the minimum equipment list does not affect the aeroplane's compliance with the airworthiness requirements applicable in the State of registry.

Operating
manual

7.-(1) 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.

(2) The manual referred to in subregulation (1) shall include details of the aircraft systems and of the checklists to be used and the design of the manual shall observe human factors principles.

Aeroplane
operated under
Article 83 *bis*
agreement

8.-(1) An aeroplane, which operates under Article 83 *bis* agreement, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format.

(2) Where the agreement summary specified in subregulation (1) is issued in a language other than English, an English translation shall be included.

(3) The agreement summary of the Article 83 *bis* agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred under the agreement by the State of registry to the State of the operator, when conducting surveillance activities.

(4) The agreement summary shall-

- (a) be transmitted to ICAO together with Article 83 *bis* agreement for registration with the ICAO Council by the State of registry or the State of the operator; and
- (b) contain the information for the specific aircraft as set out in the Eighth Schedule.

Aeroplane on all
flights

9. 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.

Medical
supplies

10. An aeroplane shall be equipped with adequate and accessible medical supplies comprising of-

- (a) one or more first-aid kits for the use of cabin crew in managing incidents of ill health;
- (b) for aeroplanes required to carry cabin crew as part of the operating crew, one universal precaution kit, two for aeroplanes authorised to carry more than 250 passengers, for the use of cabin crew members in managing incidents of ill health associated with a case of suspected communicable disease or in the case of illness involving contact with body fluids; and

- (c) for aeroplanes authorised to carry more than 100 passengers, on a sector length of more than two hours, a medical kit, for the use of medical doctors or other qualified persons in treating in-flight medical emergencies.

Portable fire
extinguishers

11. An aeroplane shall be equipped with 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-

- (a) the pilot's compartment; and
- (b) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew.

Seat, berth
and seat belt
or safety
harness

12.-(1) An aeroplane shall be equipped with-

- (a) a seat or berth with safety belt for each person on board over the age of two years;
- (b) a seat belt for each seat and restraining belts for each berth; and
- (c) a safety harness for each flight crew seat.

(2) The safety harness for each pilot seat shall incorporate a device which-

- (a) automatically restrains the occupant's torso in the event of rapid deceleration; and
- (b) prevents a suddenly incapacitated pilot from interfering with the flight controls.

Information and
instructions
conveyed to
passengers

13. An aeroplane shall be equipped with means of ensuring that the following information and instructions are conveyed to passengers:

- (a) when seat belts are to be fastened;
- (b) when and how oxygen equipment is to be used where carriage of oxygen is required;
- (c) restrictions on smoking;
- (d) location and use of life jackets or equivalent individual flotation devices where their carriage is required; and
- (e) location and method of opening emergency exits.

Spare electrical
fuses

14. An aeroplane shall be equipped with spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

Lavatory fire
extinguisher

15. 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 31st December 2018 shall-

- (a) meet the applicable minimum performance requirements of the State of registry; and
- (b) not be of a type that depletes the ozone layer.

Operations
manual,
flight manual
and charts.
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- 16.** The following shall be carried in the aeroplane-
- (a) the operations manual prescribed in the Civil Aviation (Air Operator Certification and Administration) Regulations, 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 aeroplane performance operating limitations in accordance with the regulations relating to operation of aircraft- commercial air transport 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) current and suitable charts to cover the route of the proposed flight and any route along which it is reasonable to expect that the flight may be diverted.

Marking of
break-in
points

17.-(1) A person shall not operate an aircraft unless the exterior surface of the fuselage suitable for break-in by rescue crews in emergency is marked to show “break-in areas”, for purposes of rescue in an emergency as shown

in the Figure 1 of this regulation.

(2) The break-in areas shall be rectangular in shape and shall be marked by right-angled corner markings, each area of which shall be 9cm in length along its outer edge and 3cm in width.

(3) Where the corner markings referred to in subregulation (2) are more than 2 m apart, intermediate lines 9cm x 3cm shall be inserted so that there is no more than 2 m between adjacent markings.

(4) The words “CUT HERE IN EMERGENCY” and “*KATA HAPA WAKATI WA DHARURA*” shall be marked across the centre of each break-in area in capital letters.

(5) The markings required under this regulation shall be-

- (a) painted, or affixed by other equally permanent means; red or yellow and, in any case in which the colour of the adjacent background is such as to render red or yellow markings not readily visible, be outlined in such a manner that shall be readily distinguishable from the surrounding fuselage area by contrast in colour; and
- (b) kept clean and unobscured at all times.

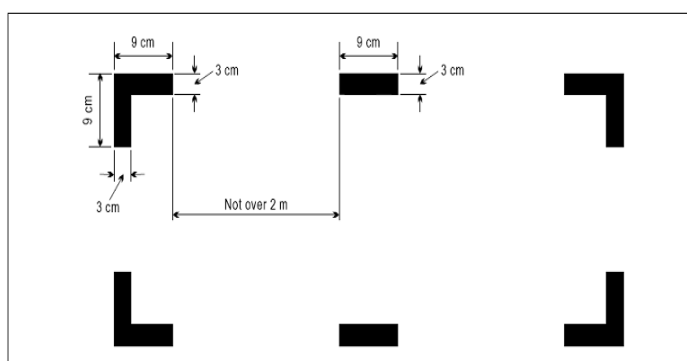


Figure 1: Marking of break-in Points

Flight
recorders

18.-(1) Crash protected flight recorders shall include one or more of the following:

- (a) a flight data recorder (FDR);

- (b) a cockpit voice recorder (CVR);
- (c) an airborne image recorder (AIR); or
- (d) a data link recorder (DLR).

(2) Image and data link information may be recorded on either the CVR or the FDR as prescribed in the Third Schedule.

(3) Lightweight flight recorders shall include one or more of the following:

- (a) an aircraft data recording system (ADRS);
- (b) a cockpit audio recording system (CARS);
- (c) an airborne image recording system (AIRS); or
- (d) a data link recording system (DLRS).

(4) Image and data link information may be recorded on either the CARS or the ADRS as prescribed in the Third Schedule.

(5) The parameters used under this regulation shall be recorded as prescribed in the Third Schedule.

Application of
flight data
recorders and
aircraft data
recording
systems

19.-(1) All turbine-engined aeroplane of a maximum certificated take-off mass of 5700kg or less for which the application for type certification is submitted to a Contracting State on or after 1st January, 2016 shall be equipped with-

- (a) an FDR which shall record at least the first 16 parameters listed in Table A8-1 in the Third Schedule;
- (b) a Class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilot or pilots as defined in the Third Schedule; or
- (c) an ADRS which shall record at least the first 7 parameters listed in Table A8-3 in the Third Schedule.

(2) All turbine-engined aeroplane of a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1st January, 2016 shall be equipped with-

- (a) an FDR which shall record at least the first 16 parameters listed in Table A8-1 in the Third Schedule;

- (b) a class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilot or pilots; as defined in the Third Schedule; or
- (c) an ADRS which shall record at least the first 7 parameters listed in Table A8-3 in Third Schedule.

(3) All aeroplanes of a maximum certificated take-off mass of over 27000kg for which the individual certificate of airworthiness is first issued on or after 1st January, 1989 shall be equipped with FDR which shall record at least the first 32 parameters listed in Table A8-1 of the Third Schedule.

(4) All aeroplanes of a maximum certificated take-off mass of over 5700kg, up to and including 27000kg, for which the individual certificate of airworthiness is first issued on or after 1st January, 1989, shall be equipped with an FDR which shall record at least the first 16 parameters listed in Table A8-1 of the Third Schedule.

(5) All multi-engined turbine aeroplanes of a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1st January, 1990 shall be equipped with an FDR which shall record at least the first 16 parameters listed in Table A8-1 of the Third Schedule.

(6) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1st January, 1989, with a maximum certificated take-off mass of over 5700kg, except those in subregulation (8), shall be equipped with an FDR which shall record at least the first 5 parameters listed in Table A8-1 to the Third Schedule.

(7) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1st January 1987 but before 1st January, 1989, with a maximum certificated take-off mass of over 5700kg, except those in subregulation (8), shall be equipped with an FDR which shall record at least the first 9 parameters listed in Table A8-1 of the Third Schedule.

(8) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on

or after 1st January, 1987 but before 1st January, 1989, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30th September, 1969 shall be equipped with an FDR which shall record at least the first 16 parameters listed in Table A8-1 of the Third Schedule.

(9) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1st January, 1987, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30th September, 1969 shall be equipped with an FDR which shall record, in addition to the first 5 parameters listed in the Table A8-1 of the Third Schedule, such additional parameters as are necessary to meet the objectives of determining-

- (a) the attitude of the aeroplane in achieving its flight path; and
- (b) the basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.

(10) All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the individual certificate of airworthiness is first issued after 1st January 2005 shall be equipped with an FDR which shall record at least the first 78 parameters listed in Table A8-1 of the Third Schedule.

(11) All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the application for type certification is submitted to a Contracting State on or after 1st January, 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table A8-1 of the Third Schedule.

(12) All aeroplanes of a maximum certificated take-off mass of over 5700kg for which individual certificate of airworthiness is first issued to a Contracting State on or after 1st January, 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table A8-1 of the Third Schedule.

(13) An operator shall ensure that the flight data recording system are-

- (a) inspected annually and the inspection report made available to the Authority;
- (b) calibrated as deemed necessary and, in any case, not more than five years.

(14) FDRs or ADRS shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape.

(15) All FDRs shall retain the information recorded during at least the last 25 hours of their operation, with exception of those installed on aeroplanes referenced in regulation 18(5) for which the FDR shall retain the information recorded during at least the last 30 minutes of its operation, and in addition sufficient information from the preceding take-off for calibration purpose.

(16) All aeroplanes that are required to be equipped with CARS, and for which the individual certificate of airworthiness is first issued on or after 1st January, 2025, shall be equipped with a CARS which shall retain the information recorded during at least the last two hours of their operation.

Application of
cockpit voice
recorders and
cockpit audio
recording
systems

20.-(1) Turbine-engined aeroplanes of a maximum certificated take-off mass of over 2250kg, up to and including 5700kg, for which the application for type certification is submitted to a Contracting State on or after 1st January, 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.

(2) Turbine-engined aeroplanes of a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1st January, 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.

(3) Aeroplanes of a maximum certificated take-off mass of over 5700kg for which the individual certificate of airworthiness is first issued on or after 1st January, 1987 shall be equipped with a CVR.

(4) Turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued

before 1st January, 1987, with a maximum certificated take-off mass of over 5700kg that are of types of which the prototype was certificated by the appropriate national Authority after 30th September, 1969 shall be equipped with a CVR:

Provided that, CVRS and CARS shall not use magnetic tape or wire.

CVR- duration

21. All aeroplanes of a maximum certificated take-off mass of over 27000kg for which the individual certificate of airworthiness is first issued on or after 1st January, 2021 shall be equipped with a CVR which shall retain the information recorded during at least the last twenty-five hours of its operation:

Provided that, all CVRs shall retain the information recorded during at least the last two hours of their operation.

CVR -alternate
power source

22.-(1) An alternate power source shall automatically engage and provide ten minutes, plus or minus one minute, of operation whenever aeroplane power to the recorder ceases, either by normal shutdown or by any other loss of power.

(2) Subject to subregulation (1), the alternate power source shall power the CVR and its associated cockpit area microphone components.

(3) All aeroplanes of a maximum certificated take-off mass of over 27000kg for which the application for type certification is submitted to a Contracting State on or after 1st January, 2018 shall be provided with an alternate power source, as defined in subregulation (1) that powers the forward CVR in the case of combination recorders.

(4) All aeroplanes of a maximum certificated take-off mass of over 27000kg for which the individual certificate of airworthiness is first issued on or after 1st January, 2018 shall be provided with an alternate power source, as defined in subregulation (1) that powers at least one CVR.

(5) The CVR shall be located as close as practicable to the alternate power source.

Data link
recorders

23.-(1) All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1st January, 2016, which use any of the data link communications applications referred to in paragraph 5.1.2 of the Third Schedule and-

(a) are required to carry a CVR; and

(b) the data link communications messages on a crash-protected flight recorder.

(2) All aeroplanes for which the individual certificate of airworthiness was first issued before 1st January, 2016 that are required to carry a CVR and are modified on or 1st January, 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of the Third Schedule shall record the data link communications messages on a crash-protected flight recorder unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1st January, 2016.

(3) All aeroplanes for which the individual certificate of airworthiness was first issued before 1st January, 2016, that are required to carry a CVR and are modified on or after 1st January, 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of the Third Schedule should record the data link communications messages on a crash-protected flight recorder.

(4) DLR systems shall have recording 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 DLR systems.

(5) The minimum recording duration for the data link recorders shall be equal to the duration of the CVR.

(6) Data link recording shall be capable of being correlated with the recorded cockpit audio.

Flight crew-
machine
interface
recordings

24.-(1) All aeroplanes of a maximum take-off mass of over 27000kg for which the application for type certification is submitted to a Contracting State on or after 1st January, 2023 shall be equipped with a crash-protected flight recorder which shall record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew as prescribed in Third Schedule.

(2) All aeroplanes of a maximum take-off mass of over 5700kg for which the application for type certification is submitted to a Contracting State on or after 1st January, 2023 shall be equipped with a crash-protected flight recorder which shall record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew, as prescribed in Third Schedule.

(3) The minimum flight crew-machine interface recording duration shall be at least for the last 2 hours and capable of being correlated to the recorded cockpit audio.

General
guidelines of
flight recorders

25.-(1) Flight recorders shall-

- (a) be constructed, located and installed so as to provide maximum practical protection for the recordings so that the recorded information may be preserved, recovered and transcribed;
- (b) meet the prescribed crashworthiness and fire protection specifications;
- (c) not be switched off during flight time;
- (d) be deactivated upon completion of flight time following an accident or incident to preserve flight recorder records; and
- (e) not be reactivated before their disposition as determined in accordance with the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations.

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(2) The operational checks and evaluations of recordings from the flight recorder systems shall be conducted annually to ensure the continued serviceability of the recorders as prescribed in the Third Schedule.

(3) The documentation requirement concerning FDR and ADRS parameters provided by operators to

accident investigation authorities shall be in electronic format and take account of industry specifications.

Annual
inspection of
cockpit voice
recorders

26.-(1) A flight crew member shall monitor the built-in test features on the cockpit for the cockpit voice recorder prior to the first flight of the day.

(2) The operator shall conduct annual inspections of a cockpit voice recorder as follows:

- (a) the read-out of the recorded data shall ensure that the recorder operates correctly for the nominal duration of the recording;
- (b) an annual examination of the recorded signal on the cockpit voice recorder shall be carried out by replay of the recording of cockpit voice recorder;
- (c) while installed in the aircraft, the cockpit voice recorder shall record text signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
- (d) during the annual examination, a sample of in-flight recordings of the cockpit voice recorder shall be examined for evidence that the intelligibility of the signal is acceptable; and
- (e) operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

(3) The operator shall give a report of the annual inspection conducted under this regulation to the Authority.

Combination
recorders

27.-(1) All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the application for type certification is submitted to the Contracting State on or after 1st January 2016, and which are required to be equipped with both CVR and FDR, shall be equipped with two combination recorders, FDR and CVR.

(2) All aeroplanes of a maximum certificated take-off mass of over 15000kg for which the application for type certification is submitted to a Contracting State on or

after 1st January 2016, and which are required to be equipped with both CVR and FDR, shall be equipped with two combination recorders, FDR and CVR.

(3) Subject to subregulation (2), one recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

(4) All aeroplanes of a maximum certificated take-off mass over 5700kg, required to be equipped with FDR and CVR, may alternatively be equipped with two combination recorders, FDR and CVR.

(5) This regulation may be complied with by equipping the aeroplanes with two combination recorders, one forward and one after or separate devices.

(6) All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5700kg or less, required to be equipped with FDR or CVR, may alternatively be equipped with one combination recorder, FDR or CVR.

Flight recorder
data recovery

28.-(1) All aeroplanes of a maximum certificated take-off mass of over 27000kg and authorised to carry more than nineteen passengers for which the application for type certification is submitted to a contracting State on or after 1st January 2021, shall be equipped with a means approved by the State of the operator, to recover flight recorder data and make it available in a timely manner.

(2) The Authority in approving the means to make flight recorder data available in a timely manner, shall consider the following:

- (a) the capabilities of the operator;
- (b) overall capability of the aeroplane and its systems as certified by the State of design;
- (c) the reliability of the means to recover the appropriate CVR channels and appropriate FDR data; and
- (d) specific mitigation measures.

Aeroplanes
operated as
visual flight rule
(VFR flights)

29.-(1) Aeroplanes when operated as VFR flights shall be equipped with-

- (a) a magnetic compass;

- (b) an accurate timepiece indicating the time in hours, minutes and seconds;
- (c) a sensitive pressure altimeter;
- (d) an airspeed indicator; and
- (e) such additional instruments or equipment as may be prescribed by the Authority.

(2) VFR flights which are operated as controlled flights shall be equipped in accordance with instruments flight rules.

Aeroplanes on
flights over
water

30.-(1) Seaplanes for all flights shall be equipped with:

- (a) one life jacket, or equivalent individual flotation 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;
- (b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable; and
- (c) one sea anchor or drogue.

(2) Landplanes shall carry the following equipment:

- (a) when flying over water and at a distance of more than 93km or 50NM away from the shore, in the case of landplanes operated in accordance with the relevant regulations relating to civil aviation operation of aircraft-commercial air transport;
- (b) when flying en-route over water beyond gliding distance from the shore, in the case of all other landplanes; and
- (c) when taking off or landing at an aerodrome where, in the opinion of the Authority, 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) The equipment referred to in subregulation (1) shall comprise one life jacket or equivalent individual flotation device for each person on board, stowed in a

position easily accessible from the seat or berth of the person for use.

(4) Life jackets accessible from seats or berths located in crew rest compartments are required only when the seats or berths concerned are certified to be occupied during take-off and landing.

Aeroplanes on
long-range over-
water flights

31.-(1) Notwithstanding regulation 30, the following equipment shall be installed in all aeroplanes when used over routes on which the aeroplane may be over water and at more than a distance corresponding to 120 minutes at cruising speed or 740km or 400NM, whichever is the lesser, away from land suitable for making an emergency landing in the case of aircraft operated in accordance with the regulations relating to operation of aircraft -commercial air transport, and 30 minutes or 185km or 100NM, whichever is the lesser, for all other aeroplanes-

- (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;
- (b) equipment for making the pyrotechnical distress signals described in Civil Aviation (Rules of the Air) Regulations;
- (c) on all aeroplanes of a maximum certificated takeoff mass of over 27000kg, a securely attached underwater locating device operating at a frequency of 8.8 kHz; and
- (d) subject to paragraph(c), automatically activated underwater locating device shall operate for a minimum of thirty days and shall not be installed in wings or empennage.

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(2) Each life jacket and equivalent individual flotation device, when carried in accordance with this regulation, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement are met by the provision of individual flotation devices other than life

jackets.

Aeroplanes on
flights over
designated land
areas

32. Aeroplanes, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be 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.

All aeroplanes
on high altitude
flights

33.-(1) Approximate altitude in the Standard Atmosphere corresponding to the value of absolute pressure is prescribed in the following table:

Table 1 - Absolute pressure

Absolute pressure	Metres	Feet
700 hPa	3 000	10 000
620 hPa	4 000	13 000
376 hPa	7 600	25 000

(2) An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the regulations relating to operation of aircraft -commercial air transport.

(3) An aeroplane intended to 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 compartments shall be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the regulations relating to operation of aircraft -commercial air transport.

(4) Pressurised aeroplanes intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurisation.

(5) An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 376

hPa, or which, when operated at flight altitudes at which the atmospheric pressure is more than 376 hPa, cannot descend safely within 4 minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa shall be provided with automatically deployable oxygen equipment to satisfy the requirements of the regulations relating to operation of aircraft -commercial air transport.

(6) The total number of oxygen dispensing units shall exceed the number of passenger and cabin crew seats by at least 10 per cent.

Aeroplanes in
icing conditions

34. Aeroplanes shall be equipped with suitable de-icing or anti-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.

Aeroplanes
operated in
accordance with
instrument flight
rules

35.-(1) 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:

- (a) a magnetic compass;
 - (b) an accurate timepiece indicating the time in hours, minutes and seconds;
 - (c) two sensitive pressure altimeters with counter drum-pointer; or equivalent presentation;
 - (d) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;
 - (e) a turn and slip indicator;
 - (f) an attitude indicator or artificial horizon;
 - (g) a heading indicator or directional gyroscope;
 - (h) a means of indicating whether the power supply to the gyroscopic instrument is adequate;
 - (i) a means of indicating in the flight crew compartment the outside air temperature;
 - (j) a rate-of-climb and descent indicator; and
 - (k) such additional instruments or equipment as may be prescribed by the Authority.
- (2) The requirements of paragraphs (e), (f) and (g)

may be met by combinations of instruments or by integrated flight director systems:

Provided that, the safeguards against total failure, inherent in the three separate instruments, are retained.

Aeroplanes over
5700kg -
emergency
power supply

36.-(1) Aeroplanes of a maximum certificated take-off mass of over 5700kg newly introduced into service after 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 or artificial horizon, clearly visible to the pilot-in-command.

(2) Subject to subregulation (1), 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 or indicators is or are respectively being operated by emergency power.

(3) The instruments used by any one pilot shall be so arranged as to permit the pilot to see their indications readily from his station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

Aeroplanes
operated at night

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37.-(1) Aeroplanes when operated at night shall be equipped with-

- (a) all equipment specified in Regulation 35;
- (b) the lights required by the Civil Aviation (Rules of the Air) regulations for aircraft in flight or operating on the movement area of an aerodrome;
- (c) two landing lights;
- (d) illumination for all 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.

(2) Specifications and characteristics of lights referred in this regulation shall meet the requirements as

prescribed in the First Schedule.

Pressurised
aeroplanes when
carrying
passengers-
weather radar

38. Pressurised aeroplanes when carrying passengers shall be equipped with operative weather radar whenever such aeroplanes are being operated in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne weather radar, may be expected to exist along the route either at night or under instrument meteorological conditions.

Aeroplanes
operated above
15000m or
49000ft
radiation
indicator

39.-(1) Aeroplanes intended to be operated above 15000m or 49000ft shall carry equipment to measure and indicate continuously the dose rate of total cosmic radiation received, being the total of ionizing and neutron radiation of galactic and solar origin, and the cumulative dose on each flight.

(2) The display unit of the equipment shall be readily visible to a flight crew member.

Mach number
indicator

40. Aeroplanes with speed limitations expressed in terms of mach number shall be equipped with a mach number indicator.

Aeroplanes
required to be
equipped with
ground
proximity
warning systems
(GPWS)

41.-(1) Turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5700kg or authorised to carry more than nine passengers shall be equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

(2) The operator shall establish and implement database management procedures that ensure the timely distribution and update of current terrain and obstacle data to the ground proximity warning system.

(3) Turbine-engined aeroplanes of a maximum certificated take-off mass of 5700kg or less and authorised to carry more than five but not more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings excessive descent rate and excessive altitude loss after take-off or go-around, warning of unsafe terrain clearance and a forward-looking terrain avoidance function.

(4) All piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5700kg or authorised to carry more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings in excessive descent rate and excessive altitude loss after take-off or go-around, warning of unsafe terrain clearance and a forward-looking terrain avoidance function.

(5) A ground proximity warning system 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.

(6) A ground proximity warning system shall provide warnings of the following circumstances, unless otherwise specified:

- (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-
 - (i) gear not locked down;
 - (ii) flaps not in a landing position; and
- (e) excessive descent below the instrument glide path.

Aeroplanes
carrying
passengers-
cabin crew seats

42.-(1) Aeroplanes 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 comply with the regulations relating to operation of aircraft -commercial air transport in respect of emergency evacuation.

(2) Cabin crew seats provided in accordance with subregulation (1) shall be located near floor level and other emergency exits as required by the State of registry for emergency evacuation.

Emergency
locator
transmitter
(ELT)

43.-(1) Aeroplanes shall carry an automatic emergency locator transmitter.

(2) Aeroplanes authorised to carry more than 19

passengers for which the individual certificate of airworthiness is first issued after 1st July 2008 shall be equipped with either-

- (a) at least two ELTs, one of which shall be automatic; or
- (b) at least one ELT and a capability that meets the requirements of this regulation.

(3) Aeroplanes authorised to carry more than 19 passengers shall be equipped with at least one automatic emergency locator transmitter or two emergency locator transmitters of any type, except as provided for in subregulation (2).

(4) Aeroplanes authorised to carry 19 passengers or less for which the individual certificate of airworthiness is first issued after 1st July 2008 shall be equipped with at least one automatic emergency locator transmitter.

(5) Aeroplanes authorised to carry 19 passengers or less shall be equipped with at least one automatic emergency locator transmitter of any type except as provided for in subregulation (4).

(6) Emergency locator transmitter equipment carried in accordance with this regulation shall operate in compliance with the Civil Aviation (Communication Systems) Regulations.

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Location of
aeroplane in
distress

44.-(1) Aeroplanes of a maximum certificated take-off mass of over 27000kg or 5700kg for which the individual certificate of airworthiness is first issued on or after 1st January 2023, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress, in accordance with the regulations applicable to location of aircraft in distress.

(2) The operator shall make position information of a flight in distress available to the appropriate organisations, as prescribed by the Authority.

Aeroplanes
required to be
equipped with
Airborne
Collision

45.-(1) Turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5700kg or 51 authorised to carry more than 19 passengers shall be equipped with an airborne collision avoidance system

Avoidance
System (ACAS
II)

(ACAS II).

(2) Aeroplanes shall be equipped with an airborne collision avoidance system (ACAS II).

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(3) An airborne collision avoidance system shall operate in accordance with the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

Requirements
for pressure-
altitude
reporting
transponders

46.-(1) Aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of the applicable regulations relating to aeronautical telecommunication-surveillance and collisions avoidance systems.

(2) Aeroplanes shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62m or 25ft, or better.

(3) The Mode S transponder shall be provided with the airborne or on-the-ground status where the aeroplane is equipped with an automatic means of detecting such status.

Microphones

47. Flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level or altitude.

Turbo-jet
aeroplanes
forward-looking
wind shear
warning system

48.-(1) Turbo-jet aeroplanes of a maximum certificated take-off mass more than 5700kg or authorised to carry more than 9 passengers shall be equipped with a forward-looking wind shear warning system.

(2) A forward-looking wind shear warning system shall be capable of providing the pilot with a timely aural and visual warning of wind shear ahead of the aircraft, and the information required to permit the pilot to safely commence and continue a missed approach or go-around or to execute an escape manoeuvre when necessary.

(3) Subject to subregulation (2), the system shall provide an indication to the pilot when the limits specified for the certification of automatic landing equipment are being approached, when such equipment is in use.

49. Aeroplanes operated by a single pilot under the

Aeroplanes
operated by
single pilot
under instrument
flight rule at
night

- instrument flight rule or at night shall be equipped with-
- (a) a serviceable autopilot that has at least altitude hold and heading select modes;
 - (b) a headset with a boom microphone or equivalent; and
 - (c) means of displaying charts that enables them to be readable in all ambient light conditions:

Provided that, the approval shall be in accordance with regulations relating to operation of aircraft-commercial air transport.

Aeroplanes
equipped with
automatic
landing systems
or equivalent
displays

50.-(1) Where aeroplanes are equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of an aeroplane shall be approved by the Authority.

(2) In approving the operational 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 has carried out a safety risk assessment of the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS; and
- (c) the operator 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.

Electronic flight
bags (EFBs)

51.-(1) Where portable EFBs are used on board an aeroplane, the operator 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 operator shall-

- (a) assess the safety risks associated with each EFB function;
 - (b) establish and document 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 issue a specific approval for the operational use of EFB functions to be used for the safe operation of aeroplanes.
- (4) When issuing a specific approval for the use of EFBs referred to in subregulation (3), the Authority shall ensure that-
- (a) the EFB equipment and its associated installation hardware, including interaction with aeroplane systems where applicable, meet the appropriate airworthiness certification requirements;
 - (b) the operator has assessed the safety risks associated with the operations supported by the EFB functions;
 - (c) the operator has established requirements for redundancy of the information where appropriate as contained in and displayed by the EFB functions;
 - (d) the operator has established and documented procedures for the management of the EFB functions including any database it may use; and
 - (e) the operator has established and documented the procedures for the use of, and training requirements for, the EFB and the EFB function.

(b) Aeroplane Communication, Navigation and Surveillance Equipment

Communication
equipment

52.-(1) 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 Tanzania Communication Regulatory Authority.

(2) The requirements of subregulation (1) are complied with, where the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

(3) The radio communication equipment required in accordance with subregulation (1) shall provide for communications on the aeronautical emergency frequency 121.5 MHz.

(4) An aeroplane for operations where communication equipment is required to meet required communication performance (RCP) specification for performance-based communication (PBC), shall in addition to the requirements specified in subregulation (1):

- (a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specifications;
- (b) have information relevant to the aeroplane RCP specification capabilities prescribed in the flight manual or other aeroplane documentation approved by the State of design or State of registry; and
- (c) have information relevant to the aeroplane RCP specification capabilities included in the MEL.

(5) The Authority shall ensure that, the operator for operations where an RCP specification for PBC has been prescribed, has established and documented-

(a) normal and abnormal procedures, including contingency procedures;

- (b) flight crew qualification and proficiency requirements, in accordance with appropriate RCP 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 RCP specifications.

(6) The Authority shall ensure that, in respect of those aeroplanes referred to in subregulation (4), adequate provisions exist for-

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complied with the RCP specifications.

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Navigation
equipment

53.-(1) An aeroplane shall be provided with navigation equipment which will enable it to proceed in accordance with-

- (a) its operational flight plan;
- (b) the requirements of air traffic services, except when, where not so precluded by the appropriate Authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

(2) 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 this regulation.

Performance
based navigation
(PBN)

54.-(1) An aeroplane for operations where a navigation specification for PBN has been prescribed, shall in addition to the requirements specified in subregulation (2)-

- (a) be provided with navigation equipment that will enable it to operate in accordance with the prescribed navigation specifications;
- (b) have information relevant to the aeroplane navigation specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of the design or State of registry; and
- (c) have information relevant to the aeroplane navigation specification capabilities included in the MEL.

(2) The Authority shall ensure that, the operator for operations where a navigation specification for PBN has been prescribed has established and documented-

- (a) normal and abnormal procedures including contingency procedures;
- (b) flight crew qualification and proficiency requirements in accordance with the appropriate navigation 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 the appropriate navigation specifications.

(3) The Authority shall issue a specific approval for operations based on PBN authorisation required (AR) navigation specifications.

Minimum
navigation
performance
specifications
(MNPS)

55. An aeroplane for flights in defined portions of airspace where based on regional air navigation agreement, MNPS are prescribed, shall be 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 authorised by the Authority for the MNPS operations concerned.

Reduced vertical
separation

56.-(1) For flights in defined portions of airspace where, based on regional air navigation agreement, an

minimum
(RVSM)

RVSM of 300m or 1000ft is applied between FL 290 and FL 410 inclusive:

(a) the aeroplane shall be 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 and the threshold for the alert shall not exceed 90m or 300ft; and

(iv) automatically reporting pressure altitude; and

(b) the Authority shall issue a specific approval for RVSM operations.

(2) The Authority prior to granting the RVSM specific approval required in accordance with subregulation (1), shall be satisfied that-

(a) the vertical navigation performance capability of the aeroplane satisfies the requirements prescribed in the Second Schedule;

(b) the operator has instituted appropriate procedures in respect of continued airworthiness for maintenance and repair practices and programmes; and

(c) the operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

(3) An RVSM specific approval is valid globally on the understanding that any operating procedures specific to a given region shall be prescribed in the operations manual or appropriate crew guidance.

(4) The State of the operator, in consultation with the State of registry shall ensure that, in respect of those aeroplanes mentioned in subregulation (1), where appropriate, adequate provisions exist for:

(a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with the

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Civil Aviation (Air Traffic 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.

(5) An operator who have been issued an RVSM specific approval by the Authority shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1000 flight hours per aeroplane, whichever period is longer.

(6) Subject to subregulation (1), where the operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

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(7) Monitoring data from any regional monitoring programme established in accordance with the Civil Aviation (Air Traffic Services) Regulations, may be used to satisfy the requirement.

(8) An operator shall not operate RVSM airspace without a valid RVSM approval issued by the Authority.

(9) Subject to subregulation (8), the Authority shall ensure that appropriate action are taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM approval.

Instrument
meteorological
conditions
(IMC)

57.-(1) 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, on flights in which it is intended to land in IMC.

(2) Subject to subregulation (1), the 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.

Surveillance
equipment

58.-(1) An aeroplane shall be provided with surveillance equipment which will enable it to operate in

accordance with the requirements of air traffic services.

(2) An aeroplane for operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), shall in addition to the requirements specified in subregulation (1):

- (a) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specifications;
- (b) have information relevant to the aeroplane required surveillance performance or RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of design or State of registry; and
- (c) have information relevant to the aeroplane RSP specification capabilities included in the MEL.

(3) The Authority shall ensure that the operator for operations, where an RSP specification for PBS has been prescribed, has established and documented-

- (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.

(4) The Authority shall ensure that, in respect of those aeroplanes referred to in subregulation (2), adequate provisions exist for-

- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators,

identified in such reports as not complying with the RSP specifications.

(5) The equipment installation shall be such that the failure of any single unit required for communication, navigation or surveillance purposes or any combination thereof shall not result in the failure of another unit required for communication, navigation or surveillance purposes.

Electronic
navigation data
management

59.-(1) An operator 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 operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aircraft as appropriate.

(3) Authority shall ensure that the operator continues to monitor both the process and products.

PART IV

GENERAL AVIATION-AEROPLANES (GENERAL AVIATION OPERATIONS)

(a) Aeroplane Instruments, Equipment and Flight Documents

General

60. An aeroplane in addition to the minimum equipment necessary for the issuance of a certificate of airworthiness shall not fly unless, the instruments, equipment and flight documents prescribed in this Part are installed or carried, as appropriate, in aeroplanes according to the aeroplane used and to the circumstances under which the flight is to be conducted:

Provided that, the Authority shall accept the prescribed instruments and equipment, including their installation.

Aeroplanes
on all flights

61.-(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 maneuvers 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, shall 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) seat and seatbelt for-
 - (i) each person over two years of age; and
 - (ii) each seat and restraining belts;
- (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 Aeroplane performance operating limitations in accordance with the applicable regulations relating to operation of aircraft general aviation-aeroplane;
 - (ii) any specific approval issued by the Authority, where applicable, for the operations 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;

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(iv) procedures in accordance with the Civil Aviation (Rules of the Air) Regulations, for pilot-in-command of intercepted aircraft;

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(v) visual signals for use by intercepting and intercepted aircraft in accordance with the Civil Aviation (Rules of the Air) Regulations; and

(vi) the journey logbook for the aeroplane;

(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) An 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 31st December 2018 shall:

(a) meet the applicable minimum performance requirements of the State of registry; and

(b) not be of a type that depletes the ozone layer.

(4) Aeroplanes on all flights shall be equipped with-

(a) the ground air signal codes for search and rescue purposes;

(b) a safety harness for each flight crew member seat.

Marking of
break-in
points

62.-(1) A person shall not operate an aircraft unless the exterior surface of the fuselage suitable for break-in by rescue crews in emergency is marked to show “break-in areas”, for purposes of rescue in an emergency as shown in the Figure 2 of this regulation.

(2) The break-in areas shall be rectangular in shape and shall be marked by right-angled corner markings, each area of which shall be 9 cm in length along its outer edge and 3 cm in width.

(3) Where the corner markings referred to in subregulation (2) are more than 2 m apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

(4) The words “CUT HERE IN EMERGENCY” and “*KATA HAPA WAKATI WA DHARURA*” shall be marked across the centre of each break-in area in capital letters.

(5) The markings required under this regulation shall be-

- (a) painted, or affixed by other equally permanent means; red or yellow and, in any case in which the colour of the adjacent background is such as to render red or yellow markings not readily visible, be outlined in such a manner that shall be readily distinguishable from the surrounding fuselage area by contrast in colour; and
- (b) kept clean and unobscured at all times.

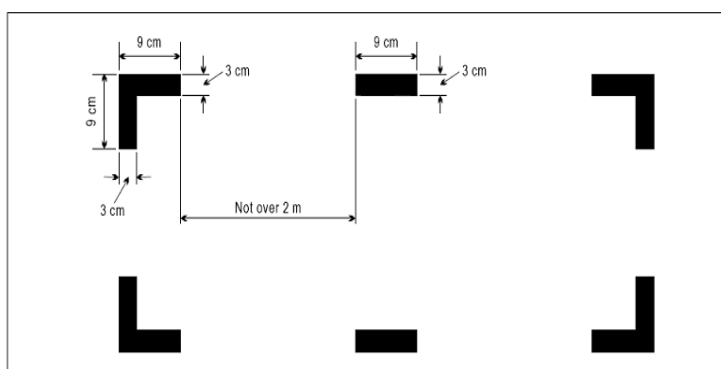


Figure 2. Marking of break-in Points

Visual flight
rules (VFR)
operations

63.-(1) 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; and

- (c) equipped with such additional equipment as may be prescribed by the Authority.

(2) VFR flights which are operated as controlled flights shall be equipped in accordance with Instrument Flight rules or IFR.

Aeroplanes
on flights
over water -
seaplanes

64.-(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 manoeuvring.

(2) For purposes of subregulation (1) the term "seaplanes" includes amphibians operated as seaplanes.

Land planes

65. Single engined landplanes includes amphibians operated as landplanes-

- (a) when flying enroute over water beyond gliding distance from the shore; or
- (b) when 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,

shall 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 use.

Aeroplanes
on extended
flights over
water

66.-(1) 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.

(2) 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.

(3) The pilot-in-command shall take into account the operating environment and conditions such as, but not limited to-

- (a) sea state and sea and air temperatures;
- (b) the distance from land suitable for making an emergency landing; and
- (c) the availability of search and rescue facilities.

(4) The pilot-in-command shall, in addition to the equipment required in subregulation (1), based on the risks assessment 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
- (b) equipment for making the distress signals described in the Civil Aviation (Rules of the Air) Regulations.

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Aeroplanes
on flights
over
designated
land areas

67. Aeroplanes, when operated across land areas which have been designated by the state concerned as areas in which search and rescue would be difficult, shall be equipped with such signalling devices and life-saving equipment, including means of sustaining life as may be appropriate to the area overflown.

Aeroplanes
on high
altitude
flights

68.-(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 the applicable regulations relating to operation of aircraft-general aviation aeroplanes.

(2) Pressurised aeroplanes intended to be operated at flight altitudes at which the atmospheric pressure is less

than 376 hPa shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurisation.

Aeroplanes
operated in
accordance
with
instrument
flight rule

69.-(1) 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 or 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) stabilised 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 Authority.

(2) The requirements referred to subregulation (1) may be met by combinations of instruments or by integrated flight director systems:

Provided that, the safeguards against total failure, inherent in the three separate instruments, are retained.

Aeroplanes
when
operated at
night

70. Aeroplanes, when operated at night, shall be equipped with-

- (a) the equipment specified in the regulation 69, and characteristics of lights prescribed in the Fourth Schedule;
- (b) a landing light;

- (c) illumination for all flight instruments and equipment that are essential for the safe operation of the aeroplane that are used by the flight crew;
- (d) lights in all passenger compartments; and
- (e) an independent portable light for each crew member station.

Mach
number
indicator

71. Aeroplanes with speed limitations expressed in terms of mach number shall be equipped with a means of displaying mach number.

Aeroplanes
required to
be equipped
with ground
proximity
warning
system
(GPWS)

72.-(1) Turbine-engined aeroplanes of a maximum certificated take-off mass more than 5700kg or authorised to carry-

- (a) more than nine passengers; and
- (b) more than five passengers but not more than nine passengers,

shall be equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

(2) All piston engine aeroplane of maximum certificated take-off mass more than 5700kg or are authorised to carry more than nine passengers shall be equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

(3) A ground proximity warning system 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.

(4) A ground proximity warning system shall provide, at a minimum, warnings of the following:

- (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 if -
 - (i) gear not locked down; and
 - (ii) flaps not in a landing position; and

(e) excessive descent below the instrument glide path.

(5) A ground proximity warning system installed in turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5700kg or authorised to carry more than nine passengers for which the individual certificate of airworthiness is first issued after 1st January 2011 shall provide, at a minimum, warnings of the followings:

- (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 if -
 - (i) gear not locked down; and
 - (ii) flaps not in a landing position; and
- (e) excessive descent below the instrument glide path.

Emergency
locator
transmitter
(ELT)

73.-(1) Aeroplanes authorised to carry nineteen passengers or less shall be equipped with at least one emergency locator transmitter of any type except as provided for in subregulation (4).

(2) Aeroplanes authorised to carry more than nineteen passengers shall be equipped with at least one automatic emergency locator transmitter or two emergency locator transmitter of any type except as provided for in subregulation (3).

(3) Aeroplanes authorised to carry more than nineteen passengers for which the individual certificate of airworthiness is first issued after 1st July 2008 shall be equipped with at least two emergency locator transmitter, one of which shall be automatic emergency locator transmitter.

(4) Aeroplanes authorised to carry nineteen passengers or less for which the individual certificate of airworthiness is first issued after 1st July 2008 shall be equipped with at least one automatic emergency locator transmitter.

GN No. 75 of 2017	(5) Emergency locator transmitter equipment carried to satisfy the requirements of this regulation shall operate in accordance with the Civil Aviation (Communication Systems) Regulations.
Aeroplanes required to be equipped with pressure altitude reporting transponder GN. No. 72 of 2017	74.-(1) 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 Systems) Regulations. (2) Aeroplanes operating as visual flight rule flights shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provision of the unless exempted by Authorities.
Microphone s	75. Flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level or altitude, when operating under instrument flight rule.
Aeroplanes equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS	76.-(1) Where aeroplanes are equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, criteria for the use of such systems for the safe operation of an aeroplane shall be approved by the Authority. (2) In approving the operational 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; and (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.

Flight
recorders

77.-(1) Crash-protected flight recorders comprise one or more of the following-

- (a) a flight data recorder;
- (b) a cockpit voice recorder;
- (c) an airborne image recorder or AIR; and
- (d) a data link recorder.

(2) Image and data link information shall be recorded on either the CVR or the FDR as prescribed in the Sixth Schedule.

(3) Lightweight flight recorders shall include one or more of the following-

- (a) an aircraft data recording system;
- (b) a cockpit audio recording system;
- (c) an airborne image recording system or AIRS; and
- (d) a data link recording system.

(4) Image and data link information may be recorded on either the CARS or the ADRS as prescribed in the Six Schedule.

(5) The requirements on flight recorders and parameters used under this regulation shall be recorded as prescribed in the Sixth Schedule.

Application
of FDR and
ADRS

78.-(1) Turbine-engined aeroplanes with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1st January 2016 shall be equipped with-

- (a) an FDR which shall record at least the first 16 parameters in table A2.3-1 of the Sixth Schedule;
- (b) a class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilots or pilots; as prescribed in 2.2.2 of Sixth Schedule; or
- (c) an ADRS which shall record at least the first 7 parameters listed in Table A2-3.3 in the Sixth Schedule.

(2) Aeroplanes of a maximum certificated take-off mass of over 5700kg for which the application for type certification is submitted to a Contracting State on or after 1st January 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table A2.3-1 of the Sixth Schedule.

(3) Aeroplanes of a maximum certificated take-off mass of over 5700kg for which the individual certificate of airworthiness is first issued on or after 1st January 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table A2.3-1 of the Sixth Schedule.

(4) FDRs, ADRS, AIRs or AIRS shall not use engraving metal foil frequency modulation or FM, photographic film or magnetic tape.

(5) FDRs shall retain the information recorded during at least the last 25 hours of their operation.

Application of
CVR and CARS

79.-(1) Turbine-engined aeroplanes with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1st January 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or CARS.

(2) CVRs and CARS referred to in subregulation (1) shall not use magnetic tape or wire.

(3) CVRs shall retain the information recorded during at least the last two hours of their operation.

(4) Aeroplanes that are required to be equipped with CARS, and for which the individual certificate of airworthiness is first issued on or after 1st January 2025, shall be equipped with a CARS which shall retain the information recorded during at least the last two hours of their operation.

Application of
data link
recorders

80.-(1) Aeroplanes for which the individual certificate of airworthiness is first issued on or after 1st January 2016, which use any of the data link communications applications referred to in paragraph 5.1.2 of the Sixth Schedule and are required to carry a

CVR, shall record the data link communications messages on a crash-protected flight recorder.

(2) Aeroplanes for which the individual certificate of airworthiness was first issued before 1st January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to install and use any of the data link communications applications referred to in paragraph 5.1.2 of the Sixth Schedule shall record the data link communications messages on a crash-protected flight recorder unless the installed data link communications equipment is compliant with the type certificate issued or aircraft modification first approved prior to 1st January 2016.

(3) A class B AIR may be used as a means for recording data link communications applications messages to and from the aeroplanes where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

(4) All aeroplanes for which the individual certificate of airworthiness was first issued before 1st January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of the Sixth Schedule shall record the data link communications messages on a crash-protected flight recorder.

(5) The minimum recording duration shall be equal to the duration of the CVR.

(6) Data link recording shall be capable of being correlated with the recorded cockpit audio.

Guideline of
flight recorders

81.-(1) Flight recorders shall-

- (a) be constructed, located and installed to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed;
- (b) meet the prescribed crashworthiness and fire protection specifications;
- (c) not be switched off during flight time;

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- (d) be deactivated upon completion of flight time following an accident or incident to preserve flight recorder records; and
- (e) not be reactivated before their disposition as determined in accordance with the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations.

(2) The need for removal of the flight recorder records from the aircraft shall be determined by the investigation authority in Tanzania conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation:

Provided that, the pilot-in-command's responsibilities regarding the retention of flight recorder records are contained in subregulation (4).

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(3) The Pilot-in-command, or the owner or the operator, shall ensure that in the event the aeroplane becomes involved in an accident or incident, all related flight recorder records, and where necessary the associated flight recorders are preserved and retained in safe custody pending their disposition in accordance with the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations.

(4) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders as prescribed in the Sixth Schedule.

(5) Procedures for the inspections of the flight recorder systems shall be as set out in the Sixth Schedule.

Flight recorder
electronic
documentation

82. The documentation requirement concerning FDR and ADRS parameters provided by operators to accident investigation authorities shall be in electronic format and meet industry specifications.

Electronic flight
bags (EFBs)
equipment

83.-(1) The pilot-in-command or the operator shall ensure that, they do not affect the performance of the aeroplane systems, equipment or the ability to operate the aeroplane, where portable EFBs are used on board an aeroplane.

(2) The pilot-in-command or the operator shall, where EFBs are used on board an aeroplane-

- (a) assess the safety risks 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 issue a specific approval for the operational use of EFBs functions used for the safe operation of aeroplanes.

(4) The Authority shall, when issuing a specific approval for the use of EFBs, ensure that-

- (a) the EFBs equipment and its associated installation hardware, including interaction with aeroplane systems where applicable, meet the appropriate airworthiness certification requirements;
- (b) the operator or owner has assessed the risks associated with the operations supported by the EFBs functions;
- (c) the operator or owner has established requirements for redundancy of the information where applicable contained in and displayed by the EFBs functions;
- (d) the operator has established and documented procedures for the management of the EFBs functions including any databases it may use; and
- (e) the operator has established and documented the procedures for the use of, and training requirements for, the EFBs functions.

Aeroplane
operated under
Article 83 *bis*
agreement

84.-(1) An aeroplane, which operates under Article 83 *bis* agreement shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format.

(2) When the agreement summary specified in subregulation (1) is issued in a language other than English, an English translation shall be included.

(3) The agreement summary of the Article 83 *bis* agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred under the agreement by the State of registry to the State of the operator, when conducting surveillance activities.

(4) The agreement summary shall-

- (a) be transmitted to ICAO together with the Article 83 *bis* agreement for registration with the ICAO Council by the State of registry or the State of the operator; and
- (b) contain the information for the specific aircraft as set out in the Ninth Schedule.

(b) Aeroplane Communication, Navigation and Surveillance Equipment

Communication
equipment

85.-(1) An aeroplane operated in accordance with the instrument flight rules or at night shall be provided with radio communication equipment.

(2) Equipment referred to in subregulation (1) shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the Tanzania Communication Regulatory Authority.

(3) The requirements of subregulation (1) and (2) are complied with, when the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

(4) Subject to subregulation (1), when complying with the requirement, 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 anyone will not result in failure of any other.

(5) An aeroplane to be operated in accordance with VFR, but as a controlled flight, shall 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 Tanzania Communication Regulatory Authority aeronautical information publications unless, exempted by the Authority.

(6) An aeroplane to be operated on a flight to which the provisions of regulations 65 or 66 apply, 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 in the applicable state aeronautical information publications unless exempted by the Authority.

(7) The radio communication equipment required in accordance with this regulation shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

(8) An aeroplane for operations where communication equipment is required to meet an RCP specification for PBC, shall in addition to the requirements specified in this regulation:

- (a) be provided with communication equipment that will enable it to operate in accordance with the prescribed RCP specifications;
- (b) have information relevant to the aeroplane RCP specification capabilities prescribed in the flight manual or other aeroplane documentation approved by the State of design or State of Registry; 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.

(9) The Authority shall establish criteria for operations where an RCP specification for PBC has been prescribed.

(10) The Authority shall ensure that, the operator for operations where an RCP specification for PBC has been prescribed, has established and documented-

- (a) normal and abnormal procedures, including contingency procedures;

- (b) flight crew qualification and proficiency requirements, in accordance with the appropriate RCP 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 RCP specifications.

(11) The Authority shall ensure that, in respect of subregulation (8), adequate provisions exist for-

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complied with the RCP specifications.

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Navigation
equipment

86.-(1) An aeroplane shall be provided with navigation equipment which shall enable it to proceed in accordance with-

- (a) its flight plan; and
 - (b) 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) 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 shall enable the aeroplane to navigate in accordance with this regulation.

Performance-
based navigation

87.-(1) An aeroplane shall, for the operations where a navigation specification for PBN has been prescribed, in addition to the requirements specified in regulation 86-

- (a) be provided with navigation equipment which will enable it to operate in accordance with the

- prescribed navigation specifications;
- (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 State of registry; 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.

(2) The Authority shall establish criteria for operations where a navigation specification for PBN has been prescribed, require that the operator 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.

(3) The Authority shall issue a specific approval for operations based on PBN authorisation required navigation specifications.

Minimum
navigation
performance
specifications

88. An aeroplane for flights in defined portions of airspace where based on regional air navigation agreement, MNPS are prescribed, shall be 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 authorised by the Authority for the MNPS operations concerned.

Reduced vertical
separation
minimum

89.-(1) For flights in defined portions of airspace where, based on regional air navigation agreement, an RVSM of 300 m or 1,000 ft is applied between FL 290

and FL 410 inclusive:

- (a) the aeroplane shall be 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 and the threshold for the alert shall not exceed ± 90 m or 300 ft; and
 - (iv) automatically reporting pressure altitude.
- (b) the State of registry shall issue a specific approval for RVSM operation.
- (2) The Authority prior to granting the RVSM specific approval required in accordance with subregulation (1), shall be satisfied that-
 - (a) the vertical navigation performance capability of the aeroplane satisfies the requirements prescribed in the Fifth Schedule;
 - (b) the operator has instituted appropriate procedures in respect of continued airworthiness for maintenance and repair practices and programmes; and
 - (c) the operator has instituted appropriate flight crew procedures for operations in RVSM airspace.
- (3) An RVSM specific approval is valid globally on the understanding that any operating procedures specific to a given region shall be prescribed in the operations manual or appropriate crew guidance.
- (4) The State of the operator, in consultation with the State of registry shall ensure that, in respect of those aeroplanes mentioned in subregulation (1), where appropriate, adequate provisions exist for-
 - (a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with the

Civil Aviation (Air Traffic 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.

(5) An operator who have been issued an RVSM specific approval by the Authority shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1000 flight hours per aeroplane, whichever period is longer.

(6) Subject to subregulation (1), where the operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

(7) An operator shall not operate RVSM airspace without a valid RVSM approval issued by the Authority.

(8) Subject to subregulation (1), the Authority shall ensure that appropriate actions are taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM approval.

Instrument
meteorological
conditions
(IMC)

90.-(1) 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, on flights in which it is intended to land in IMC.

(2) Subject to subregulation (1), the 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.

Surveillance
equipment

91.-(1) An aeroplane shall be provided with surveillance equipment which shall enable it to operate in accordance with the requirements of air traffic services.

(2) An aeroplane for operations where surveillance equipment is required to meet an RSP specification for

performance-based surveillance (PBS), shall in addition to the requirements specified in subregulation (1):

- (a) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specifications;
- (b) have 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 State of registry; and
- (c) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane RSP specification capabilities included in the MEL.

(3) The Authority shall ensure that the operator for operations, where an RSP specification for PBS has been prescribed, has established and documented-

- (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.

(4) The Authority shall ensure that, in respect of those aeroplanes referred to in subregulation (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; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specifications.

PART V
GENERAL AVIATION-AEROPLANES (LARGE AND TURBOJET
AEROPLANES)

(a) Aeroplane Instruments, Equipment and Flight Documents

General

92.-(1) Where a master minimum equipment list is established for the aircraft type, the operator shall include in the operations manual a minimum equipment list approved by the State of registry of the aeroplane which shall 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.

(3) The operating manual shall be consistent with the aircraft flight manual and checklists to be used and its design of the manual shall observe human factors principles.

Aeroplanes on
all flights

93. Subject to the provisions referred to in regulation 61, an aeroplane shall be equipped with-

- (a) accessible and adequate medical supplies appropriate to the number of passengers the aeroplane is authorised to carry;
- (b) medical supplies shall comprise one or more first-aid kits;
- (c) a safety harness for each flight crew seat incorporating a device which shall automatically restrain the occupant's torso in the event of rapid deceleration;
- (d) The safety harness for each pilot seat shall incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight controls;

- (e) 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 where 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) An aeroplane shall carry-
 - (a) the operations manual prescribed in the regulations relating to operation of aircraft-general aviation, 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 aeroplane performance operating limitations as per the regulations relating to operation of aircraft-general aviation, 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 required by the regulations relating to operation of aircraft-general aviation.

Application of
flight data
recorders
(FDRs)

94.-(1) Aeroplanes of a maximum certificated take-off mass of over 5700kg, for which the individual certificate of airworthiness is first issued on or after 1st January 2005 shall be equipped with an FDR which shall record at least 78 parameters listed in table A2.3-1 of the Sixth Schedule-

- (a) aeroplanes of a maximum certificated take-off mass of over 27000kg, for which the individual

certificate of airworthiness is first issued on or after 1st January 1989 shall be equipped with an FDR which shall record at least 32 parameters listed in table A2.3-1 of the Sixth Schedule; and

- (b) aeroplanes of a maximum certificated take-off mass of over 5700kg, up to and including 27000kg, for which the individual certificate of airworthiness is first issued on or after 1st January 1989, shall be equipped with an FDR which shall record at least 16 parameters listed in table A2.3-1 of the Sixth Schedule.

Cockpit voice
recorders

95.-(1) Turbine-engined aeroplanes of a maximum certificated take-off mass of over 5700kg for which the application for type certification is submitted to a contracting State on or after 1st January 2016 and required to be operated by more than one pilot shall be equipped with a CVR-

- (a) aeroplanes of a maximum certificated take-off mass of over 27000kg for which the individual certificate of airworthiness is first issued on or after 1st January 1987 shall be equipped with a CVR;
- (b) aeroplanes of a maximum certificated take-off mass of over 5700kg, up to and including 27000kg, for which the individual certificate of airworthiness is first issued on or after 1st January 1987, shall be equipped with a CVR.

(2) Aeroplanes of a maximum certificated take-off mass of over 27000kg, for which the individual certificate of airworthiness is first issued on or after 1st January 2021 shall be equipped with a CVR capable of retaining the information recorded during at least the last twenty-five hours of its operation.

Combination
recorders

96. Aeroplanes of a maximum certificated take-off mass over 5700kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders, FDR/CVR.

Aeroplanes on
long-range over-
water flights

97.-(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, 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) Subject to subregulation (2), an operator shall, based on the assessment of the risks, in addition to the equipment required in regulation 66, 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) equipment for making the distress signals described in the Civil Aviation (Rules of the Air) Regulations.

(4) Each life jacket and equivalent individual flotation device, when carried in accordance with regulation 65, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of regulation 65 is met by the provision of individual flotation devices other than life jackets.

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Aeroplanes for
which the
individual
certificate of
airworthiness
was first issued
before 1 January
1990

98.-(1) Pressurised aeroplanes operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurisation.

(2) Aeroplane operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the regulations relating to operation of aircraft-general aviation.

(3) Aeroplane 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 compartments shall be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the regulations relating to operation of aircraft-general aviation.

Aeroplanes in
icing conditions

99. Aeroplanes shall be equipped with suitable de-icing or anti-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.

Aeroplanes
operated in
accordance with
instrument flight
rules

100. 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 in addition to the requirements contained in the regulations relating to operation of aircraft-general aviation, shall be equipped with two independent altitude measuring and display systems.

Aeroplanes over
5700kg -
emergency
power supply
for electrically
operated attitude
indicating
instruments

101.-(1) Aeroplanes of a maximum certificated take-off mass of over 5700kg, 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 thirty minutes, an attitude indicating instrument or artificial horizon, clearly visible to the pilot-in-command.

(2) Subject to subregulation (1), 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 indicators are 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 so arranged as to permit the pilot to see their indications readily from his station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

Pressurised
aeroplanes when
carrying
passengers -
weather-
detecting
equipment

102. Pressurised aeroplanes when carrying passengers shall be equipped with operative weather-detecting 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.

Aeroplanes
operated above
15000 m or
49000 ft -
radiation
indicator

103.-(1) Aeroplanes intended to be primarily operated above 15000m or 49000ft shall carry equipment to measure and indicate continuously the dose rate of total cosmic radiation being received, the total of ionising and neutron radiation of galactic and solar origin and the cumulative dose on each flight.

(2) The display unit of the equipment shall be readily visible to a flight crew member.

Aeroplanes
carrying
passengers-
cabin crew seats

104.-(1) Aeroplanes 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 in compliance with the regulations relating to operation of aircraft-general aviation, in respect of emergency evacuation.

(2) Cabin crew seats provided in accordance with subregulation (1) shall be located near floor level and other emergency exits as required by the State of registry for emergency evacuation.

Aeroplanes
required to be
equipped with
airborne
collision
avoidance
system (ACAS)

105.-(1) Turbine-engined aeroplanes of a maximum certificated take-off mass more than 15000kg, or authorised to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 24th November 2005, shall be equipped with ACAS II.

(2) Turbine-engined aeroplanes of a maximum

certificated take-off mass more than 5700kg, but not exceeding 15000kg, or authorised to carry more than 19 passengers, for which the individual airworthiness certificate is first issued after 1st January 2008, shall be equipped with ACAS II.

Aeroplanes
required to be
equipped with
pressure-altitude
reporting
transponder
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106. Aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

Microphones

107. Flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level or altitude.

(b) Aeroplane Communication, Navigation and Surveillance Equipment

Communication
equipment

108. An aeroplane shall, in addition to the requirements of the regulations relating to operation of aircraft-general aviation, 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 Tanzania Communication Regulatory Authority.

Installation

109. The equipment installation shall be such that the failure of any single unit required for communications, navigation or surveillance purposes or any combination thereof shall not result in the failure of another unit required for communications, navigation or surveillance purposes.

Electronic
navigation data
management

110.-(1) An 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 operator shall establish and implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all necessary aeroplanes.

(3) The Authority shall ensure that the operator continues to monitor both the process and products.

PART VI

HELICOPTER OPERATIONS - COMMERCIAL AIR TRANSPORT

(a) Helicopter Instruments, Equipment and Flight Documents

General

111. In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in these Regulations shall be installed or carried, as appropriate, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted:

Provided that, the prescribed instruments and equipment, including their installation, shall be approved or accepted by the State of registry.

Air operator
certificate
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112.-(1) A helicopter shall carry a certified true copy of the air operator certificate specified in the Civil Aviation (Air Operator Certification and Administration) Regulations, and a copy of the operations specifications relevant to the helicopter type, issued in conjunction with the certificate.

(2) When the certificate and the associated operations specifications are issued by the State of the operator in a language other than English, an English translation shall be included.

Minimum
equipment list

113.-(1) The operator shall include in the operations manual a minimum equipment list, approved by the State of the operator 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) Where the State of the operator is not the State of registry, the State of the operator shall ensure that the MEL does not affect the helicopter's compliance with the airworthiness requirements applicable in the State of registry.

Operating
manual

114.-(1) The operator shall make available to operations staff and crew members an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft.

(2) The manual referred to in subregulation (1), shall include details of the aircraft systems and of the checklists to be used, easily accessible to the flight crew during all flight operations and the design of the manual shall observe human factors principles.

Helicopter
operated under
an Article 83 *bis*
agreement

115.-(1) A helicopter, when operating under an Article 83 *bis* agreement entered into between the State of registry and the Authority, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format.

(2) Where the agreement summary specified in subregulation (1) is issued in a language other than English, an English translation shall be included.

(3) The agreement summary of an Article 83 *bis* agreement shall be accessible to a civil aviation safety inspector in determining which functions and duties are transferred by the State of registry to the Authority under the agreement, when conducting surveillance activities such as ramp checks.

(4) The agreement summary shall be-

- (a) transmitted to ICAO together with the Article 83 *bis* agreement for registration with the ICAO Council by the State of registry or the State of the operator;
- (b) contain the information for the specific aircraft as specified in the Tenth Schedule.

Helicopters on all flights

116. A helicopter shall be equipped with instruments that will enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvres and observe the operating limitations of the helicopter in the expected operating conditions.

Medical supplies

117. A helicopter shall be equipped with accessible and adequate medical supplies which shall include-

- (a) a first-aid kit; and
- (b) for helicopters required to carry cabin crew as part of the operating crew, a universal precaution kit, for the use of cabin crew in managing incidents of ill health associated with a case of suspected communicable disease, or in the case of illness involving contact with body fluids.

Portable fire extinguishers

118. A helicopter shall be equipped with portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter and at least located in-

- (a) the pilot's compartment; and
- (b) each passenger compartment that is separate from the pilot's compartment and that is not readily accessible to the flight crew.

Seat, berth and seat belt or safety harness

119.-(1) A helicopter shall be equipped with-

- (a) a seat or berth for each person over two years of age and above;
- (b) a seat belt for each seat and restraining belts for each berth;
- (c) a safety harness for each flight crew seat; and

- (d) a safety harness for each pilot seat incorporating a device which shall automatically restrain the occupant's torso in the event of rapid deceleration.

(2) Where dual controls are fitted, the safety harness for each pilot seat shall incorporate a restraining device to prevent the upper body of an incapacitated occupant from interfering with the flight controls.

Fasten seat belt,
use of oxygen,
no smoking, life
jackets and
emergency exit

120. A helicopter shall be equipped with means of ensuring that the following information and instructions are conveyed to passengers-

- (a) when seat belts or harnesses are to be fastened;
- (b) when and how oxygen equipment is to be used where the carriage of oxygen is required;
- (c) restrictions on smoking;
- (d) location and use of life jackets or equivalent individual flotation devices where their carriage is required; and
- (e) location and method of opening emergency exits.

Spare electrical
fuses

121. Where fuses are used, a helicopter shall have spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

Lavatory fire
extinguisher

122. Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter 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 a helicopter for which the individual certificate of airworthiness is first issued on or after 31st December 2018 shall:

- (a) meet the applicable minimum performance requirements of the State of registry; and
- (b) not be of a type that depletes the ozone layer.

Operations
manual, flight

123. The following shall be carried in the helicopter-

manual and
charts

- (a) the operations manual prescribed in the regulations relating to helicopter operations, or those parts of it that pertain to flight operations;
- (b) the helicopter flight manual for the helicopter, or other documents containing performance data required for the application of the regulations relating to helicopter operations and any other information necessary for the operation of the helicopter within the terms of its certificate of airworthiness, unless these data are available in the operations manual; and
- (c) current and suitable charts to cover the route of the proposed flight and any route along which it is reasonable to expect that the flight may be diverted.

Marking of
break-in points

124.-(1) A person shall not operate an aircraft or helicopter unless the exterior surface of the fuselage suitable for break-in by rescue crews in emergency are marked to show “break-in areas”, for purposes of rescue in an emergency as shown in the Figure 3 of this regulation.

(2) The break-in areas shall be rectangular in shape and shall be marked by right-angled corner markings, each area of which shall be 9cm in length along its outer edge and 3cm in width.

(3) Where the corner markings referred to in subregulation (2) are more than 2m apart, intermediate lines 9cm x 3cm shall be inserted so that there is no more than 2m between adjacent markings.

(4) The words “CUT HERE IN EMERGENCY” and “*KATA HAPA WAKATI WA DHARURA*” shall be marked across the centre of each break-in area in capital letters.

(5) The markings required under this regulation shall be-

- (a) painted, or affixed by other equally permanent means; red or yellow and, in any case in which the colour of the adjacent background is such

as to render red or yellow markings not readily visible, be outlined in such a manner that shall be readily distinguishable from the surrounding fuselage area by contrast in colour; and

(b) kept clean and unobscured at all times.

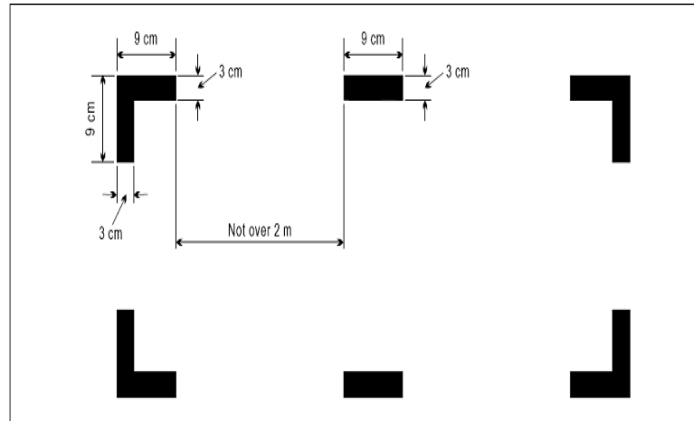


Figure 3. Marking of break-in points

Flight recorders

125.-(1) Crash- protected flight recorders shall include one or more of the following:

- (a) a flight data recorder;
- (b) a cockpit voice recorder;
- (c) an airborne image recorder; and
- (d) a data link recorder.

(2) Image and data link information may be recorded on either the CVR or the FDR as set out in the Seventh Schedule.

(3) Combination recorders, FDR/CVR shall be used to meet the flight recorder equipage requirements in these Regulations.

(4) Detailed requirements on flight recorders are set out in the Seventh Schedule.

(5) Light weight flight recorders shall include one or more of the following:

- (a) an aircraft data recording system (ADRS);
- (b) a cockpit audio recording system (CARS);

- (c) an airborne image recording system (AIRS); or
- (d) a data link recording system (DLRS).

(6) Image and data link information may be recorded on either the CARS or the ADRS as set out in the Seventh Schedule:

Provided that, FDR and ADRS parameters to be recorded shall be those as set out in the Seventh Schedule.

Application of
FDR and ADRS

126.-(1) Helicopters of a maximum certificated take-off mass of over 3175kg for which the individual certificate of airworthiness is first issued on or after 1st January 2016 shall be equipped with an FDR which shall record at least the first 48 parameters set out in Table A4-1 of the Seventh Schedule.

(2) Helicopters of a maximum certificated take-off mass of over 7000kg, or having a passenger seating configuration of more than 19 passengers, for which the individual certificate of airworthiness is first issued on or after 1st January 1989 shall be equipped with an FDR which shall record at least the first 30 parameters set out in Table A4-1 of Seventh Schedule.

(3) Helicopters of a maximum certificated take-off mass of over 3175kg, up to and including 7000kg, for which the individual certificate of airworthiness is first issued on or after 1st January 1989, shall be equipped with an FDR which shall record at least the first 15 parameters set out in Table A4-1 of Seventh Schedule.

(4) Turbine-engined helicopters of a maximum certificated take-off mass of over 2250kg, up to and including 3175kg for which the application for type certification was submitted to a Contracting State on or after 1st January 2018 shall be equipped with-

- (a) an FDR which shall record at least the first 48 parameters set out in Table A4-1 of Seventh Schedule;
- (b) a Class C AIR or AIRS which shall record at least flight path and speed parameters displayed to the pilot, as set out in Table A4-3 of Seventh Schedule; or
- (c) an ADRS which shall record the 7 parameters set out in Table A4-3 of Seventh Schedule.

(5) Helicopters of a maximum certificated take-off mass of 3175kg or less for which the individual certificate of airworthiness is first issued on or after 1st January 2018 shall be equipped with-

- (a) FDR which shall record at least the first 48 parameters set out in Table A4-1 of Seventh Schedule;
- (b) a class C AIR or AIRS which shall record at least flight path and speed parameters displayed to the pilots, as set out in Table A4-3 of Seventh Schedule; or
- (c) an ADRS which shall record the 7 parameters listed in Table A4-3 of Seventh Schedule.

(6) Helicopters of a maximum certificated take-off mass of over 3175kg for which the application for type certificate is submitted to a contracting State on or after 1 January 2023 shall be equipped with an FDR capable of recording at least the first 53 parameters set out in Table A4-1 of Seventh Schedule.

(7) Helicopters of a maximum certificated take-off mass of over 3175kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023 shall be equipped with an FDR capable of recording at least the first 53 parameters set out in Table A4-1 of Seventh Schedule.

(8) FDRs, ADRS, AIRs or AIRS shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape

(9) FDRs shall retain the information recorded during at least the last ten hours of their operation.

Application of
CVR and
cockpit audio
recording
systems

127.-(1) Helicopters of a maximum certificated take-off mass of over 7000kg shall be equipped with a CVR.

(2) For helicopters not equipped with FDR, at least main rotor speed shall be recorded on the CVR.

(3) CVRs and CARS shall not use magnetic tape or wire.

(4) All helicopters required to be equipped with a CVR shall be equipped with a CVR which shall retain the

information recorded during at least the last 2 hours of its operation.

Application of
data link
recorders

128.-(1) Helicopters for which the individual certificate of airworthiness is first issued on or after 1st January 2016, which use any of the data link communications applications referred to in paragraph 5.1.2 in the Seventh Schedule and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.

(2) Helicopters for which the individual certificate of airworthiness was first issued before 1st January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of the Seventh Schedule shall record the data link communications messages on a crash-protected flight recorder unless the installed data link communications equipment is compliant with a type design or aircraft modification first approved prior to 1st January 2016.

(3) A class B AIR may be a means for recording data link communications applications messages to and from the helicopters where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

(4) Helicopters for which the individual certificate of airworthiness was first issued before 1st January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of the Seventh Schedule shall record the data link communications messages on a crash-protected flight recorder.

(5) The minimum recording duration shall be equal to the duration of the CVR.

(6) Data link recording shall be capable of being correlated with the recorded cockpit audio.

General
guideline of
flight recorders

129.-(1) Flight recorders shall-

(a) be constructed, located and installed to provide maximum practical protection for the

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Flight recorders electronic documentation	130. The documentation requirement concerning FDR parameters provided by operators to accident investigation authorities shall be in electronic format and meet industry specifications.
Instruments and equipment for flights operated under VFR and IFR	131. The flight instrument requirements in this Part may be met by combinations of instruments or by electronic displays.
Visual Flight Rules by day	132. Helicopters when operating in accordance with Visual Flight Rules (VFR) by day shall be equipped with- (a) a magnetic compass; (b) an accurate timepiece indicating the time in hours, minutes and seconds; (c) a sensitive pressure altimeter;

- (d) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (e) a heading indicator or directional gyroscope;
- (f) an airspeed indicator; and
- (g) such additional instruments or equipment as may be prescribed by the Authority.

VFR by night

133.-(1) Helicopters when operating in accordance with VFR at night shall be equipped with-

- (a) the equipment specified in regulation 132;
- (b) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (c) a slip indicator;
- (d) a heading indicator or directional gyroscope;
- (e) a rate of climb and descent indicator;
- (f) such additional instruments or equipment as may be prescribed by the Authority and the following lights-

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- (i) the lights required by the Civil Aviation (Rules of the Air) Regulations for aircraft in flight or operating on the movement area of a heliport;
- (ii) two landing lights;
- (iii) illumination for all instruments and equipment that are essential for the safe operation of the helicopter that are used by the flight crew;
- (iv) lights in all passenger compartments; and
- (v) a flashlight for each crew member station.

(2) One of the landing lights referred to in subregulation (1)(f)(ii) shall be trainable, at least in the vertical plane.

Instrument
Flight Rules

134.-(1) Helicopters when operating in accordance with Instrument Flight Rules (IFR), or when the helicopter cannot be maintained in a desired attitude without

reference to one or more flight instruments, shall be equipped with-

- (a) a magnetic compass;
- (b) an accurate time piece indicating the time in hours, minutes and seconds;
- (c) two sensitive pressure altimeters;
- (d) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;
- (e) a slip indicator;
- (f) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (g) a heading indicator or directional gyroscope;
- (h) a means of indicating whether the power supply to the gyroscope instrument is adequate;
- (i) a means of indicating on the flight deck the outside air temperature;
- (j) a rate of climb and descent indicator;
- (k) a stabilisation system, unless it has been demonstrated to the satisfaction of the certificating authority that the helicopter possesses, by nature of its design, adequate stability without such a system;
- (l) such additional instruments or equipment as may be prescribed by the Authority; and
- (m) where operated at night, the lights specified in regulation 132.

(2) Helicopters when operating in accordance with IFR 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 or artificial horizon, clearly visible to the pilot-in-command.

(3) 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 indicators is being operated by emergency power.

Ground
proximity
warning system

135. Helicopter when operating in accordance with IFR and which has a maximum certificated take-off mass in excess of 3175kg or a maximum passenger seating configuration of more than nine passengers shall be equipped with a ground proximity warning system - forward-looking terrain avoidance function.

Helicopters on
flights over
water

136. Helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter where-

- (a) engaged in offshore operations, or other overwater operations as prescribed by the Authority;
- (b) flying over water in a hostile environment at a distance from land corresponding to more than 10 minutes at normal cruise speed when operating in performance Class 1 or 2;
- (c) flying over water in a non-hostile environment at a distance from land specified by the Authority of the responsible State when operating in performance Class 1; or
- (d) flying over water beyond autorotational or safe forced landing distance from land when operating in performance Class 3.

Emergency
equipment

137.-(1) Helicopter operating in performance Class 1 or 2 and operating in accordance with the provisions of regulation 135 shall be equipped with-

- (a) one life jacket, or equivalent individual flotation 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;
- (b) for offshore operations the life jacket shall be worn constantly unless the occupant is wearing an integrated survival suit that includes the functionality of the life jacket;
- (c) life-saving rafts in sufficient numbers to carry all persons on board, stowed to facilitate their ready use in emergency, provided with such

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life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken;

(d) when two life rafts are fitted, each shall be capable to carry all occupants in the overload state; and

(e) equipment for making the pyrotechnical distress signals described in the Civil Aviation (Rules of the Air) Regulations.

(2) Helicopter operating in performance Class 3 when operating beyond autorotational distance from land but within a distance from land specified by the appropriate authority of the responsible state shall be equipped with one life jacket, or equivalent individual flotation 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.

(3) When determining the distance from land referred to in subregulation (2), consideration shall be given to environmental conditions and the availability of search and rescue facilities.

(4) For offshore operations, when operating beyond autorotational distance from land, the life jacket shall be worn unless the occupant is wearing an integrated survival suit that includes the functionality of the life jacket.

(5) Helicopter operating in performance Class 3 when operating beyond the distance specified in subregulation (2) shall be equipped as in subregulation (1).

(6) In the case of a helicopter operating in performance Class 2 or 3, when taking off or landing at a heliport where, the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in subregulation (1)(a) shall be applied.

(7) Each life jacket and equivalent individual flotation device, when carried in accordance with this regulation, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

(8) Helicopter for which the individual certificate of airworthiness is first issued on or after 1st January, 1991, at least 50 percent of the life rafts carried in accordance with the provisions of this regulation shall be deployable by remote control.

(9) Rafts which are not deployable by remote control and which have a mass of more than 40kg shall be equipped with some means of mechanically assisted deployment.

(10) Helicopter for which the individual certificate of airworthiness was first issued before 1st January 1991, the provisions of subregulations (7) and (8) shall be complied with.

Helicopters on
flights over
designated sea
areas

138.-(1) Helicopter when operating over sea areas which have been designated by the State concerned as areas in which search and rescue would be difficult, shall be equipped with life-saving equipment including means of sustaining life as may be appropriate to the area overflown.

(2) For offshore operations, a survival suit shall be worn by all occupants when the sea temperature is less than 10°C or when the estimated rescue time exceeds the calculated survival time.

(3) Where the elevation and strength of the sun results in a high temperature hazard on the flight deck, consideration shall be given to alleviating the flight crew from this recommendation.

(4) When establishing rescue time, the sea state and the ambient light conditions shall be taken into consideration.

Helicopters on
flights over
designated land
areas

139. Helicopter, when operated across land areas which have been designated by the state concerned as areas in which search and rescue would be 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.

Emergency
locator

140.-(1) Helicopters operating from 1st July 2008 in performance Class 1, 2 and 3 shall be equipped with at

transmitter
(ELT)

least one automatic ELT and, when operating on flights over water as described in regulation 135 with at least one automatic ELT and one ELT in a raft or life jacket.

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(2) ELT equipment carried to meet the requirements of subregulation (1) shall operate in accordance with the relevant provisions of the Civil Aviation (Communication Systems) Regulations.

Helicopters on
high altitude
flights

141.-(1) Approximate altitude in the Standard Atmosphere corresponding to the value of absolute pressure prescribed in the following Table:

Table 2 - Absolute Pressure

Absolute pressure	Metres	Feet
700 hPa	3 000	10 000
620 hPa	4 000	13 000
376 hPa	7 600	25 000

(2) Helicopter operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the applicable regulations relating to helicopter operations.

(3) Helicopter 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 compartments shall be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the applicable regulations relating to helicopter operations.

(4) Helicopter operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, where operated at flight altitudes at which the atmospheric pressure is more than 376 hPa which cannot descend safely within 4 minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, shall be provided with automatically deployable oxygen equipment to comply with the requirements of regulations relating to helicopter operations.

(5) The total number of oxygen dispensing units shall exceed the number of passenger and cabin crew seats by at least ten percent.

Helic
opters
in
icing
condi
tions

142. Helicopters shall be equipped with suitable anti-icing or de-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.

Helic
opters
when
carryi
ng
passe
ngers
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signif
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weath
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detect
ion

143. Helicopter when carrying passengers shall be equipped with operative weather radar or other significant-weather detection equipment whenever such helicopters is being operated in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable, may be expected to exist along the route either at night or under instrument meteorological conditions.

Helic
opters
carryi
ng
passe
ngers
-
cabin
crew
seats

144.-(1) Helicopters shall be equipped with a forward or rearward facing within 15 degrees of the longitudinal axis of the helicopter seat, fitted with a safety harness for the use of each cabin crew member required to comply with the applicable regulations relating to helicopter operations., in respect of emergency evacuation.

(2) Subject to the provisions of regulation 116, a seat and seat belt shall be provided for the use of each additional cabin crew member.

(3) Cabin crew seats shall be located near floor level and other emergency exits as required by the State of registry for emergency evacuation.

Helic
opters
requir
ed to
be
equip
ped

145. Helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the requirements of the Civil aviation (Surveillance and Collision Avoidance Systems) Regulations, except as authorised by the Authority.

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report
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transp
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Micro
phone
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146. Flight crew members required to be on flight deck duty shall communicate through boom or throat microphones.

Vibra
tion
health
monit
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syste
m

147. Helicopter with a maximum certificated take-off mass in excess of 3175kg or a maximum passenger seating configuration of more than nine shall be equipped with a vibration health monitoring system.

Helic
opters
equip
ped
with
auto
matic
landi
ng
syste
ms,
HUD
or
equiv
alent
displa
ys,
EVS,
SVS
or
CVS

148.-(1) Where a helicopter is equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of a helicopter shall be approved by the Authority.

(2) The Authority shall, in approving the operational use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, ensure that-

- (a) the equipment meets the appropriate airworthiness certification requirements;

- (b) the operator has carried out a safety risk assessment of the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS; and
- (c) the operator 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.

Electronic
flight
bags
(EFBs)
equipment

149.-(1) Where portable EFBs are used on board a helicopter, the operator shall ensure that they do not affect the performance of the helicopter systems, equipment or the ability to operate the helicopter.

(2) Where EFBs are used on board a helicopter the operator shall-

- (a) assess the safety risks associated with each EFB functions;
- (b) establish and document the procedures for the use of and training requirements for, the device and each EFB functions; and
- (c) ensure that, in the event of an EFBs failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.

(3) The Authority shall issue a specific approval for the operational use of EFB functions to be used for the safe operation of helicopters.

(4) When issuing a specific approval for the operational use of EFBs referred to in subregulation (2), the Authority shall ensure that-

- (a) the EFBs equipment and its associated installation hardware, including interaction with helicopter systems where applicable, meet the appropriate airworthiness certification requirements;
- (b) the operator has assessed the safety risks associated with the operations supported by the EFBs functions;

- (c) the operator has established requirements for redundancy of the information where appropriate contained and displayed by the EFB function;
- (d) the operator has established and documented procedures for the management of the EFBs functions including any databases it may use; and
- (e) the operator has established and documented the procedures for the use of, and training requirements for the EFBs functions.

(b) Helicopter Communication, Navigation and Surveillance Equipment

Com
muni
cation
equip
ment

150.-(1) Helicopter shall be provided with radio communication equipment capable of-

- (a) conducting two-way communication for heliport 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 Tanzania Communication Regulatory Authority.

(2) The requirements of subregulation (1) are considered to be fulfilled where the ability to conduct the communications prescribed therein is established during radio propagation conditions which are normal for the route.

(3) The radio communication equipment required in accordance with subregulation (1) shall provide for communications on the aeronautical emergency frequency 121.5 MHz.

(4) A helicopter shall, for operations where communication equipment is required to meet an RCP

specification for PBC, in addition to the requirements specified in subregulation (1)-

- (a) be provided with communication equipment that will enable it to operate in accordance with the prescribed RCP specifications;
- (b) have information relevant to the helicopter RCP specification capabilities prescribed in the flight manual or other helicopter documentation approved by the State of design or State of registry; and
- (c) have information relevant to the helicopter RCP specification capabilities included in the MEL.

(5) The Authority shall, for operations where an RCP specification for PBC has been prescribed, ensure that the operator has established and documented-

- (a) normal and abnormal procedures, including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with appropriate RCP 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 RCP specifications.

(6) The Authority shall ensure that, in respect of those helicopters referred to in subregulation (4), adequate provisions exist for-

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with Civil Aviation (Air Traffic Services) Regulations.
- (b) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specifications.

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Navig
ation

151.-(1) Helicopter shall be provided with navigation equipment that will enable it to proceed in

equip
ment

accordance with-

- (a) its operational flight plan; and
- (b) the requirements of air traffic services;

except when authorised by the Authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

(2) Helicopter shall, for the operations where a navigation specification for PBN has been prescribed, in addition to the requirements specified in subregulation (1)-

- (a) be provided with navigation equipment that will enable it to operate in accordance with the prescribed navigation specifications; and
- (b) have information relevant to the helicopter navigation specification capabilities prescribed in the flight manual or other helicopter documentation approved by the State of design or State of registry; and
- (c) have information relevant to the helicopter navigation specification capabilities included in the MEL.

(3) The Authority shall, for operations where a navigation specification for PBN has been prescribed, ensure that the operator has established and documented-

- (a) normal and abnormal procedures, including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with the appropriate navigation 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 navigation specifications.

(4) The Authority shall issue a specific approval for operations based on PBN authorisation required navigation specifications.

(5) Helicopter 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 helicopter to navigate in accordance with this regulation.

(6) Helicopter shall be provided with appropriate navigation equipment providing guidance to a point from which a visual landing can be effected, on flights in which it is intended to land in instrument meteorological conditions.

(7) The equipment referred to in subregulation (6) shall be capable of providing such guidance at each heliport at which it is intended to land in instrument meteorological conditions and at any designated alternate heliports.

Surveillance
equipment

152.-(1) Helicopter shall be provided with surveillance equipment which shall enable it to operate in accordance with the requirements of air traffic services.

(2) Helicopter shall, for the operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance, in addition to the requirements specified in subregulation (1)-

- (a) be provided with surveillance equipment that will enable it to operate in accordance with the prescribed RSP specifications;
- (b) have information relevant to the helicopter RSP specification capabilities prescribed in the flight manual or other helicopter documentation approved by the State of design or State of registry; and
- (c) have information relevant to the helicopter RSP specification capabilities included in the MEL.

(3) The Authority shall, for operations where an RSP specification for PBS has been prescribed, ensure that the operator has established and documented-

- (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.

(4) The Authority shall ensure that, in respect of those helicopters referred to in subregulation (2), adequate provisions exist for-

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2017

- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations; and

- (b) taking immediate corrective action for individual helicopter, helicopter types or operators, identified in such reports as not complied with the RSP specifications.

Instal
lation

153. The equipment installation shall be such that the failure of any single unit required for communication, navigation or surveillance purposes or any combination thereof will not result in the failure of another unit required for communication, navigation or surveillance purposes.

Electr
onic
navig
ation
data
mana
gement

154.-(1) The operator 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) An operator shall establish and implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aircraft.

(3) The Authority shall ensure that the operator continues to monitor both the process and products.

PART VII HELICOPTER OPERATIONS - GENERAL AVIATION

(a) Helicopter Instruments, Equipment and Flight Documents

General

155.-(1) In addition to the minimum equipment required for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in this Part shall be installed or carried, as appropriate, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted.

(2) Subject to subregulation (1), the instruments and equipment, including their installation, shall be approved or accepted by the Authority.

Instruments

156. Helicopter shall be equipped with instruments which shall enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvre, and observe the operating limitations of the helicopter in the expected operating conditions.

Equipment-
first-aid,
portable
fire
extinguishers

157. A helicopter 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 helicopter 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.

Seat,
berth
and
seat
belt
or
safety
harness

158. Helicopter shall be equipped with-

- (a) a seat or berth for each person two years of age and above; and
- (b) a seat belt for each seat and restraining belts for each berth.

Operations

159. The following shall be carried in the helicopter-

manu
al,
flight
manu
al and
charts

- (a) the flight manual or other documents or information concerning any operating limitations prescribed for the helicopter by the certificating authority of the Authority, required for the compliance with the applicable regulations relating to helicopter operations;
- (b) any specific approval issued by the Authority, where applicable, for the operations to be conducted;
- (c) current and suitable charts for the route of the proposed flight and all routes along which the flight may be diverted;
- (d) documents containing procedures as prescribed in the Civil Aviation (Rules of the Air) Regulations, for pilot-in-command of intercepted aircraft;
- (e) a list of visual signals for use by intercepting and intercepted aircraft, as contained in the Civil aviation (Rules of the Air) Regulations; and
- (f) the journey logbook for the helicopter.

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Spare
electr
ical
fuses

160. Helicopter shall have spare electrical fuses of appropriate ratings for replacement of those accessible in flight where fuses are used.

Lavat
ory
fire
extin
guish
er

161.-(1) Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter 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 a helicopter for which the individual certificate of airworthiness is first issued on or after 31st December 2018 shall-

- (a) meet the applicable minimum performance requirements of the State of registry; and
 - (b) not be of a type that depletes the ozone layer.
- (2) Helicopters on all flights shall be equipped

with-

- (a) the ground-air signal codes for search and rescue purposes;

- (b) a safety harness for each flight crew member seat.

Marking of break-in points

162.-(1) A person shall not operate an aircraft or helicopter unless the exterior surface of the fuselage suitable for break-in by rescue crews in emergency is marked to show “break-in areas”, for purposes of rescue in an emergency as shown in the Figure 4 of this regulation.

(2) The break-in areas shall be rectangular in shape and shall be marked by right-angled corner markings, each area of which shall be 9 cm in length along its outer edge and 3 cm in width.

(3) Where the corner markings referred to in subregulation (2) are more than 2 m apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

(4) The words “CUT HERE IN EMERGENCY” and “*KATA HAPA WAKATI WA DHARURA*” shall be marked across the centre of each break-in area in capital letters.

(5) The markings required under this regulation shall be-

- (a) painted, or affixed by other equally permanent means; red or yellow and, in any case in which the colour of the adjacent background is such as to render red or yellow markings not readily visible, be outlined in such a manner that shall be readily distinguishable from the surrounding fuselage area by contrast in colour; and
- (b) kept clean and unobscured at all times.

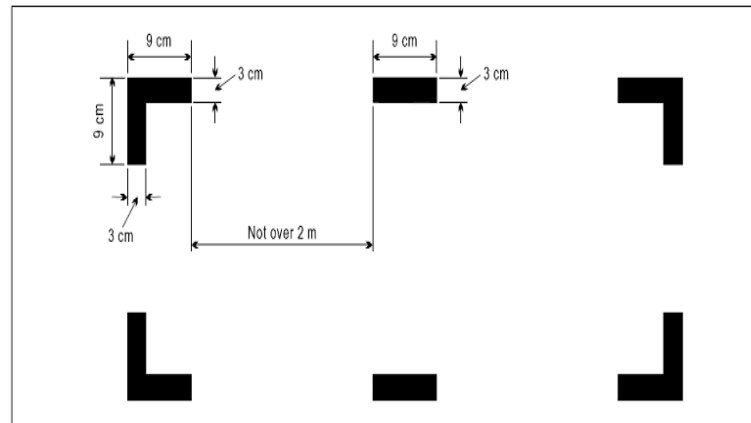


Figure 4. Marking of break-in points

Instruments and equipment for flights operated under VFR and IFR

163. The flight instrument requirements in this Part may be met by combinations of instruments or by electronic displays.

Visual
flight
rule
by
day

164. Helicopters when operating in accordance with visual flight rule by day shall be equipped with-

- (a) a magnetic compass;
- (b) a sensitive pressure altimeter;
- (c) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (d) a heading indicator or directional gyroscope
- (e) an airspeed indicator; and
- (f) such additional instruments or equipment as may be prescribed by the Authority; or
- (g) shall carry, a means of measuring and

displaying the timing in hours, minutes and seconds.

Visual
flight
rule
by
night

165.-(1) All helicopters when operating in accordance with visual flight rule at night shall be equipped with-

- (a) the equipment specified in regulation 164;
- (b) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (c) a slip indicator;
- (d) a heading indicator or directional gyroscope;
- (e) a rate of climb and descent indicator;
- (f) such additional instruments or equipment as may be prescribed by the Authority; and the following lights-

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2017

- (i) the lights required by the Civil Aviation (Rules of the Air) Regulations for aircraft in flight or operating on the movement area of a heliport;
- (ii) landing lights;
- (iii) illumination for all instruments and equipment that are essential for the safe operation of the helicopter that are used by the flight crew;
- (iv) lights in all passenger compartments; and
- (v) a flashlight for each crew member station.

(2) One of the landing lights referred to in subregulation (1)(f)(ii) shall be trainable, at least in the vertical plane.

Instru
ment
flight
rule

166. Helicopters when operating in accordance with instrument flight rule, or when the helicopter is not maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with-

- (a) a magnetic compass;
- (b) two sensitive pressure altimeters;

- (c) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;
- (d) a slip indicator;
- (e) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (f) a heading indicator or directional gyroscope;
- (g) a means of indicating whether the power supply to the gyroscope instrument is adequate;
- (h) a means of indicating on the flight deck the outside air temperature;
- (i) a rate of climb and descent indicator;
- (j) such additional instruments or equipment as may be prescribed by the Authority;
- (k) where operated at night, the lights specified in regulation 165 paragraphs (f); and
- (l) means of measuring and displaying the time in hours, minutes and seconds.

Helicopters
on
flight
s over
water
-
means
of
flotation

167.-(1) Helicopters flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when-

- (a) engaged in offshore operations, or other over water operations as prescribed by the Authority; or
- (b) flying at a distance from land specified by the Authority.

(2) When determining the distance from land referred to in subregulation (1), consideration shall be made to environmental conditions and the availability of search and rescue facilities.

Emergency
equipment

168.-(1) Helicopter operating in accordance with the provisions of regulation 167 shall be equipped with-

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- (a) one life jacket, or equivalent individual flotation 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;
- (b) when not precluded by consideration related to the type of helicopter used-
 - (i) life-saving rafts in sufficient numbers to carry all persons on board;
 - (ii) stowed to facilitate their ready use in emergency;
 - (iii) provided with such life-saving equipment including means of sustaining life as appropriate to the flight to be undertaken; and
- (c) equipment for making the pyrotechnical distress signals prescribed in the Civil Aviation (Rules of the Air) Regulations.

(2) When taking-off or landing at a heliport where the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in subregulation (1) (a) shall be complied with.

(3) Each life jacket and equivalent individual flotation device, when carried in accordance with this regulation, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

(4) Helicopter for which the individual certificate of airworthiness is first issued on or after 1 January 1991, at least 50 per cent of the life rafts carried in accordance with the provisions of these Regulations shall be deployable by remote control.

(5) Rafts which are not deployable by remote control and which have a mass of more than 40kg shall be equipped with some means of mechanically assisted deployment.

(6) Helicopter for which the individual certificate of airworthiness was first issued before 1st January 1991, the provisions of subregulation (4) and (5) shall be complied with.

Helicopters
operating
on
flight
s over
designated
land
areas

169. Helicopters, when operated across land areas which have been designated by the Authority as areas in which search and rescue would be 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.

Helicopters
operating
on
high
altitudes
de
flight
s

170.-(1) Unpressurised helicopters operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required in the applicable regulations relating to helicopter operations.

(2) Pressurised helicopters operated at high altitudes shall carry emergency oxygen storage and dispensing equipment capable of storing and dispensing the oxygen supplies required in the applicable regulations relating to helicopter operations.

Flight
recorders

171.-(1) Crash-protected flight recorders shall include one or more of the following:

- (a) a flight data recorder;
- (b) a cockpit voice recorder;
- (c) an airborne image recorder; or
- (d) a data link recorder.

(2) Image and data link information may be recorded on either the CVR or the FDR as prescribed in the Seventh Schedule.

(3) Combination recorders, FDR/CVR may be used to meet the flight recorder equipage requirements in this Part and as prescribed in the Seventh Schedule.

(4) The requirements on flight recorders and parameters used under this regulation shall be recorded as prescribed in the Seventh Schedule.

(5) Light weight flight recorders shall include one or more of the following:

- (a) an aircraft data recording system;
- (b) a cockpit audio recording system;
- (c) an airborne image recording system; and

(d) a data link recording system.

(6) Image and data link information may be recorded on either the CARS or the ADRS as prescribed in the Seventh Schedule.

Appli
cation
of
FDR
and
ADR
S

172. Helicopters of a maximum certificated take-off mass of over 3175kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with an FDR which shall record at least the first 48 parameters listed in Table A4-1 of Seventh Schedule.

(2) Helicopters of a maximum certificated take-off mass of over 7000kg, or having a passenger seating configuration of more than 19 passengers, for which the individual certificate of airworthiness is first issued on or after 1st January 1989 shall be equipped with an FDR which shall record at least the first 48 parameters listed in Table A4-1 of Seventh Schedule.

(3) Helicopters of a maximum certificated take-off mass of over 3175kg, up to and including 7000kg, for which the individual certificate of airworthiness is first issued on or after 1st January 1989, shall be equipped with a type V FDR.

(4) FDRs and ADRS shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape.

(5) FDRs shall retain the information recorded during at least the last ten hours of their operation.

Appli
cation
of
CVR
-
Cock
pit
audio
recor
ding
syste
ms
(CAR
S)

173.-(1) Helicopters of a maximum certificated take-off mass of-

(a) over 7000kg shall be equipped with a CVR;

(b) over 3175kg for which the individual certificate of airworthiness is first issued on or after 1st January 1987 shall be equipped with a CVR.

(2) For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

(3) CVRs shall not use magnetic tape or wire.

(4) Helicopters required to be equipped with a CVR shall be equipped with a CVR which shall retain the information recorded during at least the last two hours of its operation.

Appli
cation
of
data
link
recor
ders

174.-(1) Helicopters for which the individual certificate of airworthiness is first issued on or after 1st January 2016, which use any of the data link communications applications referred to in paragraph 5.1.2 of the Seventh Schedule and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.

(2) Helicopters for which the individual certificate of airworthiness was first issued before 1st January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to install and use any of the data link communications applications referred to in paragraph 5.1.2 of the Seventh Schedule shall record the data link communications messages on a crash-protected flight recorder unless the data link communications equipment is compliant with a type design or aircraft modification first approved prior to 1st January 2016.

(3) A Class B AIR may be a means for recording data link communications applications messages to and from the helicopters where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

(4) Helicopters for which the individual certificate of airworthiness was first issued before 1st January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of the Seventh Schedule shall record the data link communications messages on a crash-protected flight recorder.

(5) The minimum recording duration shall be equal to the duration of the CVR.

(6) Data link recording shall be capable of being

correlated with the recorded cockpit audio.

General
guide
line
of
Flight
recor
ders

175.-(1) Flight recorders shall-

- (a) be constructed, located and installed to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed;
- (b) meet the prescribed crashworthiness and fire protection specifications;
- (c) not be switched off during flight time;
- (d) be deactivated upon completion of flight time following an accident or incident to preserve flight recorder records;
- (e) not be reactivated before their disposition as required by the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations.

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(2) The need for removal of the flight recorder records from the aircraft shall be determined by the investigation authority in the state conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

(3) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Flight
recor
ders
electr
onic
docu
menta
tion

176. The documentation requirement concerning FDR parameters provided by operators to accident investigation authorities shall be in electronic format and meet industry specifications.

Emer
gency
locato
r
trans
mitter

177.-(1) From 1st July 2008, all helicopters operating in performance Class 1, 2 and 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in regulation 167 with at least one automatic ELT and one ELT in a raft or life

jacket.

(2) ELT equipment carried to satisfy the requirements of subregulation (1) shall operate in accordance with the requirements of the relevant regulations relating to civil aviation aeronautical telecommunication communication systems.

Helicopters required to be equipped with pressure-altitude reporting transponder

178. Helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the requirements of the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

Microphones

179. Flight crew members required to be on flight deck duty shall communicate through boom or throat microphones.

Helicopters equipped with automatic landing systems, HUD or equivalent displays

180.-(1) Where helicopters are equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of a helicopter shall be approved by the Authority.

(2) When establishing operational criteria for the use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the Authority shall require that-

ys,
EVS,
SVS
or
CVS

- (a) the equipment meets the appropriate airworthiness certification requirements;
- (b) the operator has carried out a safety risk assessment of the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS; and
- (c) the operator 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.

Electr
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flight
bags
(EFB
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equip
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181.-(1) Where portable EFBs are used on board a helicopter, the Pilot in Command and the operator shall ensure that they do not affect the performance of the helicopter systems, equipment or the ability to operate the helicopter.

(2) Where EFBs are used on board a helicopter the pilot-in-command or the operator shall-

- (a) assess the safety risks associated with each EFBs function;
- (b) establish and document the procedures for the use of, and training requirements for the device and each EFBs function; and
- (c) ensure that in the event of an EFBs failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.

(3) The Authority shall issue a specific approval the operational use of EFB functions for the safe operation of helicopters.

(4) When issuing a specific approval for the operational use of EFBs, the Authority shall ensure that-

- (a) the EFBs equipment and its associated installation hardware, including interaction with helicopter systems where applicable, meet

- the appropriate airworthiness certification requirements;
- (b) the owner has assessed the safety risks associated with the operations supported by the EFBs functions;
- (c) the owner has established requirements for redundancy of the information where appropriate, contained and displayed by the EFBs functions;
- (d) the owner has established and documented procedures for the management of the EFBs functions including any databases it may use; and
- (e) the owner has established and documented the procedures for the use of, and training requirements for the EFBs functions.

Helicopter
operated
under
Article 83
bis
agreement

182.-(1) Helicopter, when operating under an Article 83 *bis* agreement entered into between the State of registry and the State of the principal location of a general aviation operator, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format.

(2) When the agreement summary specified in subregulation (1) is issued in a language other than English, an English translation shall be included.

(3) The agreement summary of an Article 83 *bis* agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred by the State of registry to the State of the principal location of a general aviation operator under the agreement, when conducting surveillance activities.

(4) The agreement summary shall-

- (a) be transmitted to ICAO together with the Article 83 *bis* agreement for registration with the ICAO Council by the State of registry or the State of the principal location of a general aviation operator;
- (b) contain the information for the specific aircraft

as set out in the Tenth Schedule.

(b) Helicopter Communication, Navigation and Surveillance Equipment

Com
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183.-(1) Helicopter operated in accordance with IFR or at night shall be provided with radio communication equipment.

(2) The equipment in subregulation (1) shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the Tanzania Communication Regulatory Authority.

(3) The requirements of subregulation (1) shall be considered fulfilled where the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

(4) Subregulation (1) 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 anyone will not result in failure of any other.

(5) Helicopter to be operated in accordance with VFR, but as a controlled flight, shall, 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 Tanzania Communication Regulatory Authority unless exempted by the Authority.

(6) Helicopter to be operated on a flight to which the provisions of regulations 165 or 166 apply 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 Tanzania Communication Regulatory Authority.

(7) The radio communication equipment required in accordance with this regulation shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

(8) Helicopter shall, for the operations where communication equipment is required to meet an RCP specification for performance-based communication, in addition to the requirements specified in this regulation-

- (a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specifications;
- (b) have information relevant to the helicopter RCP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of design or State of registry; and
- (c) have information relevant to the helicopter RCP specification capabilities included in the MEL.

(9) The Authority shall establish criteria for operations where RCP specification for PBC has been prescribed.

(10) The Authority shall, in establishing criteria for operations where RCP specification for PBC has been prescribed, ensure that the operator establish-

- (a) normal and abnormal procedures, including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with appropriate RCP 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 RCP specifications

(11) The Authority shall ensure that, in respect of those helicopters referred to in subregulation (8), adequate provisions exist for-

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with the Civil Aviation (Air

- Traffic Services) Regulations; and
- (b) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specifications.

Navig
ation
equip
ment

184.-(1) Helicopter shall be provided with navigation equipment which shall enable it to proceed in accordance with-

- (a) its operational flight plan; and
- (b) the requirements of air traffic services;

except when authorised by the Authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

(2) For international general aviation, landmarks shall be located at least every 110km or 60 NM.

(3) Helicopter shall, for the operations where a navigation specification for performance-based navigation has been prescribed, 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;
- (b) have information relevant to the helicopter navigation specification capabilities listed in the flight manual or other helicopter documentation approved by the State of design or State of registry; and
- (c) have information relevant to the helicopter navigation specification capabilities included in the MEL.

(4) The Authority shall establish criteria for operations where a navigation specification for PBN has been prescribed.

(5) The Authority shall, in establishing criteria for operations where a navigation specification for PBN has been prescribed, ensure that the operator establish-

- (a) normal and abnormal procedures, including contingency procedures;

- (b) flight crew qualification and proficiency requirements, in accordance with the appropriate navigation 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 navigation specifications.

(6) The Authority shall issue a specific approval for operations based on PBN authorisation required navigation specifications.

(7) Helicopter 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 helicopter to navigate in accordance with subregulations (1) and (2).

(8) For international general aviation, subregulation (5) may be met by means other than the duplication of equipment.

(9) Helicopter shall be provided with appropriate navigation equipment providing guidance to a point from which a visual landing can be effected, on flights intended to land in instrument meteorological conditions.

(10) The equipment in subregulation (9) shall be capable of providing such guidance at each heliport at which it is intended to land in instrument meteorological conditions and at any designated alternate heliports.

Surveillance
equipment

185.-(1) Helicopter shall be provided with surveillance equipment which shall enable it to operate in accordance with the requirements of air traffic services.

(2) Helicopter shall, for the operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance, in addition to the requirements specified in subregulation (1)-

- (a) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification;
- (b) have information relevant to the helicopter RSP specification capabilities listed in the flight

manual or other helicopter documentation approved by the State of design or State of registry; and

- (c) have information relevant to the helicopter RSP specification capabilities included in the MEL.

(3) The Authority shall ensure that criteria for operations where an RSP specification for PBS has been prescribed are complied with.

(4) When establishing criteria for operations where an RSP specification for PBS has been prescribed, the Authority shall require that the operator 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 helicopters referred to in subregulation (2), adequate provisions exist for-

- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations; and
- (b) taking immediate corrective action for individual helicopter, helicopter types or operators, identified in such reports as not complying with the RSP specifications.

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PART VIII EXEMPTION

Requi
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186.-(1) A person may apply to the Authority for an exemption from any provision 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 shall contain the applicant's-

- (a) name;
- (b) physical address and mailing address;
- (c) telephone number;
- (d) fax number if available; and
- (e) email address if available.

Appli
cation
for
exem
ption

187.-(1) An application for an exemption shall contain-

- (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) where the applicant seeks to operate under the proposed exemption outside the United Republic airspace, the application must indicate whether the exemption would contravene any provision of the Standards and Recommended Practices of ICAO as well as the Regulations pertaining to the airspace in which the operation may occur.

(2) Where the applicant seeks emergency processing, the application shall 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, where the Authority finds that the applicant has not justified the failure to apply for an exemption in a timely fashion.

(4) The Authority of the operator of an aeroplane type with two turbine engines which, prior to 25th March 1986 was authorised and operating on a route where the flight time at single-engine cruise speed to an adequate en-route alternate aerodrome exceeded the threshold time established for such operations in accordance with regulation 98, shall give consideration to permitting such an operation to continue on that route after that date.

Initial
review
by
Auth
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188.-(1) The Authority shall review the application for accuracy and compliance with the requirements of regulations 186 and 187.

(2) Where the application appears on its face to satisfy the provisions of these Regulations and the Authority determines that a review of its merits is justified, the Authority shall publish a detailed summary of the application in the aeronautical information circular for comment and specify the date by which comments shall be received by the Authority for consideration.

(3) Where the filing requirements of regulations 186 and 187 have not been met, the Authority shall 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) Where 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.

Evaluation
of
appli
cation

189.-(1) Where the filing requirements have been satisfied after initial review, 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) Where the exemption affects a significant population of the aviation community of the United Republic, the Authority shall publish the summary in the Aeronautical Information Circular.

PART IX OFFENCES AND PENALTIES

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190.-(1) The Authority may revoke or suspend a certificate, licence, registration, approval, authorisation or such other document where the holder thereof contravenes any provision of these Regulations.

(2) Where a holder of a suspended or revoked certificate, licence, registration, approval, authorisation or such other document has rectified the contravention, the Authority may-

- (a) in the case of suspension, reinstate the certificate, licence, registration, approval, authorisation or such other document; and
- (b) in the case of revocation, issue a new certificate, registration, authorisation or licence, approval, such other document upon application and fulfilment of requirements under these Regulations.

Offen-
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and
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191.-(1) A person who contravenes any provision of these Regulations, orders or notices commits an offence and on conviction shall be liable to fine of not less than the equivalent in Tanzanian shillings of United States dollars one thousand or to imprisonment for a term not less than twelve months or to both.

(2) In the case of a continuing contravention, each day of the contravention shall constitute a separate offence and shall be liable to an additional fine of not less than the equivalent in Tanzanian shillings of United States dollars five hundred for each day the offence continues.

(3) Where 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 or notices 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.

PART X GENERAL PROVISIONS

Safet-
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inspe-
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audits

192. The Authority shall-

- (a) carry out such safety inspections and audits as may be necessary for the purpose of verifying the validity of an application for construction and operation of a heliport;
- (b) carry out safety inspections and audits of any document and records of an operator, which may be necessary to determine compliance with

the appropriate requirements as prescribed in these Regulations.

Enfo
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193.-(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) 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.

Revo
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194. [Revokes the Civil Aviation (Instruments and Equipment) Regulations].

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195. All valid licences, certificates, permits or registration approval issued or granted by the Authority before the commencement of these Regulations shall remain operational until they are expired, revoked, or replaced by the Authority.

FIRST SCHEDULE

(Made under regulation 37)

LIGHTS TO BE DISPLAYED BY AEROPLANE (COMMERCIAL AIR
TRANSPORT) TERMINOLOGY

When the following terms are used in this schedule, they have the following meanings:

“angles of coverage”-

- (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;

“horizontal plane” means the plane containing the longitudinal axis and perpendicular to the plane of symmetry of the aeroplane.

“longitudinal axis of the aeroplane” means a selected axis parallel to the direction of flight at a normal cruising speed, and passing through the centre of gravity of the aeroplane.

“making way” is where an aeroplane on the surface of the water is “making way” when it is under way and has a velocity relative to the water.

“under command” is where 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.

“under way” is where an aeroplane on the surface of the water is “under way” when it is not a ground or moored to the ground or to any fixed object on the land or in the water.

“vertical planes” means a planes perpendicular to the horizontal plane.

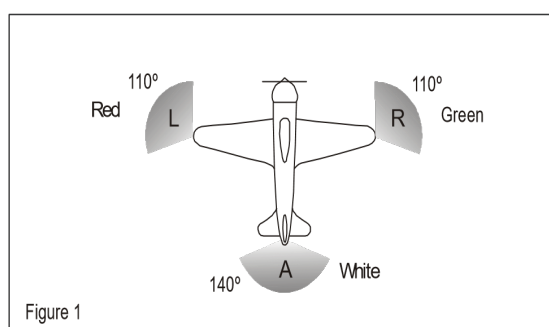
“visible” means a visible on a dark night with a clear atmosphere.

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) 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.



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) 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 a ground.

The lights required by aeroplanes in each case are described below.

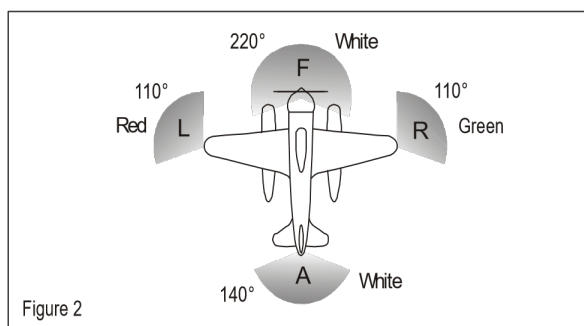
3.2 When under way

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.

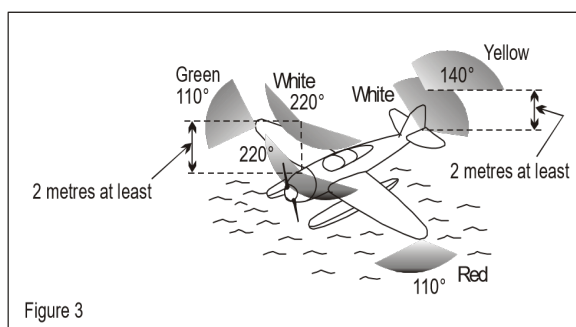
The lights described in 3.2 (a), (b) and (c) shall be visible at a distance of at least 3.7 km (2 NM). The light described in 3.2 (d) shall be visible at a distance of 9.3 km (5 NM) when fitted to an aeroplane of 20 m or more in length or visible at a distance of 5.6 km (3 NM) when fitted to an aeroplane 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.



3.4 When being towed

The lights described in 3.2 (a), (b) and (c) appearing as steady, unobstructed lights.

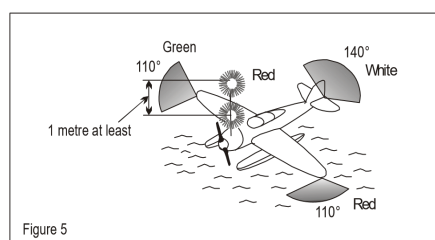
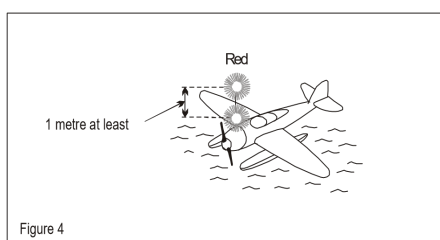
3.5 When not under command and not making way

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

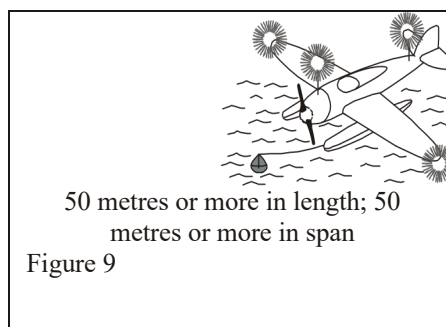
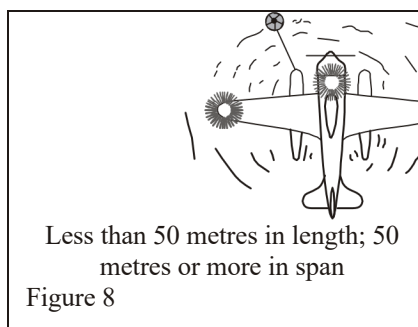
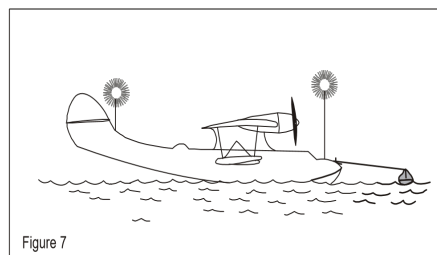
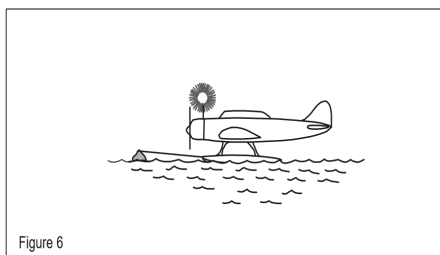
As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 (a), (b) and (c).

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.



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.

SECOND SCHEDULE

(Made under regulation 56)

ALTIMETRY SYSTEM PERFORMANCE REQUIREMENTS FOR OPERATIONS IN
RVSM AIRSPACE (COMMERCIAL AIR TRANSPORT - AEROPLANES)

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 $28 - 0.013z^2$ for $0 \leq z \leq 25$ when z is the magnitude of the mean TVE in metres, or $92 - 0.004z^2$ 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 (80 ft) 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

(Made under regulations 18, 19, 23, 24 and 25)

FLIGHT RECORDERS (COMMERCIAL AIR TRANSPORT - AEROPLANES)

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:

- (a) a flight data recorder (FDR);
- (b) a cockpit voice recorder (CVR);
- (c) an airborne image recorder (AIR);
- (d) a data link recorder (DLR).

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR.

Lightweight flight recorders comprise one or more of the following:

- (a) an aircraft data recording system (ADRS);
- (b) a cockpit audio recording system (CARS);
- (c) an airborne image recording system (AIRS);
- (d) a data link recording system (DLRS);

When image or data link information is required to be recorded on a lightweight flight recorder, it is permissible to record it on either the CARS or the ADRS

1. GENERAL REQUIREMENTS

1.1 Non-deployable flight recorder containers shall be painted a distinctive orange colour.

1.2 Non-deployable crash-protected flight recorder containers shall:

- (a) carry reflective material to facilitate their location; and
- (b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz. At the earliest practicable date, but not later than 1 January 2018, this device shall operate for a minimum of 90 days.

1.3 Automatic deployable flight recorder containers shall:

- (a) be painted a distinctive orange colour, however the surface visible from outside the aircraft may be of another colour;
- (b) carry reflective material to facilitate their location; and

- (c) have an integrated automatically activated ELT.
- 1.4 The flight recorder systems shall be installed so that:
- (a) the probability of damage to the recordings is minimised;
 - (b) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and
 - (c) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and
 - (d) for aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimised.

Note.- The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialised replay or copying techniques.

- 1.5 The crash-protected flight recorders shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardizing service to essential or emergency loads.
- 1.6 The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.
- 1.7 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.
- 1.8 Means shall be provided for an accurate time correlation between the flight recorder systems recordings.
- 1.9 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;
 - (b) parameter origin or source and equations which relate counts to units of measurement;

- (c) manufacturer's test reports.; and
- (d) detailed information to ensure the continued serviceability of the flight recorder system.

1.10 The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the aeroplane to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

Note 1.- The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required per this Schedule.

Note 2.- Conditions related to the continued serviceability of a flight recorder system are defined in paragraph 7 of this Schedule. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.

2. FLIGHT DATA RECORDER (FDR) AND AIRCRAFT DATA RECORDING SYSTEMS (ADRS)

2.1 Start and stop logic

The FDR or ADRS 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 The parameters that satisfy the requirements for FDRs are listed in Table A8-1. 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 where 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 Where further FDR recording capacity is available, recording of the following additional information shall be considered:

- (a) 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:

- (i) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and auto flight system engagement and mode indications if not recorded from another source;
 - (ii) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;
 - (iii) warnings and alerts; and
 - (iv) the identity of displayed pages for emergency procedures and checklists; and
 - (b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.
- 2.2.3 The parameters that satisfy the requirements 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 (*) shall be recorded if an information source for the parameter is displayed to the pilot and is practicable to record:
1. Pressure altitude.
 2. Indicated airspeed or calibrated airspeed.
 3. Heading (primary flight crew reference).
 4. Pitch attitude.
 5. Roll attitude.
 6. Engine thrust/power.
 7. Landing-gear status*.
 8. Total or outside air temperature*.
 9. Time*.
 10. Navigation data*: drift angle, wind speed, wind direction, latitude/longitude.
 11. Radio altitude*.
- 2.2.4. The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in Table A8-3.
- 2.2.5. Where further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table A8-3 shall be considered.
- 2.3 Additional information
- 2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certifying authority.
- 2.3.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the

operator. The documentation needs to 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 Start and stop logic

The CVR or 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 or 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.

3.2 Signals to be recorded

3.2.1. The CVR shall record simultaneously 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, when installed;
- (d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and
- (e) voice communication of flight crew members using the passenger address system, when installed.

3.2.2. The preferred CVR audio allocation shall be as follows:

- (a) pilot-in-command audio panel;
- (b) co-pilot audio panel;
- (c) additional flight crew positions and time reference; and
- (d) cockpit area microphone.

3.2.3. The CARS shall record simultaneously 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.

3.2.4. The preferred CARS audio allocation shall be as follows:

- (a) voice communication; and
- (b) aural environment on the flight deck.

4. AUTOMATIC DEPLOYABLE FLIGHT RECORDER (ADFR)

4.1 Operation

The following requirements shall apply to an ADFR:

- (a) deployment shall take place when the aeroplane structure has been significantly deformed;
- (b) deployment shall take place when an aeroplane sinks in water;
- (c) ADFR shall not be capable of manual deployment;
- (d) the ADFR shall be able to float on water;
- (e) the ADFR deployment shall not compromise the safe continuation of the flight;
- (f) the ADFR deployment shall not significantly reduce the chance of survival of the recorder and of successful transmission by its ELT;
- (g) the ADFR deployment shall not release more than one piece;
- (h) an alert shall be made to the flight crew when the ADFR is no longer captive to the aircraft;
- (i) the flight crew shall have no means to disable ADFR deployment when the aircraft is airborne;
- (j) the ADFR shall contain an integrated ELT, which shall activate automatically during the deployment sequence. Such ELT may be of a type that is activated in-flight and provides information from which a position can be determined; and
- (k) the integrated ELT of an ADFR shall satisfy the same requirements as an ELT required to be installed on an aeroplane. The integrated ELT shall at least have the same performance as the fixed ELT to maximize detection of the transmitted signal.

Note 1.- Refer to the Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery (Doc 10054) for more information on ADFR.

Note 2.- where an integrated ELT of a type that is activated in flight is used within an ADFR, it could be a means to comply with the requirements of Chapter 6, 6.18.

5. DATA LINK RECORDER (DLR)

5.1 applications to be recorded

5.1.1 Where the aircraft flight path is authorised 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 in Table A8-2 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.

6. FLIGHT CREW-MACHINE INTERFACE RECORDINGS

6.1 Start and stop logic

The AIR or AIRS 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 AIR or AIRS 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.

6.2 Classes

6.2.1 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.

6.2.2 A Class B AIR or AIRS captures data link message displays.

6.2.3 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.

6.3. Applications to be recorded

6.3.1 The operation of switches and selectors and the information displayed to the flight crew from electronic displays shall be captured by sensors or other electronic means.

6.3.2 The recording of operation of switches and selectors by the flight crew shall include the following:

- (a) any switch or selector that will affect the operation and the navigation of the aircraft; and
- (b) selection of normal and alternate systems.

6.3.3 The recording of the information displayed to the flight crew from electronic displays shall include the following:

- (i) primary flight and navigation displays;
- (ii) aircraft system monitoring displays;
- (iii) engine indication displays;
- (iv) traffic, terrain, and weather displays;
- (v) crew alerting systems displays;
- (vi) stand-by instruments; and
- (vii) installed EFB to the extent it is practical.

6.3.4 Where image sensors are used, the recording of such images shall not capture the head and shoulders of the flight crew members while seated in their normal operating position.

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 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 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 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 FDR or ADRS recording from a complete flight 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;

- (c) 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;
- (d) 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;
- (e) 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;
- (f) 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; and
- (g) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

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 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.

Table A8-1. Parameter characteristics for flight data recorders

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
1.	Time (UTC when 24 hours 4 ±0.125%/		24 hours	4	±0.125%/h	1s

	h 1 s available, otherwise relative time count or GNSS time sync)					
2.	Pressure- altitude		–300 m (– 1 000 ft) to maximum certificate d altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3.	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max V _{So} (Note 1)	1	±5%	1 kt (0.5 kt recommen ded)
			V _{So} to 1.2 V _D (Note 2)		±3%	
4.	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5.	Normal accelerati on (Note 8)	Applicatio n for type certificatio n is submitted to a Contractin g State before 1 January 2016	–3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
		Applicatio n for type certificatio n is submitted to a Contractin g State on or after 1 January 2016	–3 g to +6 g	0.0625	±1% of maximum range excluding datum error of ±5%	0.004 g
6.	Pitch attitude		±75° or usable	0.25	±2°	0.5°

			range whichever is greater			
7.	Roll attitude		$\pm 180^\circ$	0.25	$\pm 2^\circ$	0.5°
8.	Radio transmission keying		On-off (one discrete)	1		
9.	Power on each engine (Note 3)		Full range	1 (per engine)	$\pm 2\%$	0.2% of full range or the resolution required to operate the aircraft
10. *	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	$\pm 5\%$ or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11. *	Leading edge flap and cockpit control selection		Full range or each discrete position	2	$\pm 5\%$ or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12. *	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13. *	Ground spoiler/sp eed brake selection (selection and position)		Full range or each discrete position	1	$\pm 2\%$ unless higher accuracy uniquely required	0.2% of full range
14.	Outside air temperatu re		Sensor range	2	$\pm 2^\circ\text{C}$	0.3°C
15. *	Autopilot/ auto throttle/A FCS mode and engagem ent status		A suitable combinati on of discretes	1		

16.	Longitudinal acceleration (Note 8)	Application for type certification submitted to a Contracting State before 1 January 2016	± 1 g	0.25	± 0.015 g excluding a datum error of ± 0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	± 1 g	0.0625	± 0.015 g excluding a datum error of ± 0.05 g	0.004 g
17.	Lateral acceleration (Note 8)	Application for type certification submitted to a Contracting State before 1 January 2016	± 1 g	0.25	± 0.015 g excluding a datum error of ± 0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	± 1 g	0.0625	± 0.015 g excluding a datum error of ± 0.05 g	0.004 g
18.	Pilot input and/or control surface position primary controls (pitch, roll, yaw)	Application for type certification submitted to a Contracting State before 1	Full range	0.25	$\pm 2^\circ$ unless higher accuracy uniquely required	0.2% of full range or as installed

	(Notes 4 and 8)	January 2016				
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	$\pm 2^\circ$ unless higher accuracy uniquely required	0.2% of full range or as installed
19.	Pitch trim position		Full range	1	$\pm 3\%$ unless higher accuracy uniquely required	0.3% of full range or as installed
20. *	Radio altitude		-6 m to 750 m (-20 ft to 2500 ft)	1	± 0.6 m (± 2 ft) or $\pm 3\%$ whichever is greater below 150 m (500 ft) and $\pm 5\%$ above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
21. *	Vertical beam deviation (ILS/GNSS/GLS glide path, MLS elevation, IRNAV/INAN vertical deviation)		Signal range	1	$\pm 3\%$	0.3% of full range
22. *	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/INAN)		Signal range	1	$\pm 3\%$	0.3% of full range

	AN lateral deviation)					
23.	Marker beacon passage		Discrete	1		
24.	Master warning		Discrete	1		
25.	Each NAV receiver frequency selection (Note 5)		Full range	4	As installed	
26. *	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/I AN)) (Notes 5 and 6)		0 – 370 km (0 – 200 NM)	4	As installed	1,852 m (1 NM)
27.	Air/ground status		Discrete	1		
28. *	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off		Discrete	1		

	switch position)					
29. *	Angle of attack		Full range	0.5	As installed	0.3 % of full range
30. *	Hydraulics, each system (low pressure)		Discrete	2		0.5% of full range
31. *	Navigation data (latitude/longitude, ground speed and drift angle) (Note 7)		As installed	1	As installed	
32. *	Landing gear and gear selector position		Discrete	4	As installed	
33. *	Ground speed		As installed	1	Data should be obtained from the most accurate system	1 kt
34.	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35. *	Additional engine parameters (EPR, N ₁ , indicated vibration level, N ₂ , EGT, fuel flow, fuel cut-off lever position, N ₃ , engine fuel	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range

	metering valve position)					
36. *	TCAS/ACAS (traffic alert and collision avoidance system)		Discretes	1	As installed	
37. *	Wind shear warning		Discrete	1	As installed	
38. *	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39. *	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40. *	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41. *	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42. *	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43. *	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44. *	Selected flight path (all pilot selectable modes of			1	As installed	

	operation) (course/D STRK, path angle, final approach path (IRNAV/I AN))					
45. *	Selected decision height		As installed	64	As installed	Sufficient to determine crew selection
46. *	EFIS display format (pilot, co- pilot)		Discrete(s)	4	As installed	
47. *	Multi- function/e ngine/ alert s display format		Discrete(s)	4	As installed	
48. *	AC electrical bus status		Discrete(s)	4	As installed	
49. *	DC electrical bus status		Discrete(s)	4	As installed	
50. *	Engine bleed valve position		Discrete(s)	4	As installed	
51. *	APU bleed valve position		Discrete(s)	4	As installed	
52. *	Computer failure		Discrete(s)	4	As installed	
53. *	Engine thrust command		As installed	2	As installed	
54. *	Engine thrust target		As installed	4	As installed	2% of full range
55. *	Computed centre of gravity		As installed	64	As installed	1% of full range
56. *	Fuel quantity		As installed	64	As installed	1% of full range

	in CG trim tank					
57. *	Head up display in use		As installed	4	As installed	
58. *	Para visual display on/off		As installed	1	As installed	
59. *	Operational stall protection , stick shaker and pusher activation		As installed	1	As installed	
60. *	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)		As installed	4	As installed	
61. *	Ice detection		As installed	4	As installed	
62. *	Engine warning each engine vibration		As installed	1	As installed	
63. *	Engine warning each engine over temperature		As installed	1	As installed	
64. *	Engine warning each engine oil pressure low		As installed	1	As installed	
65. *	Engine warning each engine		As installed	1	As installed	

	over speed					
66. *	Yaw trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67. *	Roll trim surface position		Full range		±3% unless higher accuracy uniquely required	0.3% of full range
68. *	Yaw or sideslip angle		Full range	1	±5%	0.5°
69. *	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70. *	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71. *	Loss of cabin pressure		Discrete	1		
72. *	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73. *	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74. *	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75. *	All cockpit flight control input forces (control wheel, control		Full range (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5%	0.2% of full range or as installed

	column, rudder pedal)					
76. *	Event marker		Discrete	1		
77. *	Date		365 days	64		
78. *	ANP or EPE or EPU		As installed	4	As installed	
79. *	Cabin pressure altitude	Applicatio n for type certificatio n submitted to a Contractin g State on or after 1 January 2023	As installed (0 ft to 40,000 ft recomme nded)	1	As installed	100 ft
80. *	Aeroplane computed weight	Applicatio n for type certificatio n submitted to a Contractin g State on or after 1 January 2023	As installed	64	As installed	1% of full range
81. *	Flight director command	Applicatio n for type certificatio n submitted to a Contractin g State on or after 1 January 2023	Full range	1	$\pm 2^\circ$	0.5°
82. *	Vertical speed	Applicatio n for type certificatio n submitted to a Contractin g State on or after 1 January 2023	As installed	0.25	As installed (32 ft/min recommende d)	16 ft/min

Notes. -

1. V_{SO} stalling speed or minimum steady flight speed in the landing configuration.
2. V_D design diving speed.
3. Record sufficient inputs to determine power.
4. 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. In aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.
5. Where signal available in digital form.
6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
7. When signals readily available.
8. It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the measurement range, maximum sampling and recording interval, accuracy limits or recording resolution description detailed in this Schedule.

Table A8-2. Description of Applications for Data Link Recorders

<i>Item No.</i>	<i>Application type</i>	<i>Application description</i>	<i>Recording content</i>
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 management (CM) respectively.	C
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.	C

		Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	
4.	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for 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.	C
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 to be recorded only as far as is practicable given the architecture of the system.

Table A8-3. Parameter Characteristics for Aircraft Data Recording Systems

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
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1.	Heading a) Heading (Magnetic or True)	$\pm 180^\circ$	1	$\pm 2^\circ$	0.5°	Heading is preferred, if not available, yaw rate shall be recorded
	b) Yaw rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
2.	Pitch a) Pitch attitude	$\pm 90^\circ$	0.25	$\pm 2^\circ$	0.5°	Pitch attitude is preferred, if not available, pitch rate shall be recorded
	b) Pitch rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
3.	Roll a) Roll attitude	$\pm 180^\circ$	0.25	$\pm 2^\circ$	0.5°	Roll attitude is preferred, if not available, roll rate shall be recorded
	b) Roll rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
4.	Positioning system: a) Time	24 hours	1	$\pm 0.5 \text{ s}$	0.1 s	UTC time preferred where available
	b) Latitude/longitude	Latitude: $\pm 90^\circ$ Longitude: $\pm 180^\circ$	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1,000 ft) to maximum certificated altitude of aircraft + 1 500 m (5,000 ft)	2 (1 if available)	As installed ($\pm 15 \text{ m}$ ($\pm 50 \text{ ft}$) recommended)	1.5 m (5 ft)	
	d) Ground speed	0-1,000 kt	2 (1 if available)	As installed ($\pm 5 \text{ kt}$ recommended)	1 kt	
	e) Track	0-360°	2 (1 if available)	As installed ($\pm 2^\circ$)	0.5°	

	f) Estimated error	Available range	2 (1 if available)	recomm ended) As installe d	As installed	Shall be recorded if readily available
5.	Normal acceleration	-3 g to + 6 g (*)	0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ± 0.45 g recommended)	0.004 g	
6.	Longitudinal acceleration	± 1 g (*)	0.25 (0.125 if available)	As installed (± 0.015 g excluding a datum error of ± 0.05 g recommended)	0.004 g	
7.	Lateral acceleration	± 1 g (*)	0.25 (0.125 if available)	As installed (± 0.015 g excluding a datum error of ± 0.05 g recommended)	0.004 g	
8.	External static pressure (or pressure altitude)	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))	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	

				recomm ended)		
9.	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10.	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	
11.	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12.	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
13.	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14.	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15.	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16.	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	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.
17.	Engine gas generator speed (Ng)	0-150%	Each engine each second	As installed	0,2% of full range	
18.	Free power turbine speed (Nf)	0-150%	Each engine each second	As installed	0.2% of full range	
19.	Coolant temperature	Full range	1	As installed ($\pm 5^{\circ}\text{C}$ recommended)	1°C	
20.	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21.	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22.	Flaps position	Full range or each discrete position	2	As installed	0.5°	
23.	Primary flight control surface position	Full range	0.25	As installed	0.2% of full range	
24.	Fuel quantity	Full range	4	As installed	1% of full range	
25.	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26.	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	

27.	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28.	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and-locked and down-and-locked position
29.	Novel/unique aircraft features	As required	As required	As required	As required	

FOURTH SCHEDULE

(Made under regulation 70)

LIGHTS TO BE DISPLAYED BY AEROPLANE (GENERAL AVIATION-
AEROPLANES)

1. TERMINOLOGY

When the following terms are used in this schedule, they have the following meanings:

Angles of coverage.

- (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.

Horizontal plane. The plane containing the longitudinal axis and perpendicular to the plane of symmetry of the aeroplane.

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.

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.

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.

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.

Vertical planes. Planes perpendicular to the horizontal plane.

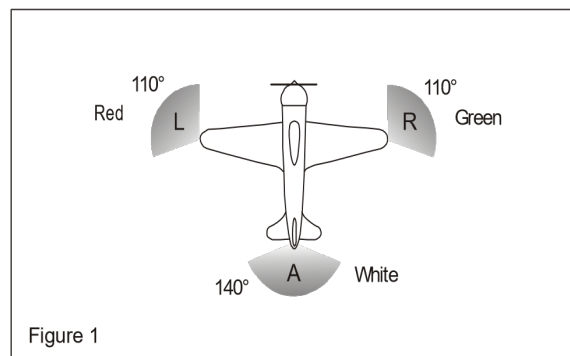
Visible. Visible on a dark night with a clear atmosphere.

2. NAVIGATION LIGHTS TO BE DISPLAYED IN THE AIR

Note.- The lights specified herein are intended to meet the requirements of 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.



3. 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:

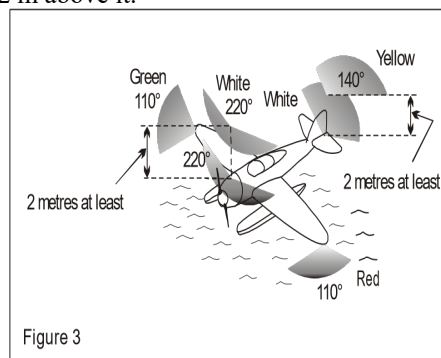
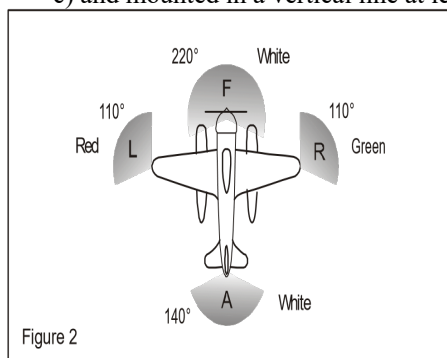
- (a). a red light projected above and below the horizontal through angle of coverage L;
- (b). a green light projected above and below the horizontal through angle of coverage R;
- (c). a white light projected above and below the horizontal through angle of coverage A;
and
- (d). a white light projected through angle of coverage F.

The lights described in a), b) and c) shall be visible at a distance of at least 3.7 km (2 NM). The light described in d) shall 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.



3.4 When being towed

The lights described in 3.2 a), b) and c) appearing as steady, unobstructed lights.

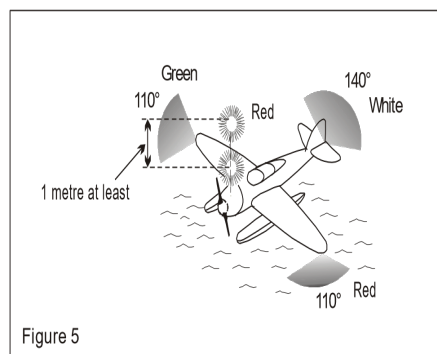
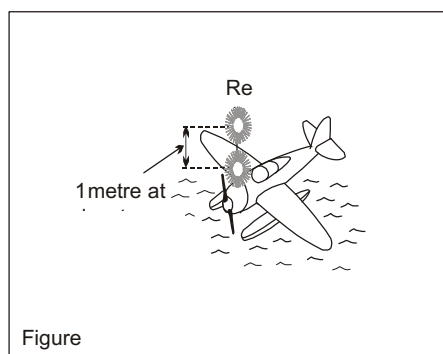
3.5 When not under command and not making way

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

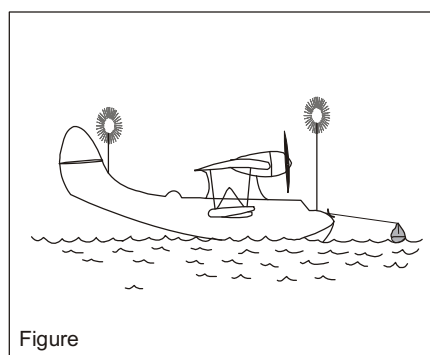
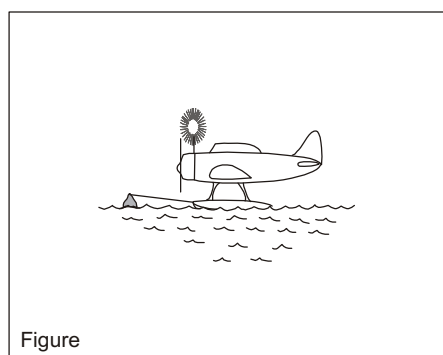
As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 a), b) and c).

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.



3.7 When at anchor

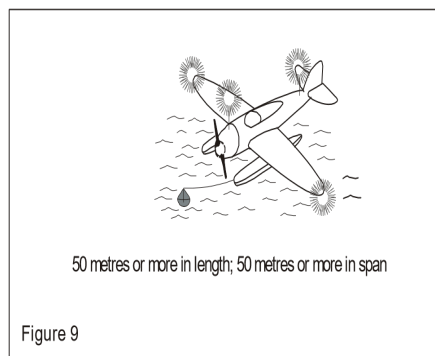
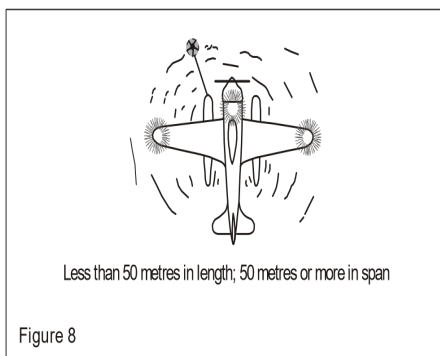
- (a). If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).
- (b). If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) 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 a ground

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.



FIFTH SCHEDULE

(Made under regulation 89)

ALTIMETRY SYSTEM PERFORMANCE REQUIREMENTS FOR OPERATIONS IN RVSM AIRSPACE (GENERAL AVIATION - AEROPLANES)

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 $28 - 0.013z^2$ for $0 \leq z \leq 25$ when z is the magnitude of the mean TVE in metres, or $92 - 0.004z^2$ 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 (80 ft) 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.

SIXTH SCHEDULE

(Made under regulation 77, 78, 80, 81 and 94)

FLIGHT RECORDERS (GENERAL AVIATION - AEROPLANES)

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:

- a flight data recorder (FDR),
- a cockpit voice recorder (CVR),
- an airborne image recorder (AIR),
- a data link recorder (DLR).

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR.

Lightweight flight recorders comprise one or more of the following:

- an aircraft data recording system (ADRS),
- a cockpit audio recording system (CARS),
- an airborne image recording system (AIRS),
- a data link recording system (DLRS).

When image or data link information is required to be recorded on a lightweight flight recorder, it is permissible to record it on either the CARS or the ADRS.

1 GENERAL REQUIREMENTS

1.1 Non-deployable flight recorder containers shall be painted a distinctive orange colour.

1.2 Non-deployable crash-protected flight recorder containers shall:

- (a). carry reflective material to facilitate their location; and
- (b). 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 90 days.

1.3 Automatic deployable flight recorder containers shall:

- (a). be painted a distinctive orange colour, however the surface visible from outside the aircraft may be of another colour;
- (b). carry reflective material to facilitate their location; and

(c). have an integrated automatically activated ELT.

- 1.4 The flight recorder systems shall be installed so that:
- (a). the probability of damage to the recordings is minimised;
 - (b). there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and
 - (c). if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and
 - (d). aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimised.

Note.- The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialized replay or copying techniques.

1.5 The crash-protected flight recorder shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder without jeopardizing service to essential or emergency loads.

1.6 The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.

1.7 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.

1.8 Means shall be provided for an accurate time correlation between the recorder systems recordings.

1.9 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;
- (b). parameter origin or source and equations which relate counts to units of measurement;
- (c). manufacturer's test reports; and
- (d). detailed information to ensure the continued serviceability of the flight recorder system.

1.10 The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the aeroplane to be incorporated in the continuing airworthiness

maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

Note 1.- The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required in this Schedule.

Note 2.- Conditions related to the continued serviceability of a flight recorder system are defined in paragraph 6 of this Schedule. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.

2. FLIGHT DATA RECORDER (FDR) AND AIRCRAFT DATA RECORDING SYSTEM (ADRS)

2.1 START AND STOP LOGIC

The FDR or ADRS 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 The parameters that satisfy the requirements for FDRs are the first 7 parameters listed in Table A2.3-1. 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 If further FDR recording capacity is available, recording of the following additional information shall be considered:

- (a). 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:
 - (i) 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;
 - (ii) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;
 - (iii) warnings and alerts; and
 - (iv) the identity of displayed pages for emergency procedures and checklists;
- (b). retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.

2.2.2.3 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:

- Pressure altitude
- Indicated airspeed or calibrated airspeed
- Heading (primary flight crew reference)
- Pitch attitude
- Roll attitude
- Engine thrust/power
- Landing gear status*
- Total or outside air temperature*
- Time*
- Navigation data*: Drift angle, wind speed, wind direction, latitude/longitude
- Radio altitude*

2.2.4 The parameters that satisfy the requirements for ADRS are listed in Table A2.3-3.

2.2.5. Where further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table A2.3-3 shall be considered.

2.3. ADDITIONAL INFORMATION

2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.

2.3.2 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.

3. COCKPIT VOICE RECORDER (CVR) AND COCKPIT AUDIO RECORDING SYSTEM (CARS)

3.1 Start and stop logic

The CVR or 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 or 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.

3.2 Signals to be recorded

3.2.1. The CVR shall record simultaneously 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.

3.2.2 The preferred CVR audio allocation shall be as follows:

- (a) pilot-in-command audio panel;
- (b) co-pilot audio panel;
- (c) additional flight crew positions and time reference; and
- (d) cockpit area microphone.

3.2.3 The CARS shall record simultaneously 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.

3.2.4 The preferred CARS audio allocation shall be as follows:

- (a) voice communication; and
- (b) aural environment on the flight deck.

4. AIRBORNE IMAGE RECORDER (AIR) AND AIRBORNE IMAGE RECORDING SYSTEM (AIRS)

4.1. Start and stop logic

The AIR or AIRS 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 AIR or AIRS 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.

4.2. Classes

4.2.1 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.

4.2.2 A Class B AIR or AIRS captures data link message displays.

4.2.3 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.

5. DATA LINK RECORDER (DLR)

5.1 Applications to be recorded

5.1.1 Where the aircraft flight path is authorised 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 in Table A2.3-2 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.

6 INSPECTIONS OF FLIGHT RECORDER SYSTEMS

6.1 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.

6.2 FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording 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 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.

6.3 Recording 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 FDR or ADRS recording from a complete flight 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;
- (c) 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;

- (d) 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;
 - (e) 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
 - (f) 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.
 - (g) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.
- 6.4 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.
- 6.5 A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.
- 6.6 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.

Table A2.3-1 Parameter Characteristics for Flight Data Recorders

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
1.	Time (UTC when 24 hours 4 $\pm 0.125\%/h$ 1 s available, otherwise relative time		24 hours	4	$\pm 0.125\%/h$	1s

	count or GNSS time sync)					
2.	Pressure-altitude		–300 m (–1,000 ft) to maximum certificated altitude of aircraft +1,500 m (+5,000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3.	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max V _{So} (Note 1)	1	±5%	1 kt (0.5 kt recommended)
			V _{So} to 1.2 V _D (Note 2)		±3%	
4.	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5.	Normal acceleration (Note 8)		–3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
6.	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7.	Roll attitude		±180°	0.25	±2°	0.5°
8.	Radio transmission keying		On-off (one discrete)	1		
9.	Power on each engine (Note 3)		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10. *	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft

11. *	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12. *	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13. *	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14.	Outside air temperature		Sensor range	2	±2°C	0.3°C
15. *	Autopilot/au to throttle/AFC S mode and engagement status		A suitable combination of discretes	1		
16.	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17.	Lateral acceleration (Note 3)		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
18.	Pilot input and/or control surface position primary controls (pitch, roll, yaw) (Notes 4 and 8)	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed

		Applicati on for type certificati on submitted to a Contracti ng State on or after 1 January 2016	Full range	0.125	$\pm 2^\circ$ unless higher accuracy uniquely required	0.2% of full range or as installed
19.	Pitch trim position		Full range	1	$\pm 3\%$ unless higher accuracy uniquely required	0.3% of full range or as installed
20. *	Radio altitude		-6 m to 750 m (-20 ft to 2 500 ft)	1	± 0.6 m (± 2 ft) or $\pm 3\%$ whichever is greater below 150 m (500 ft) and $\pm 5\%$ above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
21. *	Vertical beam deviation (ILS/GNSS/ GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)		Signal range	1	$\pm 3\%$	0.3% of full range
22. *	Horizontal beam deviation (ILS/GNSS/ GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	$\pm 3\%$	0.3% of full range
23.	Marker beacon passage		Discrete	1		
24.	Master warning		Discrete	1		

25.	Each NAV receiver frequency selection (Note 5)		Full range	4	As installed	
26. *	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IA N)) (Notes 5 and 6)		0 – 370 km (0 – 200 NM)	4	As installed	1,852 m (1 NM)
27.	Air/ground status		Discrete	1		
28. *	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)		Discrete	1		
29. *	Angle of attack		Full range	0.5	As installed	0.3 % of full range
30. *	Hydraulics, each system (low pressure)		Discrete	2		0.5% of full range
31. *	Navigation data (latitude/longitude, ground speed and		As installed	1	As installed	

	drift angle) (Note 7)					
32. *	Landing gear and gear selector position		Discrete	4	As installed	
33. *	Groundspeed		As installed	1	Data should be obtained from the most accurate system	1 kt
34.	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35. *	Additional engine parameters (EPR, N1, indicated vibration level, N2, EGT, fuel flow, fuel cut-off lever position, N3, engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36. *	TCAS/ACAS (traffic alert and collision avoidance system)		Discrete(s)	1	As installed	
37. *	Wind shear warning		Discrete	1	As installed	
38. *	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39. *	Selected altitude (all pilot)		As installed	1	As installed	Sufficient to determine

	selectable modes of operation)					crew selection
40. *	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41. *	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42. *	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43. *	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44. *	Selected flight path (all pilot selectable modes of operation) (course/DST RK, path angle, final approach path (IRNAV/IA N))			1	As installed	As installed
45. *	Selected decision height		As installed	64	As installed	Sufficient to determine crew selection
46. *	EFIS display format (pilot, co-pilot)		Discrete(s)	4	As installed	
47. *	Multi-function/engine/		Discrete(s)	4	As installed	

	alerts display format					
48. *	AC electrical bus status		Discrete(s)	4	As installed	
49. *	DC electrical bus status		Discrete(s)	4	As installed	
50. *	Engine bleed valve position		Discrete(s)	4	As installed	
51. *	APU bleed valve position		Discrete(s)	4	As installed	
52. *	Computer failure		Discrete(s)	4	As installed	
53. *	Engine thrust command		As installed	2	As installed	2% of full range
54. *	Engine thrust target		As installed	4	As installed	2% of full range
55. *	Computed centre of gravity		As installed	64	As installed	1% of full range
56. *	Fuel quantity in CG trim tank		As installed	64	As installed	1% of full range
57. *	Head up display in use		As installed	4	As installed	
58. *	Para visual display on/off		As installed	1	As installed	
59. *	Operational stall protection, stick shaker and pusher activation		As installed	1	As installed	
60. *	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)		As installed	4	As installed	
61. *	Ice detection		As installed	4	As installed	
62. *	Engine warning each engine vibration		As installed	1	As installed	
63. *	Engine warning		As installed	1	As installed	

	each engine over temperature					
64. *	Engine warning each engine oil pressure low		As installed	1	As installed	
65. *	Engine warning each engine over speed		As installed	1	As installed	
66. *	Yaw trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67. *	Roll trim surface position		Full range		±3% unless higher accuracy uniquely required	0.3% of full range
68. *	Yaw or sideslip angle		Full range	1	±5%	0.5°
69. *	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70. *	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71. *	Loss of cabin pressure		Discrete	1		
72. *	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73. *	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74. *	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75. *	All cockpit flight control input forces		Full range (±311 N (±70 lbf), ±	1	±5%	0.2% of full range

	(control wheel, control column, rudder pedal)		378 N (± 85 lbf), ± 734 N (± 165 lbf))			or as installed
76. *	Event marker		Discrete	1		
77. *	Date		365 days	64		
78. *	Actual navigation performance or estimated position error or estimated position uncertainty		As installed	4	As installed	
79. *	Cabin pressure altitude	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40,000 ft recommended)	1	As installed	100 ft
80. *	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
81. *	Flight director command (left flight director pitch command, left flight director roll command,	Application for type certification submitted to a Contracting State on or	Full range	1	$\pm 2^\circ$	0.5°

	right flight director pitch command, right flight director roll command)	after 1 January 2023				
82. *	Vertical speed	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	0.25	As installed (32 ft/min recommended)	16 ft/min

Notes.-

1. V_{SO} stalling speed or minimum steady flight speed in the landing configuration.
2. V_D design diving speed.
3. Record sufficient inputs to determine power.
4. 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. In aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.
5. If signal available in digital form.
6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.
7. If signals readily available.
8. It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the measurement range, maximum sampling and recording intervals, accuracy limits or recording resolution guidance description detailed in this Schedule.

Table A2.3-2. Description of applications for data link recorders

<i>Item No.</i>	<i>Application type</i>	<i>Application description</i>	<i>Recording content</i>
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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 management (CM), respectively.	C
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 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.	C
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 A2.3-3. Parameter Characteristics for Aircraft Data Recording Systems

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1.	Heading	$\pm 180^\circ$	1	$\pm 2^\circ$	0.5°	*Heading is preferred, if not available, yaw rate shall be recorded
	a) Heading (Magnetic or True)					
	b) Yaw rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
2.	Pitch	$\pm 90^\circ$	0.25	$\pm 2^\circ$	0.5°	*Pitch attitude is preferred, if not available, pitch rate shall be recorded
	a) Pitch attitude					
	b) Pitch rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
3.	Roll	$\pm 180^\circ$	0.25	$\pm 2^\circ$	0.5°	*If not available, roll rate shall be recorded
	a) Roll attitude					
	b) Roll rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
4.	Positioning system:	24 hours	1	$\pm 0.5 \text{ s}$	0.1 s	UTC time preferred where available
	(a). Time					
	(b). Latitude/longitude	Latitude: $\pm 90^\circ$ Longitude: $\pm 180^\circ$	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	(c). Altitude	-300 m ($-1,000 \text{ ft}$) to maximum certificated	2 (1 if available)	As installed ($\pm 15 \text{ m}$ ($\pm 50 \text{ ft}$))	1.5 m (5 ft)	

		altitude of aeroplane +1,500 m (5,000 ft)		recommen ded)		
	(d). Ground speed	0–1,000 kt	2 (1 if available)	As installed (±5 kt recommen ded)	1 kt	
	(e). Track	0–360°	2 (1 if available)	As installed (± 2° recommen ded)	0.5°	
	(f). Estimate d error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5.	Normal acceleration	–3 g to + 6 g (*)	0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ±0.45 g recommen ded)	0.004 g	
6.	Longitudinal acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommen ded)	0.004 g	
7.	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommen ded)	0.004 g	
8.	External static pressure (or pressure altitude)	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)	0.1 mb (0.01 in- Hg) or 1.5 m (5 ft)	

				recommended)		
9.	Outside air temperature (or total air temperature)	–50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10.	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	
11.	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12.	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
13.	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14.	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15.	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16.	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	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
17.	Engine gas generator speed (Ng)	0-150%	Each engine each second	As installed	0.2% of full range	
18.	Free power turbine speed (Nf)	0-150%	Each engine each second	As installed	0.2% of full range	
19.	Coolant temperature	Full range	1	As installed ($\pm 5^{\circ}\text{C}$ recommended)	1° C	
20.	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21.	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22.	Flaps position	Full range or each discrete position	2	As installed	0.5°	
23.	Primary flight control surface position	Full range	0.25	As installed	0.2% of full range	
24.	Fuel quantity	Full range	4	As installed	1% of full range	
25.	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26.	Emergency voltage	Full range	Each engine	As installed	1 Volt	

			each second			
27.	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28.	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and-locked and down-and-locked position
29.	Novel/unique aircraft features	As required	As required	As required	As required	

SEVENTH SCHEDULE

(Made under regulation 125, 126, 128, 171, 172 and 174)

FLIGHT RECORDERS - HELICOPTER OPERATIONS

The material in this Schedule concerns flight recorders intended for installation in helicopters engaged in international air navigation. Crash-protected flight recorders comprise one or more of the following

- (a) a flight data recorder (FDR);
- (b) a cockpit voice recorder (CVR);
- (c) an airborne image recorder (AIR);
- (d) a data link recorder (DLR).

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR.

Lightweight flight recorders comprise one or more of the following:

- (a) an aircraft data recording system (ADRS);
- (b) a cockpit audio recording system (CARS);
- (c) an airborne image recording system (AIRS);
- (d) a data link recording system (DLRS).

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CARS or the ADRS.

1. GENERAL REQUIREMENTS

1.1 Non-deployable flight recorder containers shall be painted a distinctive orange colour.

1.2 Non-deployable crash-protected flight recorder containers shall:

- (a) carry reflective material to facilitate their location; and
- (b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz. At the earliest practical date, but not later than 1 January 2018, this device shall operate for a minimum of 90 days.

1.3 Automatic deployable flight recorder containers shall:

- (a) be painted a distinctive orange colour, however the surface visible from outside the helicopter may be of another colour;
- (b) carry reflective material to facilitate their location; and
- (c) have an integrated automatically activated ELT.

1.4 The flight recorder systems shall be installed so that:

- (a) the probability of damage to the recordings is minimised;

- (b) there is an aural or visual means for preflight checking that the flight recorder systems are operating properly; and
- (c) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and
- (d) helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimised.

Note.- The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialized replay or copying techniques.

- 1.5 The crash-protected flight recorders shall be installed so that 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.
- 1.6 The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.
- 1.7 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.
- 1.8 Means shall be provided for an accurate time correlation between the flight recorder systems functions.
- 1.9 The manufacturer usually provides 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;
 - (b) parameter origin or source and equations which relate counts to units of measurement;
 - (c) manufacturer's test reports; and
 - (d) detailed information to ensure the continued serviceability of the flight recorder system.
- 1.10 The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the helicopter to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

Note 1.- The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required in this Schedule.

Note 2.- Conditions related to the continued serviceability of a flight recorder system are defined in paragraph 6 of this Schedule. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.

2. FLIGHT DATA RECORDER (FDR) AND AIRCRAFT DATA RECORDING SYSTEM (ADRS)

2.1 START AND STOP LOGIC

The FDR or ADRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power.

2.2 PARAMETERS TO BE RECORDED

2.2.1 The parameters that satisfy the requirements for FDRs, are listed in Table A4-1. The number of parameters to be recorded shall depend on helicopter complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of helicopter complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by helicopter systems or the flight crew to operate the helicopter. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

2.2.2 The following parameters shall satisfy the requirements for flight path and speed:

- pressure altitude
- indicated airspeed
- outside air temperature
- heading
- normal acceleration
- lateral acceleration
- longitudinal acceleration (body axis)
- time or relative time count
- navigation data*: drift angle, wind speed, wind direction, latitude/longitude
- radio altitude*

2.2.3 If further FDR recording capacity is available, recording of the following additional information shall be considered:

- (a) additional operational information from electronic displays, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS); and
- (b) additional engine parameters (EPR, N_1 , fuel flow, etc.).

2.2.4 The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in Table A4-3.

2.2.5 Where further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table A4-3 shall be considered.

2.3 ADDITIONAL INFORMATION

2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the appropriate certificating authority.

2.3.2 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.

3. COCKPIT VOICE RECORDER (CVR) AND COCKPIT AUDIO RECORDING SYSTEM (CARS)

3.1 START AND STOP LOGIC

The CVR or CARS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR or 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.

3.2 SIGNALS TO BE RECORDED

3.2.1 The CVR shall record simultaneously on four separate channels, or more, at least the following:

- (a) voice communication transmitted from or received in the aircraft by radio;
- (b) aural environment on the flight deck;
- (c) voice communication of flight crew members on the flight deck using the interphone system, if installed;
- (d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and
- (e) voice communication of flight crew members using the passenger address system, if installed.

3.2.2. Recommendation

The preferred CVR audio allocation shall be as follows:

- (a) pilot-in-command audio panel;
- (b) co-pilot audio panel;
- (c) additional flight crew positions and time reference; and
- (d) cockpit area microphone.

3.2.3. The CARS shall record simultaneously on two separate channels, or more, at least the following:

- (a) voice communication transmitted from or received in the helicopter by radio;
- (b) aural environment on the flight deck; and
- (c) voice communication of flight crew members on the flight deck using the helicopter's interphone system, if installed.

3.2.4 .Recommendation.

The preferred CARS audio allocation shall be as follows:

- a) voice communication; and
- b) aural environment on the flight deck.

4. AIRBORNE IMAGE RECORDER (AIR) AND AIRBORNE IMAGE RECORDING SYSTEM (AIRS)

4.1 START AND STOP LOGIC

The AIR or AIRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS 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.

4.2 CLASSES

4.2.1 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 AIRs or AIRS in this document.

4.2.2 A Class B AIR or AIRS captures data link message displays.

4.2.3 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 where an FDR is not required.

5. DATA LINK RECORDER (DLR)

5.1 APPLICATIONS TO BE RECORDED

5.1.1 Where the helicopter flight path is authorised or controlled through the use of data link messages, all data link messages, both uplinks (to the helicopter) and downlinks (from the helicopter), shall be recorded on the helicopter. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall to 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 in Table A4-2 shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) are to be recorded only as far as is practicable given the architecture of the system.

6. INSPECTIONS OF FLIGHT RECORDER SYSTEMS

6.1 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.

6.2 FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording 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 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.

6.3 Recording 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 FDR or ADRS recording from a complete flight 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;
- (c) 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;
- (d) 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;

- (e) 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
- (f) 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.
- (g) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

6.4 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.

6.5 A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.

6.6 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.

Table A4-1. Parameter Characteristics for Flight Data Recorders

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
1.	Time (UTC when 24 hours 4 $\pm 0.125\%/h$ 1 s available, otherwise relative time count or GNSS time sync)		24 hours	4	$\pm 0.125\%/h$	1s
2.	Pressure-altitude		-300 m (-1,000 ft) to maximum	1	± 30 m to ± 200 m (± 100 ft)	1.5 m (5 ft)

			certificate d altitude of aircraft +1,500 m (+5,000 ft)		to ± 700 ft)	
3.	Indicated airspeed		As the installed pilot display measuring system	1	$\pm 3\%$	1 kt
4.	Heading		360°	1	$\pm 2^\circ$	0.5°
5.	Normal acceleration		-3 g to +6 g	0.125	± 0.09 g excludin g datum error of ± 0.045 g	0.004 g
6.	Pitch attitude		$\pm 75^\circ$ or 100% of usable range whichever is greater	0.5	$\pm 2^\circ$	0.5°
7.	Roll attitude		$\pm 180^\circ$	0.5	$\pm 2^\circ$	0.5°
8.	Radio transmission keying		On-off (one discrete)	1	—	—
9.	Power on each engine		Full range	1 (per engine)	$\pm 2\%$	0.1% of full range
10.	Main rotor:					
	Motor rotor speed		50–130%	0.51	$\pm 2\%$	0.3% of full range
	Rotor brake		Discrete		—	—
11.	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)		Full range	0.5 (0.25 recommen ded)	$\pm 2\%$ unless higher accuracy uniquely required	0.5% of operatin g range
12.	Hydraulics, each system (low		Discrete	1	—	—

	pressure and selection)					
13.	Outside air temperature		Sensor range	2	$\pm 2^{\circ}\text{C}$	0.3°C
14.	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretes	1	—	—
15.	Stability augmentation system engagement		Discrete	1	—	—
16.	Main gearbox oil pressure		As installed	1	As installed	6.895 kN/m ² (1 psi)
17.	Main gearbox oil temperature		As installed	2	As installed	1°C
18.	Yaw rate		$\pm 400^{\circ}/\text{second}$	0.25	$\pm 1.5\%$ maximum range excluding datum error of $\pm 5\%$	$\pm 2^{\circ}/\text{s}$
19. *	Sling load force		0 to 200% of certified load	0.5	$\pm 3\%$ of maximum range	0.5% for maximum certified load
20.	Longitudinal acceleration		$\pm 1 \text{ g}$	0.25	$\pm 0.015 \text{ g}$ excluding a	0.004 g

					datum error of ± 0.05 g	
21.	Lateral acceleration		± 1 g	0.25	± 0.015 g excluding a datum error of ± 0.05 g	0.004 g
22. *	Radio altitude		-6 m to 750 m (-20 ft to 2,500 ft)	1	± 0.6 m (± 2 ft) or $\pm 3\%$ whichever is greater below 150 m (500 ft) and $\pm 5\%$ above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23. *	Vertical beam deviation		Signal range	1	$\pm 3\%$	0.3% of full range
24. *	Horizontal beam deviation		Signal range	1	$\pm 3\%$	0.3% of full range
25.	Marker beacon passage		Discrete	1	—	—
26.	Warnings		Discrete(s)	1	—	—
27.	Each navigation receiver frequency selection		Sufficient to determine selected frequency	4	As installed	—
28. *	DME 1 and 2 distances		0 – 370 km (0 – 200 NM)	4	As installed	1,852 m (1 NM)
29. *	Navigation data (latitude/longitude, ground speed, drift angle) wind speed, wind direction)		As installed	2	As installed	As installed
30. *	Landing gear and gear selector position		Discrete	4	—	—
31. *	Engine exhaust gas temperature (T_4)		As installed	1	As installed	

32.	Turbine inlet temperature (TIT/ITT)		As installed	1	As installed	
33. *	Fuel contents		As installed	4	As installed	
34. *	Altitude rate		As installed	1	As installed	
35. *	Ice detection		As installed	4	As installed	
36. *	Helicopter health and usage monitor system		As installed	—	As installed	—
37.	Engine control modes		Discrete	1	—	—
38. *	Selected barometric setting (pilot, co-pilot)		As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39. *	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40. *	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41. *	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42. *	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43. *	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44. *	Selected flight path (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection

45. *	Selected decision height		As installed	4	As installed	Sufficient to determine crew selection
46. *	EFIS display format (pilot, co-pilot)		Discrete(s)	4	—	—
47. *	Multi-function/engine/alerts display format		Discrete(s)	4	—	—
48. *	Event marker		Discrete	1	—	—
49. *	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
50. *	TCAS/ACAS (traffic alert and collision avoidance system) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
51. *	Primary flight controls – pilot input forces	Application for type certification is submitted to a Contracting State on or after 1	Full range	0.125 (0.0625 recommended)	± 3% unless higher accuracy is uniquely required	0.5% of operating range

		January 2023				
52. *	Computed centre of gravity	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
53. *	Helicopter computed weight	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range

Table A4-2. 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 management (CM) respectively.	C
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	C

		applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	
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 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.	C
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 helicopter 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 helicopter.

*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

Table A4-3. Parameter Characteristics for Aircraft Data Recording Systems

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1.	Heading a) Heading (Magnetic or True)	$\pm 180^\circ$	1	$\pm 2^\circ$	0.5°	*Heading is preferred, if not available, yaw rate shall be recorded
	b) Yaw rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
2.	Pitch a) Pitch attitude	$\pm 90^\circ$	0.25	$\pm 2^\circ$	0.5°	*Pitch attitude is preferred, if not available, pitch rate shall be recorded
	b) Pitch rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
3.	Roll a) Roll attitude	$\pm 180^\circ$	0.25	$\pm 2^\circ$	0.5°	*Roll attitude is preferred, if not available, roll rate shall be recorded
	b) Roll rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of } 360^\circ/\text{h}$	$2^\circ/\text{s}$	
4.	Positioning system: a) Time	24 hours	1	$\pm 0.5^\circ$	0.1°	UTC time preferred where available
	b) Latitude/longitude	Latitude: $\pm 90^\circ$ Longitude: $\pm 180^\circ$	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1,000 ft) to maximum certificated	2 (1 if available)	As installed (± 15 m (± 50 ft))	1.5 m (5 ft)	

		altitude of aeroplane +1,500 m (5,000 ft)		recommen ded)		
	d) Ground speed	0–1,000 kt	2 (1 if available)	As installed (±5 kt recommen ded)	1 kt	
	e) Track	0–360°	2 (1 if available)	As installed (± 2° recommen ded)	0.5°	
	f) Estimate d error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5.	Normal acceleration	–3 g to + 6 g (*)	0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ±0.45 g recommen ded)	0.004 g	
6.	Longitudinal acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommen ded)	0.004 g	
7.	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommen ded)	0.004 g	
8.	External static pressure (or pressure altitude)	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)	0.1 mb (0.01 in- Hg) or 1.5 m (5 ft)	

				recommended)		
9.	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10.	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	
11.	Main rotor speed (Nr)	50% to 130% or available sensor range	0.5	As installed	0.3% of full range	
12.	Engine RPM(*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters
13.	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14.	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
15.	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
16.	Manifold pressure(*)	Full range	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters
17.	Engine thrust/power/torque parameters required to determine	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1

	propulsive thrust/power*					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. Only for turbine-engined helicopters
18.	Engine gas generator speed (Ng) (*)	0-150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19.	Free power turbine speed (Nf) (*)	0-150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
20.	Collective pitch	Full range	0.5	As installed	0.1% of full range	
21.	Coolant temperature(*)	Full range	1	As installed (±5°C recommended)	1° C	*Only for turbine-engined helicopters
22.	Main voltage	Full range	Each engine each second	As installed	1 Volt	
23.	Cylinder head temperature(*)	Full range	Each cylinder each second	As installed	2% of full range	

24.	Fuel quantity	Full range	4	As installed	1% of full range	
25.	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26.	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27.	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28.	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and-locked and down-and-locked position
29.	Novel/unique aircraft features	As required	As required	As required	As required	

EIGHTH SCHEDULE

(Made under regulation 8)

ARTICLE 83 bis AGREEMENT SUMMARY
Commercial Air Transport- Aeroplanes

Note.- Regulation 8 requires a certified true copy of the agreement summary to be carried on board.

1. Purpose and scope

The Article 83 bis agreement summary shall contain the information in the template at paragraph 2, in a standardised format.

**2. Article 83 Bis Agreement Summary-
Commercial Air Transport- Aeroplanes**

ARTICLE 83 bis AGREEMENT SUMMARY		
Title of the Agreement:		
State of Registry:		Focal point:
State of the principal location of a general aviation operator:		Focal point:
Date of signature:	By State of Registry ¹	
	By State of the Operator ¹ :	
Duration:	Start Date ¹ :	End Date (if applicable) ² :
Languages of the Agreement		

ICAO Registration No.:				
Umbrella Agreement (if any) with ICAO Registration number:				
Chicago Convention	ICAO Annexes affected by the transfer of responsibility in respect of certain functions and duties to the State of the Operator			
Article 12: Rules of the Air	Annex 2, all chapters	Yes	☐	
		No	☐	
Article 30 a): Aircraft radio equipment	Radio Station Licence	Yes	☐	
		No	☐	
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6; and Annex 6 Part I, Radio Operator; or Annex 6, Part II (qualifications and/or flight crew member licensing); or Annex 6, Part III, section II, Composition of the flight crew (radio operator); or Annex 6, Part III, Section III (qualifications)	Yes	☐	Annex 6: [Specify Part and paragraph] ³
		No	☐	
Article 31: Certificates of Airworthiness	Annex 6 Part I or Part III, Section II	Yes	☐	[Specify Part and chapters] ³
		No	☐	
	Annex 6 Part II or Part III, Section III	Yes	☐	[Specify Part and chapters] ³
		No	☐	

	Annex 8 Part II, Chapters 3 and 4	Yes	☐	[Specify chapters] ³
		No	☐	

Aircraft by the transfer of responsibilities to the State of the Operator					
Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From ¹	To (if applicable) ²

Notes.-

1. dd/mm/yyyy.
2. dd/mm/yyyy or N/A if not applicable.
3. Square brackets indicate information that needs to be provided.

NINTH SCHEDULE

(Made under regulation 84)

ARTICLE 83 bis AGREEMENT SUMMARY
General Aviation Operations- Aeroplanes

Regulation 84 requires a certified true copy of the agreement summary to be carried on board.

1. Purpose and Scope

The Article 83 bis agreement summary should contain the information in the template at paragraph 2, in a standardised format

2. Article 83 bis Agreement Summary General Aviation Operations- Aeroplanes

ARTICLE 83 bis AGREEMENT SUMMARY		
Title of the Agreement:		
State of Registry:		Focal point:
State of the principal location of a general aviation operator:		Focal point:
Date of signature:	By State of Registry ¹	
	By State of the principal location of a general aviation operator ¹ :	
Duration:	Start Date ¹ :	End Date (if applicable) ² :
Languages of the Agreement		
ICAO Registration No.:		

Umbrella Agreement (if any) with ICAO Registration number:			
Chicago Convention	ICAO Annexes affected by the transfer responsibility in respect of certain functions and duties to the State of the principal location of a general aviation operator		
Article 12: Rules of the Air	Annex 2, all chapters	Yes ☐	
		No ☐	
Article 30 a): Aircraft radio equipment	Radio Station Licence	Yes ☐	
		No ☐	
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6; and Annex 6 Part I, Radio Operator; or Annex 6, Part II (qualifications and/or flight crew member licensing); or Annex 6, Part III, section II, Composition of the flight crew (radio operator); or Annex 6, Part III, Section III (qualifications)	Yes ☐	Annex 6: [Specify Part and paragraph] ³
		No ☐	
Article 31: Certificates of Airworthiness	Annex 6 Part I or Part III, Section II	Yes ☐	[Specify Part and chapters] ³
		No ☐	
	Annex 6 Part II or Part III, Section III	Yes ☐	[Specify Part and chapters] ³
		No ☐	
	Annex 8 Part II, Chapters 3 and 4	Yes ☐	[Specify chapters] ³
		No ☐	

Aircraft affected by the transfer of responsibilities to the State of the principal location of a general aviation operator

Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From ¹	To (if applicable) ²

Notes.-

1. *dd/mm/yyyy.*
2. *dd/mm/yyyy or N/A if not applicable.*
3. *Square brackets indicate information that needs to be provided.*

TENTH SCHEDULE

(Made under regulation 115 and 182)

ARTICLE 83 bis AGREEMENT SUMMARY

General Aviation Operations- Helicopter

Note.- Regulations 115 and 182 requires a certified true copy of the agreement summary to be carried on board.

1. Purpose and scope

The Article 83 bis agreement summary shall contain the information in the template at paragraph 2, and 3 in a standardised format.

2. Article 83 bis agreement summary for commercial air transport

ARTICLE 83 bis AGREEMENT SUMMARY

Title of the Agreement:		
State of Registry:		Focal point:
State of the principal location of a general aviation operator:		Focal point:
Date of signature:	By State of Registry ¹	
	By State of the Operator ¹ :	
Duration:	Start Date ¹ :	End Date (if applicable) ² :
Languages of the Agreement		
ICAO Registration No.:		
Umbrella Agreement (if any) with ICAO Registration number:		

Chicago Convention	ICAO Annexes affected by the transfer responsibility in respect of certain functions and duties to the State of the principal location of a general aviation operator			
Article 12: Rules of the Air	Annex 2, all chapters	Yes	☐	
		No	☐	
Article 30 a): Aircraft radio equipment	Radio Station Licence	Yes	☐	
		No	☐	
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6; and Annex 6 Part I, Radio Operator; or Annex 6, Part II (qualifications and/or flight crew member licensing); or Annex 6, Part III, section II, Composition of the flight crew (radio operator); or Annex 6, Part III, Section III (qualifications)	Yes	☐	Annex 6: [Specify Part and paragraph] ³
		No	☐	
Article 31: Certificates of Airworthiness	Annex 6 Part I or Part III, Section II	Yes	☐	[Specify Part and chapters] ³
		No	☐	
	Annex 6 Part II or Part III, Section III	Yes	☐	[Specify Part and chapters] ³
		No	☐	
	Annex 8 Part II, Chapters 3 and 4	Yes	☐	[Specify chapters] ³
		No	☐	

Aircraft affected by the transfer of responsibilities to the State of the principal location of a general aviation operator					
Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From ¹	To (if applicable) ²

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Notes. -

1. dd/mm/yyyy.
2. dd/mm/yyyy or N/A if not applicable.
3. Square brackets indicate information that needs to be provided.

3. Article 83 bis agreement summary for general aviation

Title of the Agreement:				
State of Registry:		Focal point:		
State of the principal location of a general aviation operator:		Focal point:		
Date of signature:	By State of Registry ¹			
	By State of the principal location of a general aviation operator ¹ :			
Duration:	Start Date ¹ :	End Date (if applicable) ² :		
Languages of the Agreement				
ICAO Registration No.:				
Umbrella Agreement (if any) with ICAO Registration number:				
Chicago Convention	ICAO Annexes affected by the transfer responsibility in respect of certain functions and duties to the State of the principal location of a general aviation operator			
Article 12: Rules of the Air	Annex 2, all chapters	Yes	☐	
		No	☐	
	Radio Station Licence	Yes	☐	

Article 30 a): Aircraft radio equipment		No	☐	
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6; and Annex 6 Part I, Radio Operator; or Annex 6, Part II (qualifications and/or flight crew member licensing); or Annex 6, Part III, section II, Composition of the flight crew (radio operator); or Annex 6, Part III, Section III (qualifications)	Yes	☐	Annex 6: [Specify Part and paragraph] ³
		No	☐	
Article 31: Certificates of Airworthiness	Annex 6 Part I or Part III, Section II	Yes	☐	[Specify Part and chapters] ³
		No	☐	
	Annex 6 Part II or Part III, Section III	Yes	☐	[Specify Part and chapters] ³
		No	☐	
	Annex 8 Part II, Chapters 3 and 4	Yes	☐	[Specify chapters] ³
		No	☐	

Aircraft affected by the transfer of responsibilities to the State of the principal location of a general aviation operator					
Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From ¹	To (if applicable) ²

Notes.-

1. dd/mm/yyyy.
2. dd/mm/yyyy or N/A if not applicable.
3. Square brackets indicate information that needs to be provided.