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THE CIVIL AVIATION ACT

(Cap. 394)

THE CIVIL AVIATION (INSTRUMENTS, EQUIPMENT AND
FLIGHT DOCUMENTS) REGULATIONS, 2025

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THE CIVIL AVIATION ACT,

(Cap. 394)

IN EXERCISE of the powers conferred by section 82 of the Civil Aviation Act, the Cabinet Secretary for Transport, Infrastructure; Housing and Urban Development makes the following Regulations—

THE CIVIL AVIATION (INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS) REGULATIONS, 2025

PART I—PRELIMINARY

1. These Rules may be cited as the Civil Aviation (Instruments, Equipment and Flight Documents) Regulations, 2025. Citation.

2. In these Regulations, unless the context otherwise requires— Interpretation.

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

“aerodrome” means a defined area on land or water, including any buildings, installations and equipment intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft;

“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;

“air ambulance” means any conveyance which is either designed or equipped for the transport of sick or injured person(s), and/or the transport of medical personnel to such person(s);

“aircraft” means any machine that can derive support in the atmosphere from the reactions of the air, other than the reactions of the air against the earth’s surface;

“aircraft 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 Operator Certificate or AOC” means a certificate authorising an operator to carry out specified commercial air transport operations;

“Air Operator Certificate Holder” means an aeroplane operator holding an operator certificate;

“Air Traffic Service (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);

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

“altimetry system error (ASE)” means the difference between the altitude indicated by the altimeter display, assuming a correct altimeter barometric setting, and the pressure altitude corresponding to the undisturbed ambient pressure;

“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. alternate aerodromes include the following—

- (a) “take-off alternate” means an alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure;
- (b) “en-route alternate” means an alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route; and
- (c) “destination alternate” means an alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

“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. alternate heliports include the following—

- (a) “take-off alternate” means an alternate heliport at which a helicopter would be able to land should this become necessary shortly after take-off and it is not possible to use the heliport of departure;
- (b) “en-route alternate” means an alternate heliport at which a helicopter would be able to land in the event that a diversion becomes necessary while en route; and
- (c) “destination alternate” means an alternate heliport at which a helicopter would be able to land should it become either impossible or inadvisable to land at the heliport of intended landing.

“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;
- (c) in relation to Kenya, the director general 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;

“Authority” means the Kenya Civil Aviation Authority;

“automatic deployable flight recorder (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, one in which a presence of a fire would be easily discovered by a crewmember while at station and to which each part of the compartment is easily accessible in flight;
- (b) Class B, one in which —
 - (i) there is sufficient access in flight to enable a crewmember 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, 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, 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 I (CAT I)” means, a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800m or a runway visual range not less than 550 m;

“Category II (Cat II)” means, a decision height lower than 60 m (200 ft), but not lower than 30 m (100 ft) and a runway visual range not less than 300 m;

“Category III (CAT III)” means, a decision height lower than 30 m (100 ft) or no decision height and a runway visual range less than 300 m or no runway visual range limitations;

“Combined Vision System (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 Operation” means an aircraft operation involving the transport of passengers, cargo, or mail for remuneration or hire;

“Configuration Deviation List (CDL)” means a list established by the organization responsible for the type design with the approval of the state of design which identifies any external parts of an aircraft type which may be missing at the commencement of a flight, and which contains, where necessary, any information on associated operating limitations and performance correction;

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

“continuing airworthiness records” means records which are related to the continuing airworthiness status of an aircraft, engine, and propeller or associated part;

“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;

“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;

“CVR” means an abbreviation for cockpit voice recorder;

“electronic flight bag (EFB)” means an electronic information system, comprised of equipment and applications for flight crew, which allows for the storing, updating, displaying and processing of EFB functions to support flight operations or duties;

“Emergency Locator Transmitter (ELT)” means a generic term describing equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated. an ELT may be any of the following—

- (a) “automatic fixed ELT (ELT(AF))” means an automatically activated ELT which is permanently attached to an aircraft;
- (b) “automatic portable ELT (ELT(AP))” means an automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft;
- (c) “automatic deployable ELT (ELT (AD))” means an ELT which is rigidly attached to an aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. manual deployment is also provided; and
- (d) “survival ELT (ELT(S))” means an ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an emergency, and manually activated by survivors;

“engine” means a unit used or intended to be used for aircraft propulsion and 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 93 km or 50 nm, 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 crew member charged with duties essential to the operation of an aircraft during a flight duty period;

“flight data analysis” means a process of analyzing 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;

“general aviation operation” means an aircraft operation other than a commercial air transport operation or an aerial work operation;

“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. there are two methods for executing instrument approach operations—

- (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. Lateral and vertical navigation guidance refers to the guidance provided either by—
 - (i) a ground-based radio navigation aid; or

- (ii) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these;

“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—

- (a) non-precision approach or NPA procedure- An instrument approach procedure designed for 2D instrument approach operations Type A;
- (b) approach procedure with vertical guidance or APV- A performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A; and
- (c) precision approach or PA procedure- An instrument approach procedure based on navigation systems, ILS, MLS, GLS and SBAS CAT I designed for 3D instrument approach operations Type A or B;

“instrument meteorological conditions 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 5 700 kg (12,500 lbs.);

“low-visibility operations or LVO” means approach operations in RVRs less than 550 m or with a DH less than 60 m or 200 ft or take-off operations in RVRs less than 400 m;

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

“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 organization 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—

- (a) “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; and
- (b) “area navigation or RNAV specification” means a navigation specification based on area navigation that does

not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, such RNAV 5, RNAV 1;

“night” means the time between fifteen minutes after sunset and fifteen minutes before sunrise, sunrise and sunset being determined at surface level, and includes any time between sunset and sunrise when an unlighted aircraft or other unlighted prominent object cannot clearly be seen at a distance of 4,572 m;

“non-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 authorizations 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, organization or enterprise engaged in or offering to engage in an aircraft operation;

“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;

“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 airfoils of powerplants;

“prototype” means an aircraft in respect of which an application has been made for a type certificate 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 centre line;

“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 aeroplanes” means an aeroplanes of a maximum certificated take-off mass of 5,700kg 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;

“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;

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

Application.

PART II— GENERAL REQUIREMENTS FOR AIRCRAFT INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

4. (1) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments and equipment prescribed in these Regulations shall be installed or carried, as appropriate, in all Aircraft according to the Aircraft used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by the Authority.

General instruments, equipment and flight documents requirements.

(2) The specified instruments and equipment, including their installation, shall be approved or accepted by the Authority.

(3) Navigation lights and anti-collision lights and other lights required by the civil aviation (rules of the air) Regulations to be displayed by aeroplanes in flight or operating on the movement area of an aerodrome shall have intensities, colours, fields of coverage and other characteristics such that they furnish the pilot of another aircraft or personnel on the ground with as much time as possible for interpretation and for subsequent manoeuvre necessary to avoid a collision.

(4) In the design of such lights in subregulation (3), due account shall be taken of the conditions under which they may reasonably be expected to perform these functions.

(5) Lights shall be installed in aeroplanes so as to minimize the possibility that they will—

- (a) adversely affect the satisfactory performance of the flight crews' duties; or
- (b) subject an outside observer to harmful dazzle.

PART III— COMMERCIAL AIR TRANSPORT AEROPLANES

Aeroplane Instruments And Equipment

5. (1) An aeroplane, when operating under an Article 83 bis agreement entered into between the State of Registry and the State of the Operator, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format.

Aeroplane operated under an Article 83 bis agreement.

(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 such as ramp checks.

(4) The agreement summary shall 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.

(5) The agreement summary shall contain the information for the specific aircraft and should follow the layout provided in the First Schedule of these Regulations.

6. 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.

All Aeroplanes on all flights.

7. An aeroplane shall be equipped with adequate and accessible medical supplies comprising of —

Medical supplies.

- (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 authorized 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 authorized 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.

8. 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—

Portable fire extinguishers.

- (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.

9. (1) An aeroplane shall be equipped with

Seat, berth and seat belt or safety harness.

- (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 automatically restrains the occupant's torso in the event of rapid deceleration.

(3) The safety harness for each pilot seat may incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight controls.

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

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

- (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.

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

Spare electrical fuses.

12. 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—

Lavatory fire extinguisher.

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

13. (1) Where areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane, such areas shall be marked as specified in Second Schedule set out in these Regulation.

Marking of break-in points.

(2) The colour of the markings shall be red or yellow, and where necessary they shall be outlined in white to contrast with the background.

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

14. (1) Crash-protected flight recorders shall comprise of—

Flight recorders.

- (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) As per the Third Schedule of these Regulations, image and data link information may be recorded on either the CVR or the FDR.

(3) Lightweight flight recorders shall comprise of —

- (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) As per the Third Schedule of these Regulations, image and data link information may be recorded on either the CARS or the ADRS.

(5) The parameters to be recorded are listed in the Third Schedule to these Regulations.

15. (1) A turbine-engined aeroplane of a maximum certificated take-off mass of 5 700 kg 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—

Flight data recorders or FDR, and aircraft data recording systems – applicability.

- (a) an FDR which shall record at least the first 16 parameters listed in table A8-1 in the Third Schedule to these Regulations;
- (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 item 2.2.3 of the Third Schedule to these Regulations; or
- (c) an ADRS which shall record at least the first 7 parameters listed in table A8-3 in the Third Schedule to these Regulations.

(2) A turbine-engined aeroplane of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness was first issued on or after 1st January 2016 may be equipped—

- (a) an FDR which may record at least the first 16 parameters listed in table A8-1 in the Third Schedule to these Regulations; or

- (b) a class C AIR or AIRS which may record at least the flight path and speed parameters displayed to the pilot or pilots; as defined in item 2.2.3 of the Third Schedule to these Regulations; or
 - (c) an ADRS which may record at least the first 7 parameters listed in table A8-3 in Third Schedule to these Regulations.
- (3) An aeroplane of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 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 to these Regulations.
- (4) An aeroplane of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 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 to these Regulations.
- (5) A multi-engined turbine engined aeroplane of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1st January 1990 may be equipped with an FDR which may record at least the first 16 parameters listed in table A8-1 of the Third Schedule to these Regulations.
- (6) A turbine-engined aeroplane, for which the individual certificate of airworthiness was first issued before 1st January 1989, with a maximum certificated take-off mass of over 5 700 kg, 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 of these Regulations.
- (7) A turbine-engined aeroplane, 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 5 700 kg, except those in subregulation (8), shall be equipped with an FDR which may record at least the first nine parameters listed in table A8-1 of the Third Schedule to these Regulations.
- (8) A turbine-engined aeroplane, 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 27 000 kg 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 to these Regulations.
- (9) A turbine-engined aeroplane, for which the individual certificate of airworthiness was first issued before 1st January 1987, with a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate

national authority after 30th September 1969 may 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 to these Regulations, 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) An aeroplane of a maximum certificated take-off mass of over 5 700 kg 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 to these Regulations.

(11) An aeroplane of a maximum certificated take-off mass of over 5 700 kg 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 to these Regulations.

(12) An aeroplane of a maximum certificated take-off mass of over 5 700 kg 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 A8-1 of the Third Schedule to these Regulations.

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

Recording technology.

17. A 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 15 (5) for which the FDR shall retain the information recorded during at least the last thirty minutes of its operation, and in addition sufficient information from the preceding take-off for calibration purpose.

Duration of FDR.

18. (1) A turbine-engined aeroplane of a maximum certificated take-off mass of over 2 250 kg, up to and including 5 700 kg, 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.

Cockpit voice recorders and cockpit audio recording systems – applicability.

(2) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg 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 may be equipped with either a CVR or a CARS.

(3) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1st January 1987 shall be equipped with a CVR.

(4) 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 27 000 kg that are of types for which the prototype was certificated by the appropriate national Authority after 30th September 1969 shall be equipped with a CVR.

(5) 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 5 700 kg up to and including 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30th September 1969 may be equipped with a CVR.

19. CVRS and CARS shall not use magnetic tape or wire.

CVR-recording
technology.
CVR- duration.

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

(2) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1st January 2022 shall be equipped with a CVR which shall retain the information recorded during at least the last 25 hours of its operation.

(3) 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.

21. (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.

CVR - alternate
power source.

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

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

(4) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg 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.

(5) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1st January 2018 may be provided with an alternate power source, as defined in subregulation (1) that powers at least one CVR.

22. (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) shall record 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 after 1st January 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of the Third Schedule to these Regulations 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 5.1.2 of the Third Schedule to these Regulations may record the data link communications messages on a crash-protected flight recorder.

(4) DLR systems or DLRS shall have recording inspection intervals of two years; subject to the approval from the Authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.

23. The minimum recording duration shall be equal to the duration of the CVR.

24. Data link recording shall be able to be correlated to the recorded cockpit audio.

25. (1) All aeroplanes of a maximum take-off mass of over 27 000 kg 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 defined in Third Schedule of these Regulations.

(2) All aeroplanes of a maximum take-off mass of over 5 700 kg upto and including 27, 000kg for which the application for type

Data link recorders-
applicability.

Data link recorders
– duration.

Data link recorders
– correlation.

Flight crew-machine
interface recordings.

certification is submitted to a Contracting State on or after 1st January 2023 may 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 defined in Third Schedule of these Regulations.

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

26. (1) The Flight recorders shall —

Flight recorders —
general.

- (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; and
- (b) meet the prescribed crashworthiness and fire protection specifications.

(2) The Flight recorder referred to subregulation (1) —

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

(3) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted annually to ensure the continued serviceability of the recorders in accordance with the Third Schedule to these Regulations.

(4) 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.

27. (1) CVR systems or CARS shall have recording inspection intervals of one year; subject to the approval from the Authority. This period may be extended to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring.

Inspection of
cockpit voice
recorders.

(2) Recording inspections shall be carried out as follows —

- (a) 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; and

- (b) 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.

28. All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to the Authority on or after 1st January 2016, and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders, FDR/CVR.

Combination recorders.

(2) All aeroplanes of a maximum certificated take-off mass of over 15 000 kg for which the application for type certification is submitted to the Authority on or after 1st January 2016, and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders, FDR/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 5 700 kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders, FDR/CVR.

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

(6) All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5 700 kg or less, required to be equipped with an FDR or a CVR, may alternatively be equipped with one combination recorder, FDR/CVR.

29. (1) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg and authorized to carry more than nineteen passengers for which the application for type certification is submitted to the Authority on or after 1st January 2021, shall be equipped with a means approved by the Authority, to recover flight recorder data and make it available in a timely manner.

Flight recorder data recovery.

(2) In approving the means to make flight recorder data available in a timely manner, the Authority shall take into account 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.

30. (1) All aeroplanes when operated as VFR flights shall be equipped with —

All aeroplanes operated as VFR flights.

- (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 required by these Regulations.

31. (1) All seaplanes for all flights shall be equipped with —

All aeroplanes on flights over water.

- (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 93 km or 50 NM away from the shore, in the case of landplanes operated in accordance with the enroute one-engine inoperative or enroute two engine inoperative requirements as per the Civil Aviation (Operation of Aircraft for – Commercial Air Transport Aeroplanes) Regulations;
- (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 whose use it is provided.

(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.

32. (1) Notwithstanding regulation 31, 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 740 km or 400 NM, whichever is the lesser, away from land suitable for making an emergency landing in the case of aircraft operated in accordance with enroute one-engine inoperative or enroute two engine inoperative requirements as per the Civil Aviation (Operation of Aircraft for – Commercial Air Transport Aeroplanes) Regulations and thirty minutes or 185 km or 100 NM, 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 27 000 kg, 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.

(2) Each life jacket and equivalent individual flotation device, when carried in accordance with regulation 31, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of regulation 31(2) (c) are met by the provision of individual flotation devices other than life jackets.

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

All aeroplanes on long-range over-water flights.

All Aeroplanes on flights over designated land areas.

34. (1) Approximate altitude in the Standard Atmosphere corresponding to the value of absolute pressure used in this text is as follows —

All aeroplanes on high altitude flights.

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 Civil Aviation (Operation of Aircraft – Commercial Air Transport Aeroplanes) Regulations.

(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 Civil Aviation (Operation of Aircraft – Commercial Air Transport Aeroplanes) Regulations.

(4) Pressurized aeroplanes newly introduced into service on or after 1 July 1962 and 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 pressurization.

(5) Pressurized aeroplanes introduced into service before 1 July 1962 and intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa may be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

(6) 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 and for which the individual certificate of airworthiness is first issued on or after 9th November 1998, shall be provided with automatically deployable oxygen equipment to satisfy the requirements of the Civil Aviation (Operation of Aircraft – Commercial Air Transport Aeroplanes) Regulations.

(7) An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if

operated at flight altitudes at which the atmospheric pressure is more than 376 hPa cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, and for which the individual certificate of airworthiness was first issued before 9 November 1998, should be provided with automatically deployable oxygen equipment to satisfy the requirements of the Civil Aviation (Operation of Aircraft for Commercial Air Transport) Regulations.

(8) The total number of oxygen dispensing units in subregulation (6) and subregulation (7) shall exceed the number of passenger and cabin crew seats by at least 10 per cent.

35. All 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.

All aeroplanes in icing conditions.

36. All aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with—

All aeroplanes operated in accordance with instrument flight rules.

- (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.

37. (1) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg newly introduced into service after 1 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.

All aeroplanes over 5 700 kg —
emergency power supply for electrically operated attitude indicating instruments.

(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 are 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 or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

38. (1) All aeroplanes when operated at night shall be equipped with—

All aeroplanes when operated at night.

- (a) all equipment specified in regulation 36;
- (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 for lights meeting the requirements of the Civil Aviation (Rules of the Air) Regulations for navigation lights are contained in the Fourth Schedule to these Regulations.

(3) The general characteristics of lights are specified in the Fourth Schedule to these Regulations.

39. Pressurized 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.

Pressurized aeroplanes when carrying passengers — weather radar.

40. (1) All aeroplanes intended to be operated above 15 000 m or 49 000 ft shall carry equipment to measure and indicate continuously the dose rate of total cosmic radiation received, being

All aeroplanes operated above 15 000 m or 49 000 ft — radiation

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.

41. All aeroplanes with speed limitations expressed in terms of Mach number shall be equipped with a Mach number indicator.

42. (1) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized 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 implement database management procedures that ensure the timely distribution and update of current terrain and obstacle data to the ground proximity warning system.

(3) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers may 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 turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five, but not more than nine, passengers for which the individual certificate of airworthiness is first issued on or after 1st January 2026, shall be equipped with a ground proximity warning system which provides the warnings of 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) All piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized 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.

(6) 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.

(7) A ground proximity warning system shall provide, unless otherwise specified herein, warnings of the following circumstances—

- (a) excessive descent rate;
- (b) excessive terrain closure rate;
- (c) excessive altitude loss after take-off or go-around;

indicator.

Mach number indicator.

Aeroplanes required to be equipped with ground proximity warning systems or GPWS.

(d) unsafe terrain clearance while not in landing configuration—

(i) gear not locked down; and

(ii) flaps not in a landing position;

(e) excessive descent below the instrument glide path.

43. (1) All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1st January 1981 shall be equipped with a forward or rearward facing seat, within 15 degrees of the longitudinal axis of the aeroplane, fitted with a safety harness for the use of each cabin crew member required to comply with the Civil Aviation (Operation of Aircraft for Commercial Air Transport) Regulation in respect of emergency evacuation.

Aeroplanes carrying passengers — cabin crew seats.

(2) All aeroplanes for which the individual certificate of airworthiness was first issued before 1st January 1981 may be equipped with a forward or rearward facing seat, within 15 degrees of the longitudinal axis of the aeroplane, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of the Civil Aviation (Operation of Aircraft for Commercial Air Transport) Regulations in respect of emergency evacuation.

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

44. (1) All aeroplanes shall carry an automatic ELT.

Emergency locator transmitter or ELT.

(2) Except as provided for in subregulation (3), all aeroplanes authorized to carry more than 19 passengers shall be equipped with at least one automatic ELT or two ELTs of any type.

(3) All aeroplanes authorized to carry more than nineteen 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 regulation 45.

(4) In the case where the requirements for Regulations 45 are met by another system no automatic ELT is required.

(5) Except as provided for in subregulation (6), all aeroplanes authorized to carry 19 passengers or less shall be equipped with at least one ELT of any type.

(6) All aeroplanes authorized 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 ELT.

(7) ELT equipment carried to satisfy the requirements of this regulation shall operate in accordance with the relevant provisions of the Civil Aviation (Communication Systems) Regulations.

45. (1) As of 1st January 2025 all aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual

Location of aeroplane in

certificate of airworthiness is first issued on or after 1st January 2024, 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 First Schedule of these Regulations applicable to location of aircraft in distress.

(2) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1st January 2023, may autonomously transmit information from which a position can be determined at least once every minute, when in distress, in accordance with the First Schedule of these Regulations applicable to location of aircraft in distress.

(3) The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the Authority in the applicable technical guidance material.

46. (1) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nineteen passengers shall be equipped with an airborne collision avoidance system or ACAS II.

(2) An airborne collision avoidance system shall operate in accordance with the relevant provisions of the applicable Civil Aviation (Aeronautical Telecommunications – Surveillance and Collision Avoidance Systems) Regulations.

47. (1) All aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of the applicable Civil Aviation (Aeronautical Telecommunications – Surveillance and Collision Avoidance Systems) Regulations.

(2) All aeroplanes for which the individual certificate of airworthiness is first issued after 1st January 2009 certificate of airworthiness shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m or 25 ft, or better.

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

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

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

49. (1) All turbo-jet aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than

distress.

Aeroplanes required to be equipped with airborne collision avoidance system or ACAS II.

Requirements for pressure-altitude reporting transponders.

Microphones.

Turbo-jet aeroplanes — forward-looking

nine passengers may be equipped with a forward-looking wind shear warning system. wind shear warning system.

(2) A forward-looking wind shear warning system may 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 also 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.

50. For approval in accordance with the applicable Civil Aviation (Operation of Aircraft – Commercial Air Transport Aeroplanes) Regulations, all aeroplanes operated by a single pilot under the IFR or at night shall be equipped with — All aeroplanes operated by a single pilot under IFR or at night.

- (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.

51. All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg, for which the individual certificate of airworthiness is first issued on or after 1st January 2026, shall be equipped with a runway overrun awareness and alerting system (ROAAS). Turbine aeroplane - runway overrun awareness and alerting system (ROAAS).

52. Notwithstanding sub regulation 32(1) to 32(4), where aeroplanes are equipped with automatic landing systems, a head-up display (HUD) or equivalent displays, enhanced vision systems (EVS), synthetic vision systems (SVS) or combined vision systems (CVS), or any combination of those systems into a hybrid system, the operator shall use such systems for the safe operation of an aeroplane in accordance with criteria established by the Authority. Aeroplanes equipped with automatic landing systems, a head-up display or HUD or equivalent displays, enhanced vision systems or EVS, synthetic vision systems or SVS or combined vision systems or CVS. EFB equipment.

53. 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.

54. (1) Where EFBs are used on board an aeroplane the operator shall — EFB functions.

- (a) assess the safety risk(s) 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.

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

55. When issuing a specific approval for the use of EFBs, the Authority shall ensure that—

EFB specific approval.

- (a) the EFB equipment and its associated installation hardware, including interaction with aeroplane systems if applicable, meet the appropriate airworthiness certification requirements;
- (b) the operator has assessed the safety risks associated with the operations supported by the EFB function(s);
- (c) the operator has established requirements for redundancy of the information (if appropriate) contained in and displayed by the EFB function(s);
- (d) the operator has established and documented procedures for the management of the EFB function(s) 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(s).

56. An operator shall not conduct commercial air ambulance operations unless the Aeroplane is equipped with the required instruments, equipment and flight documents as per these regulations and as prescribed and approved by the Authority.

Air Ambulance - aeroplanes.

PART IV—AEROPLANE COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

57. (1) An aeroplane shall be provided with radio communication equipment capable of—

Communication equipment.

- (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 Authority and/or the Communications Authority of Kenya.

(2) The requirements of subregulation (1) are considered fulfilled if 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) For operations where communication equipment is required to meet required communication performance or RCP specification for performance-based communication or PBC, an aeroplane 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 listed in the flight manual or other aeroplane documentation approved by the State of Design or the Authority; and
- (c) have information relevant to the aeroplane 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 aeroplanes mentioned in subregulation (4), adequate provisions exist for

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with the applicable 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 RCP specifications.

58. (1) An aeroplane shall be provided with navigation equipment which will enable it to proceed —

Navigation equipment.

- (a) in accordance with its operational flight plan; and
- (b) in accordance with the requirements of air traffic services; except when, if 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.

59. (1) For operations where a navigation specification for PBN has been prescribed, an aeroplane shall, in addition to the requirements specified in regulation 53 —

Performance-based navigation or PBN.

- (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 the Design or the Authority; and
- (c) have information relevant to the aeroplane navigation specification capabilities included in the MEL.

(2) 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 the appropriate navigation specifications.

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

60. For flights in defined portions of airspace where, based on regional air navigation agreement, MNPS are prescribed, an aeroplane shall be provided with navigation equipment which

Minimum navigation performance Specifications or MNPS.

- (a) continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and
- (b) has been authorized by the Authority for the MNPS operations concerned.

61. (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 —

Reduced vertical separation minimum or RVSM.

- (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 Authority shall issue a specific approval for RVSM operations.

(2) Prior to granting the RVSM specific approval required in accordance with subregulation (1) the Authority shall be satisfied that—

- (a) the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Fifth Schedule of these Regulations;
- (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 stated in the operations manual or appropriate crew guidance.

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

- (a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with the applicable 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) The Authority that has issued an RVSM specific approval to an operator 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 1 000 flight hours per aeroplane, whichever period is longer.

(6) Subject to subregulation (5), if the operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

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

(8) The Authority shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM specific approval.

(9) 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 Regulations 59 and 60 and subregulation (1)(a) in this regulation.

62. (1) On flights in which it is intended to land in IMC, 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.

Navigation
Equipment -
Instrument
Meteorological
Conditions or 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.

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

Surveillance
equipment.

(2) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS),

an aeroplane 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 the Authority; and
- (c) have information relevant to the aeroplane 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 aeroplanes mentioned in subregulation (2), adequate provisions exist for—

- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the applicable 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.

64. 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.

Installation.

65. An operator shall not conduct commercial air ambulance operations unless the aeroplane is equipped with the required communication, navigation and surveillance equipment as per these regulations and as prescribed and approved by the Authority.

Air ambulance
aeroplane-
communication,
navigation and
surveillance.

66. (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.

Electronic navigation data management.

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

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

PART V — GENERAL AVIATION — AEROPLANES (GENERAL AVIATION OPERATIONS)

Aeroplane Instruments and Equipment

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

Aeroplanes on all flights.

(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 2 years of age; and
 - (ii) each seat and restraining belts for each berth.
- (d) the following manuals, charts and information—
 - (i) the flight manual or other documents or information concerning any operating limitations prescribed for the aeroplane by the Authority, required for the application of Aeroplane performance operating limitations in accordance with the applicable Civil Aviation (Operation of Aircraft - General Aviation - Aeroplane) Regulations;
 - (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;
 - (iv) procedures in accordance with the applicable Civil Aviation (Rules of the Air) Regulations, for pilots-in-command of intercepted aircraft;
 - (v) visual signals for use by intercepting and intercepted aircraft in accordance with the applicable Civil Aviation (Rules of the Air) Regulations; and
 - (vi) the journey log book 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.
- (4) 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 Authority; and
 - (b) not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.
- (5) Aeroplanes on all flights shall be equipped with the ground air signal codes for search and rescue purposes.
- (6) All aeroplanes on all flights shall be equipped with a safety harness for each flight crew member seat.
68. (1) Where areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane, such areas shall be marked as specified in Second Schedule of these Regulations.
- (2) The colour of the markings shall be red or yellow, and where necessary shall be outlined in white to contrast with the background.
- (3) Where the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.
69. (1) All aeroplanes when operated as VFR flights shall be—
- (a) equipped with a means of measuring and displaying —
- Marking of break-in points.
- VFR operations.

(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.	
70. (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 sub regulation (1) above, the term "seaplanes" includes amphibians operated as seaplanes.	Aeroplanes on flights over water — seaplanes.
71. All single-engined landplanes includes amphibians operated as landplanes — (a) when flying en route 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 whose use it is provided.	Landplanes.
72. (1) All aeroplanes operated on extended flights over water shall be equipped with, at a minimum, one life jacket or equivalent individual floatation device for each person on board, stowed in a	Aeroplanes on extended flights over water.

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) Based upon the assessment of these risks, the pilot-in-command shall, in addition to the equipment required in subregulation (1), 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 applicable Civil Aviation (Rules of the Air) Regulations.

73. Aeroplanes, when operated across land areas which have been designated by the state concerned as areas in which search and rescue would be especially 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 flights over designated land areas.

74. (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 Civil Aviation (Operation of Aircraft – General Aviation Aeroplanes) Regulations.

Aeroplanes on high altitude flights.

(2) Pressurized aeroplanes for which the individual certificate of airworthiness was first issued on or after 1 January 1990 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 pressurization.

(3) Pressurized aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 1990 intended to be

operated at flight altitudes at which the atmospheric pressure is less than 376 hPa should be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

75. (1) All aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be—

- (a) equipped with a means of measuring and displaying;
 - (i) magnetic heading 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) stabilized aircraft heading;
 - (vii) whether the supply of power to the gyroscopic instruments is adequate;
 - (viii) the outside air temperature; and
 - (ix) rate-of-climb and descent;
- (b) equipped with, or shall carry, a means of measuring and displaying time in hours, minutes and seconds; and
- (c) equipped with such additional instruments or equipment as may be prescribed by the Authority.

(2) The requirements above 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.

76. Aeroplanes, when operated at night, shall be equipped with—

- (a) the equipment specified in the regulation 72;
- (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) for the purpose of sub regulation 1(b) above specifications for lights meeting the requirements of Civil Aviation (Rules of the Air) Regulations for navigation lights are

All aeroplanes operated in accordance with IFR.

Aeroplanes when operated at night.

contained in the Sixth Schedule of these Regulations, the general characteristics of which are specified in regulation 4 (11) of these Regulations;

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

77. A person shall not operate an aeroplane unless there is carried on board a document attesting noise certification in accordance with the Civil Aviation (Airworthiness) Regulations.

Aeroplanes complying with the noise certification.

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

Mach number indicator.

79. (1) Aeroplanes required to be equipped with ground proximity warning system or GPWS.

Aeroplanes required to be equipped with ground proximity warning system or GPWS.

(2) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers may be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

(3) All piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers may be equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

(4) 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.

(5) A ground proximity warning system shall provide, at a minimum, warnings of at least the following circumstances—

- (a) excessive descent rate;
- (b) excessive altitude loss after take-off or go-around; and
- (c) unsafe terrain clearance;

- (d) unsafe terrain clearance while not in landing configuration;
- (6) A ground proximity warning system may provide, as a minimum, warnings of at least the following circumstances—
 - (a) excessive descent rate;
 - (b) excessive terrain closure rate;
 - (c) excessive altitude loss after take-off or go-around;
 - (d) unsafe terrain clearance while not in landing configuration—
 - (i) gear not locked down;
 - (ii) flaps not in a landing position;
 - (e) excessive descent below the instrument glide path.

(7) A ground proximity warning system installed in turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5,700 kg or authorized to carry more than nine passengers for which the individual certificate of airworthiness was first issued after 1st January 2011 shall provide, as a minimum, warnings of at least the following circumstances—

- (a) excessive descent rate;
- (b) excessive terrain closure rate;
- (c) excessive altitude loss after take-off or go-around;
- (d) unsafe terrain clearance while not in landing configuration;
 - (i) gear not locked down;
 - (ii) flaps not in a landing position; and
- (e) excessive descent below the instrument glide path.

80. (1) All Aeroplanes shall carry an automatic ELT.

Emergency Locator Transmitter or ELT.

(2) Except as provided for in subregulation (3) and (4), all aeroplanes shall be equipped with at least one ELT of any type.

(3) All aeroplanes for which the individual certificate of airworthiness is first issued after 1st July 2008 shall be equipped with at least one automatic ELT.

(4) ELT equipment carried to satisfy the requirements of this regulation shall operate in accordance with the applicable Civil Aviation (Communication Systems) Regulations.

81. (1) Aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of the applicable Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

Aeroplanes required to be equipped with pressure altitude reporting transponder.

(2) Unless exempted by the Authority, aeroplanes operating as VFR flights shall be equipped with a pressure-altitude reporting

transponder which operates in accordance with the relevant provision of the applicable Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.

82. When operating under IFR, all flight crew members required to be on flight deck duty shall communicate through boom or throat microphones below the transition level or altitude.

Microphones.

83. (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 established by the Authority.

Aeroplanes equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS.

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

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

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

Flight recorders.

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

(2) As per the Seventh Schedule of these Regulations, image and data link information shall be recorded on either the CVR or the FDR.

(3) Lightweight flight recorders comprise 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) As per the Seventh Schedule of these Regulations, image and data link information may be recorded on either the CARS or the ADRS.

(5) Detailed requirements on flight recorders and parameters to be recorded are provided in the Seventh Schedule to these Regulations.

85. (1) All turbine-engined aeroplanes with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of 5,700 kg or less for which the individual certificate of airworthiness is first issued on or after 1st January 2016 may be equipped with—

- (a) an FDR which shall record at least the first 16 parameters in table A2.3-1 of the Seventh Schedule to these Regulations;
- (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 defined in 2.2.2 of Seventh Schedule to these Regulations; or
- (c) an ADRS which shall record at least the first 7 parameters listed in table A2-3.3 in the Seventh Schedule to these Regulations.

(2) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg 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 Seventh Schedule to these Regulations.

(3) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1st January 2023 may be equipped with an FDR capable of recording at least the 82 parameters listed in table A2.3-1 of the Seventh Schedule to these Regulations.

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

87. All FDRs shall retain the information recorded during at least the last 25 hours of their operation.

88. All turbine-engined aeroplanes with a seating configuration of more than 5 passenger seats and a maximum certificated take-off

FDR and ADRS – applicability.

FDR and ADRS – recording technology.

FDR and ADRS – duration.

CVR and CARS – applicability.

mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot may be equipped with either a CVR or a CARS.

89. CVRs and CARS shall not use magnetic tape or wire.

CVR and CARS –
recording
technology.
CVR and CARS –
duration.

90. (1) All CVRs shall retain the information recorded during at least the last 2 hours of their operation.

(2) 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.

91. (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 Seventh Schedule to these Regulations and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.

Data link recorders
– applicability.

(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 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 to these Regulations 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 5.1.2 of the Seventh Schedule to these Regulations may record the data link communications messages on a crash-protected flight recorder.

92. The minimum recording duration shall be equal to the duration of the CVR.

Data link recorders
– duration.

93. Data link recording shall allow correlation with the recorded cockpit audio.

Data link recorders
– correlation.

94. (1) Flight recorders shall 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.

(2) Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

(3) Flight recorders shall not be switched off during flight time.

(4) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident.

(5) The flight recorders shall not be reactivated before their disposition as determined in accordance with the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations.

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

(7) The pilot-in-command's responsibilities regarding the retention of flight recorder records are contained in Regulation 99.

95. 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.

96. (1) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders in accordance with the Seventh Schedule to these Regulations.

(2) Procedures for the inspections of the flight recorder systems shall be in accordance with Seventh Schedule to these Regulations.

97. The documentation requirement concerning FDR and ADRS parameters provided by operators to accident investigation authorities may be in electronic format and take account of industry specifications.

98. Where portable EFBs are used on board an aeroplane, the pilot-in-command or the operator or the owner shall ensure that they do not affect the performance of the aeroplane systems, equipment or the ability to operate the aeroplane.

99. (1) Where EFBs are used on board an aeroplane the pilot-in-command or the owner or the operator shall—

- (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

Flight recorders —
general.

Flight recorder
records.

Continued
serviceability.

Flight recorder
electronic
documentation.

EFBs- equipment.

EFBs – functions.

- (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.

(2) The Authority shall issue a specific approval for the operational use of EFB functions used for the safe operation of aeroplanes.

100. When issuing a specific approval for the use of EFBs, the Authority shall ensure that—

EFB specific approval.

- (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 or owner has assessed the risks associated with the operations supported by the EFB functions;
- (c) the operator or owner has established requirements for redundancy of the information where applicable contained in and displayed by the EFB functions;
- (d) the operator or owner has established and documented procedures for the management of the EFB functions including any databases it may use; and
- (e) the operator or owner has established and documented the procedures for the use of, and training requirements for, the EFB functions.

101.(1) An aeroplane, 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.

Aeroplane operated under an Article 83 bis agreement.

(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 such as ramp checks.

Aeroplane Communication, Navigation and Surveillance Equipment

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

Communication equipment.

(2) Such equipment shall be capable of conducting two-way communication with those aeronautical stations and on those frequencies prescribed by the Communications Authority of Kenya or the Authority.

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

(4) When compliance with the 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 any one will not result in failure of any other.

(5) An aeroplane to be operated in accordance with VFR, but as a controlled flight, shall, unless exempted by the Authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the Authority.

(6) An aeroplane to be operated on a flight to which the provisions of Regulations 69(1) or 70 shall apply, unless exempted by the Authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the Authority.

(7) The radio communication equipment required in accordance with subregulation (1) to (6) above these Regulations shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

(8) For operations where communication equipment is required to meet an RCP specification for PBC, an aeroplane shall, in addition to the requirements specified in subregulation (1) to (7)—

- (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 listed in the flight manual or other aeroplane documentation approved by the State of Design and accepted by the Authority; and
- (c) where the aeroplane is operated in accordance with an MEL, have information relevant to the aeroplane RCP specification capabilities included in the MEL.

(9) The aeroplane owner or operator shall establish criteria for operations where an RCP specification for PBC has been prescribed.

(10) In establishing criteria for operations where an RCP specification for PBC has been prescribed, the operator or owner shall establish—

- (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 complying with the RCP specifications.

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

Navigation
equipment- General.

- (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 will enable the aeroplane to navigate in accordance with these Regulations.

104.(1) For operations where a navigation specification for PBN has been prescribed, an aeroplane shall, in addition to the requirements specified in regulation 99—

Navigation
equipment
Performance-based
navigation.

- (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 the Authority; and
- (c) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane navigation specification capabilities included in the MEL.

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

(3) In establishing criteria for operations where a navigation specification for PBN has been prescribed, the Authority shall require that the operator or owner establish—

- (a) normal and abnormal procedures including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with the appropriate navigation specifications;
- (c) training for relevant personnel consistent with the intended operations; and
- (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with the appropriate navigation specifications.

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

105. For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, MNPS are prescribed, an aeroplane 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 authorized by the Authority for the MNPS operations concerned.

106.(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) Prior to granting the RVSM specific approval required in accordance with subregulation (1) (b) the Authority shall be satisfied that —

Navigation equipment Minimum navigation performance specifications.

Navigation equipment Reduced vertical separation minimum.

- (a) the vertical navigation performance capability of the aeroplane satisfies the requirements specified in the Eighth Schedule of these Regulations;
 - (b) the owner or operator has instituted appropriate procedures in respect of continued airworthiness for maintenance and repair practices, reliability monitoring and aircraft maintenance programmes approved by the Authority; and
 - (c) the owner or 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 stated in the approved operations manual or appropriate crew guidance.
- (4) The Authority shall ensure that, in respect of those aeroplanes mentioned in subregulation (1), adequate provisions exist for—
- (a) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with 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) For the Authority to issue an RVSM specific approval, the owner or operator shall ensure that a minimum of two aeroplanes of each aircraft type grouping of the owner/operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer.
- (6) Where an owner or operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.
- (7) The Authority shall take appropriate action in respect of aircraft and owners or operators found to be operating in RVSM airspace without a valid RVSM specific approval in accordance with these Regulations and the procedures specified by the Authority.
- 107.(1) On flights in which it is intended to land in IMC, 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.
- (2) The equipment referred to subregulation (1) shall be capable of providing such guidance for each aerodrome at which it is intended to land in IMC and for any designated alternate aerodromes.
- 108.(1) An aeroplane shall be provided with surveillance equipment which shall enable it to operate in accordance with the requirements of air traffic services.

Navigation
equipment
Instrument
meteorological
conditions.

Surveillance
equipment.

(2) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance, an aeroplane 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 Authority; 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 establish criteria for operations where an RSP specification for PBS has been prescribed.

(4) In establishing criteria for operations where an RSP specification for PBS has been prescribed, the Authority shall require that the operator or owner establish—

- (a) normal and abnormal procedures, including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;
- (c) a training programme for relevant personnel consistent with the intended operations; and
- (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.

(5) The Authority shall ensure that, in respect of those aeroplanes mentioned in subregulation (2), adequate provisions exists as prescribed by the Authority for—

- (a) submitting 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 VI—GENERAL AVIATION — AEROPLANES (LARGE
AND TURBOJET AEROPLANES)

Aeroplane Instruments and Equipment

109.(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 Authority of the aeroplane which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative. General.

(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.

110.(1) In addition to the requirements contained in Regulation 63 (2), an aeroplane shall be equipped with— Aeroplanes on all flights.

- (a) accessible and adequate medical supplies appropriate to the number of passengers the aeroplane is authorized to carry;
- (b) medical supplies may 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 may 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 Civil Aviation (Operation of Aircraft – General Aviation) 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 as per the Civil Aviation (Operations of Aircraft – General Aviation) Regulations, 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 Civil Aviation (Operation of Aircraft– General Aviation) Regulations.

111. The Flight recorders – FDR are applicable to—

- (a) all aeroplanes of a maximum certificated take-off mass of over 5,700 kg 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 Seventh Schedule to these Regulations;
- (b) all aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1st January 1989 shall be equipped with an FDR which shall record at least 32 parameters listed in table A2.3-1 of the Seventh Schedule to these Regulations; and
- (c) all aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1st January 1989, may be equipped with an FDR which shall record at least 16 parameters listed in table A2.3-1 of the Seventh Schedule to these Regulations.

112.(1) The Cockpit voice recorders are applicable to—

- (a) all turbine-engined aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with a CVR;
- (b) all aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1st January 1987 shall be equipped with a CVR;

Flight recorders –
FDR.

Cockpit voice
recorders.

- (c) all aeroplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1987, may be equipped with a CVR.

(2) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1st January 2022 shall be equipped with a CVR capable of retaining the information recorded during at least the last 25 hours of its operation.

113. All aeroplanes of a maximum certificated take-off mass over 5,700 kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders, FDR/CVR.

Combination recorders.

114.(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.

Aeroplanes on long-range over-water flights.

(2) The operator shall take into account the operating environment and conditions such as, but not limited to, sea state and sea and air temperatures, the distance from land suitable for making an emergency landing, and the availability of search and rescue facilities.

(3) subject to subregulation (2), based upon the assessment of the risks, the operator shall, in addition to the equipment required in regulation 69, 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 69, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of regulation 69(1) is met by the provision of individual flotation devices other than life jackets.

115.(1) Pressurized aeroplanes operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped

Aeroplanes for which the individual certificate of

with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

(2) An 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 Civil Aviation (Operation of Aircraft – General Aviation) Regulations.

(3) An 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 Civil Aviation (Operation of Aircraft – General Aviation) Regulations.

116. 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.

117. In addition to the requirements contained in the Civil Aviation (Operation of Aircraft – General Aviation) Regulations, aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with two independent altitude measuring and display systems.

118. (1) Aeroplanes of a maximum certificated take-off mass of over 5,700 kg newly introduced to service after 1 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) 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.

airworthiness was first issued before 1 January 1990.

Aeroplanes in icing conditions.

Aeroplanes operated in accordance with the instrument flight rules.

Aeroplanes over 5 700 kg — emergency power supply for electrically operated attitude indicating instruments.

(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 or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

119. Pressurized 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.

Pressurized aeroplanes when carrying passengers - weather-detecting equipment.

120.(1) Aeroplanes intended to be primarily operated above 15,000 m or 49,000 ft may carry equipment to measure and indicate continuously the dose rate of total cosmic radiation being received, the total of ionizing and neutron radiation of galactic and solar origin and the cumulative dose on each flight.

Aeroplanes operated above 15 000 m or 49 000 ft radiation indicator.

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

121.(1) Aeroplanes for which the individual certificate of airworthiness was first issued before 1st January 1981 shall be equipped with a forward or rearward facing seat, within 15 degrees of the longitudinal axis of the aeroplane, fitted with a safety harness for the use of each cabin crew member in compliance with the Civil Aviation (Operation of Aircraft – General Aviation) Regulations in respect of emergency evacuation.

Aeroplanes carrying passengers — cabin crew seats.

(2) Aeroplanes for which the individual certificate of airworthiness was first issued before 1st January 1981 should 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 Civil Aviation (Operation of Aircraft – General Aviation) Regulations in respect of emergency evacuation.

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

122.(1) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg, or authorized to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 24th November 2005, may be equipped with ACAS II.

Aeroplanes required to be equipped with an airborne collision avoidance system or ACAS.

(2) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 15 000 kg, or authorized to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 1st January 2007, shall be equipped with ACAS II.

(3) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg but not exceeding 15 000 kg, or authorized to carry more than 19 passengers, for which the individual

airworthiness certificate is first issued after 1st January 2008, may be equipped with ACAS II.

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

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

Aeroplane Communication, Navigation and Surveillance Equipment

125. In addition to the requirements of regulation 98, 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 Authority.

126. 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.

127. (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 owner or operator shall ensure that there is continuous monitoring both the process and products referred to subregulation (1).

(3) The owner or operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all necessary aeroplanes.

PART VII—HELICOPTER OPERATIONS – COMMERCIAL AIR TRANSPORT

Helicopter Instruments, Equipment and Flight Documents.

128. (1) A helicopter operator shall ensure a certified true copy of the air operator certificate specified in regulation 10, and a copy of

Aeroplanes required to be equipped with pressure-altitude reporting transponder.
Microphones.

Communication equipment.

Installation.

Electronic navigation data management.

General.

the operations specifications relevant to the helicopter type, issued in conjunction with the certificate is carried on board. 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.

(2) The operator shall include in the operations manual a minimum equipment list (MEL) approved by the Authority, 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.

(3) Where the Authority is not the State of Registry, the Authority shall ensure that the helicopter's MEL is in compliance with the airworthiness requirements applicable in the State of Registry.

(4) 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 and the manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe Human Factors principles. The manual shall be easily accessible to the flight crew during all flight operations.

129.(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.

Helicopter operated under an Article 83 bis agreement.

(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.

130.(1) 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.

All helicopters on all flights.

(2) A helicopter shall carry —

- (a) the operations manual prescribed in regulation 12 of the civil aviation (operation of aircraft- helicopter) regulations 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 Part IV of the civil aviation (operation of aircraft –helicopter) regulations 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.

131.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.

132.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.

133.(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.

Medical supplies.

Portable fire extinguishers.

Seat, berth and seat belt or safety harness.

(2) When 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.

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

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

- (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) location and use of life jackets or equivalent individual flotation devices where their carriage is required; and
- (d) location and method of opening emergency exits.

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

Spare electrical fuses.

136. 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

Lavatory fire extinguisher

- (a) meet the applicable minimum performance requirements of the Authority; and
- (b) not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.

137.(1) If areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, such areas shall be marked as shown in Second Schedule set out in these Regulations.

Marking of break-in points.

(2) The colour of the markings shall be red or yellow, and where necessary, they shall be outlined in white to contrast with the background.

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

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

Flight recorders.

- (a) a flight data recorder (FDR);
- (b) a cockpit voice recorder (CVR);

(c) an airborne image recorder (AIR); and

(d) a data link recorder (DIR).

(2) As per the Ninth Schedule to these Regulations, image and data link information shall be recorded on either the CVR or the FDR.

(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 contained in Ninth Schedule to these Regulations.

(5) Lightweight flight recorders comprise one or more of the following—

(a) an aircraft data recording system or ADRS;

(b) a cockpit audio recording system or CARS;

(c) an airborne image recording system or AIRS; or

(d) a data link recording system or DLRS.

(6) As per the Ninth Schedule to these Regulations, image and data link information may be recorded on either the CARS or the ADRS.

139. The FDR and ADRS parameters to be recorded shall be those listed in the Ninth Schedule to these Regulations.

FDR and ADRS.

140.(1) All helicopters of a maximum certificated take-off mass of over 3 175 kg 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 listed in table A4-1 of the Ninth Schedule to these Regulations.

FDR and ADRS – applicability.

(2) All helicopters of a maximum certificated take-off mass of over 7 000 kg, 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 listed in table A4-1 of Ninth Schedule to these Regulations.

(3) All helicopters of a maximum certificated take-off mass of over 3 175 kg, up to and including 7 000 kg, 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 listed in table A4-1 of Ninth Schedule to these Regulations.

(4) All turbine-engined helicopters of a maximum certificated take-off mass of over 2 250 kg, up to and including 3 175 kg for which the application for type certification was submitted to a Contracting State on or after 1 January 2018 shall be equipped with—

- (a) an FDR which shall record at least the first 48 parameters listed in table A4-1 of Ninth Schedule to these Regulations; or
- (b) a Class C AIR or AIRS which shall record at least flight path and speed parameters displayed to the pilot(s), as defined in table A4-3 of Ninth Schedule of these Regulations; or
- (c) an ADRS which shall record the 7 parameters listed in table A4-3 of Ninth Schedule of these Regulations.

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

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

(6) All helicopters of a maximum certificated take-off mass of over 3 175 kg 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 listed in table A4-1 of Ninth Schedule of these Regulations.

(7) All helicopters of a maximum certificated take-off mass of over 3 175 kg 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 first 53 parameters listed in table A4-1 of Ninth Schedule of these Regulations.

141. FDRs, ADRS, AIRs or AIRS shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape.

FDR and ADRS—
recording
technology.

142. All FDRs shall retain the information recorded during at least the last 10 hours of their operation.

FDR and ADRS –
duration.

143.(1) All helicopters of a maximum certificated take-off mass of over 7 000 kg shall be equipped with a CVR.

CVR and cockpit
audio recording
systems-
applicability

(2) All helicopters of a maximum certificated take-off mass of over 3,175 kg for which the individual certificate of airworthiness is first issued on or after 1st January 1987 should be equipped with a CVR.

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

144. CVRs and CARS shall not use magnetic tape or wire.

CVR- recording
technology.
CVR- duration.

145. 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.

146.(1) All 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 Ninth Schedule of these Regulations and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.

Data link recorders-
applicability.

(2) All 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 Ninth Schedule to these Regulations 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) All 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 5.1.2 of the Ninth Schedule to these Regulations shall record the data link communications messages on a crash-protected flight recorder.

147. The minimum recording duration shall be equal to the duration of the CVR.

Data link recorders-
duration.

148. Data link recording shall allow correlation with the recorded cockpit audio.

Data link recorders-
correlation.

149.(1) Flight recorders shall 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.	Flight recorders - general, construction and installation.
(2) Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.	
150.(1) Flight recorders shall not be switched off during flight time.	Flight recorders – operation.
(2) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident.	
(3) The flight recorders shall not be reactivated before their disposition as determined in accordance with the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations.	
(4) 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.	
151.Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.	Continued serviceability.
152.The documentation requirement concerning FDR parameters provided by operators to accident investigation authorities shall be in electronic format and meet industry specifications.	Flight recorders electronic documentation.
153.The flight instrument requirements in these Regulation may be met by combinations of instruments or by electronic displays.	Instruments and equipment for flights operated under VFR and IFR.
154.All helicopters when operating in accordance with VFR by day shall be equipped with—	Instruments and equipment for flights operated under VFR by day.
(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.

155.(1) All helicopters when operating in accordance with VFR at night shall be equipped with—

- (a) the equipment specified in Regulation 148;
- (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—
 - (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 shall be trainable, at least in the vertical plane.

156.(1) All helicopters when operating in accordance with 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;

Instruments and equipment for flights operated under VFR by night.

Instruments and equipment for flights operated under IFR.

- (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 stabilization 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 subregulation 149(f).

(2) All 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.

157. A helicopter when operating in accordance with IFR and which has a maximum certificated take-off mass in excess of 3 175 kg or a maximum passenger seating configuration of more than 9 passengers shall be equipped with a ground proximity warning system - forward-looking terrain avoidance function.

Ground proximity warning system.

158. All 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 when—

All helicopters on flights over water - means of flotation.

- (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.

159.(1) A helicopter operating in performance Class 1 or 2 and operating in accordance with the provisions of this Regulation 152 shall be equipped with—

Emergency equipment.

- (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 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 applicable Civil Aviation (Rules of the Air) Regulations.

(2) A 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) A 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 carried.

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

(8) On any helicopter for which the individual certificate of Airworthiness is first issued on or after 1st January 1991, at least 50 per cent 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 40 kg shall be equipped with some means of mechanically assisted deployment.

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

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

All helicopters on flights over designated sea areas.

(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) When 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 sub regulations (2).

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

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

All helicopters on flights over designated land areas.

162.(1) From 1 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 sub regulation 152(a) with at least one automatic ELT and one ELT in a raft or life jacket.

Emergency locator transmitter or ELT.

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

163.(1) Approximate altitude in the Standard Atmosphere corresponding to the value of absolute pressure used in this text is as follows—

All helicopters on high altitude flights.

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

(2) A 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 Civil Aviation (Operation of Aircraft - Helicopter) Regulations.

(3) A 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 Civil Aviation (Operation of Aircraft - Helicopter) Regulations.

(4) A helicopter operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa which cannot descend safely within 4 minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, and for which the individual certificate of Airworthiness was issued on or after 9th November 1998, shall be provided with automatically deployable oxygen equipment to comply with the requirements of Civil Aviation (Operation of Aircraft - Helicopter) Regulations.

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

164. All 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.

All helicopters in icing conditions.

165. A 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.	Helicopters when carrying passengers — significant-weather detection.
166.(1) All helicopters required to comply with the noise certification Standards of Airworthiness, shall carry a document attesting noise certification. (2) When the document, or a suitable statement attesting noise certification as contained in another document approved by the State of Registry is issued in a language other than English, it shall include an English translation.	Noise Certification
167.(1) All 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 Civil Aviation (Operation of Aircraft - Helicopter) Regulation, in respect of emergency evacuation. (2) Subject to sub regulation 127(1), 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.	Helicopters carrying passengers — cabin crew seats.
168. Except otherwise authorized by the Authority, all helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the requirements of the Civil Aviation (Aeronautical Telecommunication - Surveillance Radar and Collision Avoidance Systems) Regulations.	Helicopters required to be equipped with a pressure-altitude reporting transponder.
169. All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones.	Microphones.
170. A helicopter with a maximum certificated take-off mass in excess of 3 175 kg or a maximum passenger seating configuration of more than 9 shall be equipped with a vibration health monitoring system.	Vibration health monitoring system.
171.(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.	Helicopters equipped with automatic landing systems. HUD or equivalent displays, EVS, SVS or CVS.
(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.	
172. 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.	Electronic Flight Bags – equipment.
173.(1) Where EFBs are used on board a helicopter 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. (2) The Authority shall issue a specific approval for the operational use of EFB functions to be used for the safe operation of helicopters.	EFB functions.
174. An operator shall not conduct commercial air ambulance operations unless the helicopter is equipped with the required instruments, equipment and flight documents as per these regulations and as prescribed and approved by the Authority.	Air Ambulance – helicopter instruments, equipment and flight records
175. When issuing a specific approval for the operational use of EFBs, the Authority shall ensure that— (a) the EFB 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 EFB functions; (c) the operator has established requirements for redundancy of the information where appropriate contained and displayed by the EFB function(s); (d) the operator has established and documented procedures for the management of the EFB 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 EFB functions.	EFB specific approval.

Helicopter Communication, Navigation and Surveillance
Equipment

176.(1) A helicopter shall be provided with radio communication equipment capable of—

Communication
equipment.

- (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 appropriate authority.

(2) The requirements of subregulation (1) are considered fulfilled 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) For operations where communication equipment is required to meet an RCP specification for PBC, a helicopter 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 helicopter RCP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or the Authority; 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 mentioned 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.

177.(1) A helicopter shall be provided with navigation equipment which will enable it to proceed in accordance with—

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

except when authorized by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

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

- (a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specifications;
- (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 the Authority; 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.

Navigation
equipment.

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

(5) The 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 subregulation (1) and where applicable subregulation (2).

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

(7) The equipment 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.

178.(1) A helicopter shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.

Surveillance
equipment.

(2) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance, a helicopter 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 helicopter RSP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or the Authority; and
- (c) have information relevant to the helicopter RSP specification capabilities included in the MEL.

(3) Where an RSP specification for PBS has been prescribed, the operator shall ensure that there has been 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 Operator shall ensure that, in respect of those helicopters mentioned in subregulation (2), adequate provisions exist as prescribed by the Authority for—

- (a) submitting 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.

179. 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.

Installation.

180.(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.

Electronic navigation data management.

(2) The operator shall continue to monitor both the process and products referred in subregulation (1).

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

181. An operator shall not conduct commercial air ambulance operations unless the helicopter is equipped with the required communication, navigation and surveillance equipment as per these regulations and as prescribed and approved by the Authority.

Air Ambulance – helicopter communication, navigation and surveillance equipment

PART VIII—HELICOPTER OPERATIONS - GENERAL AVIATION

Helicopter Instruments and Equipment All Helicopters on All Flights

182. A 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.

Instruments.

183.(1) A helicopter shall be equipped with or carry on board an accessible first-aid kit. Equipments.

(2) A helicopter shall be equipped with or carry on board: 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—

- (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.

(3) A helicopter shall be equipped with—

- (a) a seat or berth for each person 2 years of age and above; and
- (b) a seat belt for each seat and restraining belts for each berth.

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

184. A helicopter shall carry on board the following manuals, charts and information— Flight Documents.

- (a) the flight manual or other documents or information concerning any operating limitations prescribed for the helicopter by the Authority, required for the application of the civil aviation (Operations of Aircraft-Helicopter) Regulations, Reg 151;
- (b) any specific approval issued by the Authority, if applicable, for the operation(s) to be conducted;
- (c) 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;
- (d) procedures, as prescribed in the civil aviation (Rules of the Air) Regulations, for pilots-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 log book for the helicopter.

185.(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 —

Lavatory fire
extinguisher, ground-
air signal codes and
safety harness.

(a) meet the applicable minimum performance requirements of the Authority; and (b) not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II. (2) All helicopters on all flights shall be equipped with the ground-air signal codes for search and rescue purposes. (3) All helicopters on all flights shall be equipped with a safety harness for each flight crew member seat.	
186.(1) Where areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, such areas shall be marked as shown in the Second Schedule set out in these Regulations. (2) The colour of the markings shall be red or yellow, and where necessary they shall be outlined in white to contrast with the background. (3) If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.	Marking of break-in points.
187.The flight instrument requirements in Regulation 183 and 184 may be met by combinations of instruments or by electronic displays.	Instruments and equipment for flights operated under VFR and IFR.
188.All helicopters when operating in accordance with VFR by day shall— (a) be equipped with— (i) a magnetic compass; (ii) a sensitive pressure altimeter; (iii) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator; (iv) a heading indicator or directional gyroscope; (v) an airspeed indicator; and (vi) such additional instruments or equipment as may be prescribed by the Authority; (b) equipped with, or shall carry, a means of measuring and displaying the timing in hours, minutes and seconds.	Instruments and equipment for flights operated under VFR by day.
189.(1) All helicopters when operating in accordance with VFR at night shall be equipped with— (a) the equipment specified in regulation 183;	Instruments and equipment for flights operated under VFR by night.

- (b) an attitude indicator or artificial horizon for each required pilot;
- (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—
 - (i) the lights required by the applicable 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 may be trainable, at least in the vertical plane.

190. All helicopters when operating in accordance with IFR, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with—

Instruments and equipment for flights operated under IFR.

- (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 189 (1) (f) and (2); and
- (l) means of measuring and displaying the time in hours, minutes and seconds.

191.(1) All 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—

All helicopters on flights over water - means of flotation.

- (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 appropriate state authority.

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

192.(1) A helicopter operating in accordance with the provisions of regulation 186 shall be equipped with—

Emergency equipment.

- (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, 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 appropriate to the flight to be undertaken; and
- (c) equipment for making the pyrotechnical distress signals described in the applicable Civil Aviation (Rules of the Air) Regulations.

(2) When taking off or landing at a heliport where the Authority, 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 carried.

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

(4) A helicopter for which the individual certificate of airworthiness is first issued on or after 1st January 1991, at least 50 per cent of the life rafts carried in accordance with the provisions of this regulations may be deployable by remote control.

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

(6) A helicopter for which the individual certificate of airworthiness was first issued before 1st January 1991, the provisions of subregulation (4) and (5) may be complied with not later than 31st December 1992.

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

All helicopters on flights over designated land areas.

194.(1) Unpressurized helicopters operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required in the applicable Civil Aviation (Operation of Aircraft - Helicopter) Regulations.

All helicopters on high altitude flights.

(2) Pressurized 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 Civil Aviation (Operation of Aircraft - Helicopter) Regulations.

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

Flight Recorders.

- (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) As per the Ninth Schedule to these Regulations, image and data link information may be recorded on either the CVR or the FDR.

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

(4) Detailed requirements on flight recorders are contained in Ninth Schedule set out in these Regulations.

(5) Light weight flight recorders comprise 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) As per the Ninth Schedule to these Regulations, image and data link information may be recorded on either the CARS or the ADRS.

196. The FDR and ADRS parameters to be recorded shall be those listed in the Ninth Schedule set out in these Regulations.

197. (1) All helicopters of a maximum certificated take-off mass of over 3 175 kg 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 listed in table A4-1 of Ninth Schedule to these Regulations.

(2) All helicopters of a maximum certificated take-off mass of over 7 000 kg, 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 listed in table A4-1 of Ninth Schedule to these Regulations.

(3) All helicopters of a maximum certificated take-off mass of over 3 175 kg, up to and including 7 000 kg, for which the individual type certificate of airworthiness is first issued on or after 1st January 1989, may be equipped with an FDR which shall record at least the first 15 parameters listed in table A4-1 of Ninth Schedule to these Regulations.

198. FDRs shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape.

199. All FDRs shall retain the information recorded during at least the last 10 hours of their operation.

200. (1) All helicopters of a maximum certificated take-off mass of over 7 000 kg 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) All helicopters of a maximum certificated take-off mass of over 3 175 kg for which the individual certificate of airworthiness is first issued on or after 1st January 1987 shall be equipped with a CVR and for helicopters equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

FDR and ADRS.

FDR and ADRS – applicability.

FDR and ADRS – recording technology.

FDR and ADRS – duration.

CVR – Cockpit audio recording systems or CARS – applicability.

201.CVRs shall not use magnetic tape or wire.	CVR- recording technology. CVR- duration.
202.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.	
203.(1) All helicopters for which the individual certificate of airworthiness type is first issued on or after 1 st January 2016, which use any of the data link communications applications referred to in of the Ninth Schedule to these Regulations and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.	Data link recorders- applicability.
(2) All helicopters for which the individual certificate of airworthiness type was first issued before 1 st January 2016, that are required to carry a CVR and are modified on or after 1 st January 2016 to use any of the data link communications applications referred to in of the Ninth Schedule to these Regulations 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 1 st 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) All helicopters for which the individual certificate of airworthiness was first issued before 1 st January 2016, that are required to carry a CVR and are modified on or after 1 st January 2016 to use any of the data link communications applications referred to in of the Ninth Schedule to these Regulations shall record the data link communications messages on a crash-protected flight recorder.	
204.The minimum recording duration shall be equal to the duration of the CVR.	Data link recorders- duration.
205.Data link recording shall allow correlation with the recorded cockpit audio.	Data link recorders- correlation.
206.(1) Flight recorders shall 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.	Flight recorders general - construction and installation.
(2) Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.	

207.(1) Flight recorders shall not be switched off during flight time. (2) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. (3) The flight recorders shall not be reactivated before their disposition as required by the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations. (4) 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.	Flight recorders general – operation.
208.Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.	General Continued serviceability.
209.The documentation requirement concerning FDR parameters provided by operators to accident investigation authorities may be in electronic format and meet industry specifications.	Flight recorders electronic documentation.
210.(1) From 1 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 190 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 applicable Civil Aviation (Communication Systems) Regulations.	Emergency Locator Transmitter.
211.All helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the requirements of the applicable Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations.	Helicopters required to be equipped with pressure-altitude reporting transponder.
212.All flight crew members required to be on flight deck duty shall communicate through boom or throat microphones.	Microphones.
213.Notwithstanding requirements for heliport or landing location operating minima as per the Civil Aviation (Operations of Aircraft –Helicopters) Regulations, 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.	Helicopters equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.
214.Where portable EFBs are used on board a helicopter, the pilot-in-command and the owner shall ensure that they do not affect the performance of the helicopter systems, equipment or the ability to operate the helicopter.	Electronic flight bags – equipment.

215.(1) Where EFBs are used on board a helicopter the pilot-in-command or the owner shall— EFB functions.

- (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.

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

216. When issuing a specific approval for the operational use of EFBs, the Authority shall ensure that— EFB specific approval.

- (a) the EFB 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 EFB functions;
- (c) the owner has established requirements for redundancy of the information where appropriate, contained and displayed by the EFB functions;
- (d) the owner has established and documented procedures for the management of the EFB 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 EFB functions.

217.(1) A 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. Helicopter operated under an Article 83 *bis* agreement.

(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 such as ramp checks.

Helicopter Communication, Navigation and Surveillance Equipment

218.(1) A helicopter operated in accordance with IFR or at night shall be provided with radio communication equipment.

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 Authority.

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

(4) When compliance with 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 any one will not result in failure of any other.

(5) A helicopter to be operated in accordance with VFR, but as a controlled flight, shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the Authority.

(6) A helicopter to be operated on a flight to which the provisions of regulations 182 or 184 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 Authority.

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

(8) For operations where communication equipment is required to meet an RCP specification for performance-based communication, a helicopter shall, in addition to the requirements specified in these 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 the Authority; and

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

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

(10) In establishing criteria for operations where RCP specification for PBC has been prescribed, the Authority shall require that the operator or owner establish—

- (a) normal and abnormal procedures, including contingency procedures;
- (b) flight crew qualification and proficiency requirements, in accordance with 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 mentioned in subregulation (8), adequate provisions exist for—

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with the applicable 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.

219.(1) A helicopter shall be provided with navigation equipment which shall enable it to proceed in accordance with—

Navigation equipment.

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

except when authorised by the appropriate 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 110 km or 60 NM.

(3) For operations where a navigation specification for performance-based navigation has been prescribed, a helicopter shall, in addition to the requirements specified in subregulation (1)—

- (a) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification;
- (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 Authority; and

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

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

(5) In establishing criteria for operations where a navigation specification for PBN has been prescribed, the Authority shall require that the operator or owner establish—

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

(7) The 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 subregulation (1) and (2).

(8) For international general aviation, subregulation (4) may be met by means other than the duplication of equipment.

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

(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.

220.(1) A helicopter shall be provided with surveillance equipment which shall enable it to operate in accordance with the requirements of air traffic services.

Surveillance
equipment.

(2) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance, a helicopter 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 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 Authority; and
 - (c) have information relevant to the helicopter RSP specification capabilities included in the MEL as applicable.
- (3) The Authority shall establish criteria for operations where an RSP specification for PBS has been prescribed.
- (4) When establishing criteria for operations where an RSP specification for PBS has been prescribed, the Authority shall require that the operator/owner establish—
- (a) normal and abnormal procedures, including contingency procedures;
 - (b) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;
 - (c) a training programme for relevant personnel consistent with the intended operations; and
 - (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.
- (5) The Authority shall ensure that, in respect of those helicopters mentioned in subregulation (2), adequate provisions exists as prescribed by the Authority for—
- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the applicable 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.

PART IX-EXEMPTION

221.(1) A person or operator may apply to the Authority for an exemption from any provision of these Regulations.

Application for exemptions.

(2) A request for exemption shall be made in accordance with

the requirements of these Regulations and an application for such exemption shall be submitted and processed in a manner prescribed by the Authority.

(3) A request for an exemption must contain the applicant's—

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

(4) The application shall be accompanied by a fee prescribed by the Authority in the applicable aeronautical information circulars for technical evaluation.

222.(1) The Authority may, upon consideration of the circumstances of a particular maintenance organisation, issue an exemption providing relief from specified provisions of these Regulations, provided that—

- (a) the Authority finds that the circumstances presented warrant the exemption; and
- (b) a level of safety shall be maintained equal to that provided by the Regulations from which the exemption is sought.

(2) The exemption referred to in subregulation (1) may be terminated or amended at any time by the Authority.

(3) A person or operator who receives an exemption shall have a means of notifying the management and appropriate personnel performing functions subject to the exemption.

PART X—GENERAL PROVISIONS

223.(1) The Authority may, in the public interest, suspend provisionally pending further investigation or re-examine the original certification basis of any approval, exemption or such other document issued or granted under these Regulations. Suspension, revocation of approval.

(2) The Authority may, upon the completion of an investigation and in the public interest, revoke, suspend, or vary any approval, exemption or such other document issued or granted under these Regulations.

(3) The Authority may, in the public interest, prevent any person or Aeroplane from flying.

(4) A holder or any person having the possession or custody of any approval, exemption or such other documents which has been revoked, suspended or varied under these Regulations shall surrender it to the Authority within a reasonable time after being required to do so by the Authority.

Exemption.

Suspension,
revocation of
approval.

(5) The breach of any condition subject to which any approval, exemption or any such other document, other than a licence issued in respect of an Aerodrome, has been granted or issued under these Regulations shall render the document invalid during the continuance of the breach.

224.(1) An Operator shall not—

Use and retention of records.

- (a) use any approval, exemption or such other document issued or required by or under these Regulations which has been forged, altered, revoked, or suspended, or to which he is not entitled;
- (b) forge or alter an approval, exemption or other document issued or required by or under these Regulations;
- (c) lend any approval, exemption or such other document issued or required by or under these Regulations to any other person; or
- (d) make any false representation for the purpose of procuring for himself or any other person the grant issue renewal or variation of any such approval, or exemption.

(2) During the period for which it is required under these Regulations to be preserved, no person shall mutilate, alter, render illegible or destroy any records required by or under these Regulations to be maintained, or knowingly make, or procure or assist in the making of, any false entry in any record, or wilfully omit to make a material entry in record.

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

(4) An Operator shall not purport to issue any approvals, authorisations or exemptions under these Regulations unless he is authorised by the Authority to do so.

(5) An Operator shall not issue any approval, authorisation or exemption of the kind referred to in subregulation (4) unless he has satisfied himself that all statements in the certificate are correct, and that the applicant is qualified to hold that certificate.

225.(1) Any person who knows of a violation of the Act, or any rule, regulation, or order issued there under, shall report it to the Authority.

Reports of violation.

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

226.(1) The Authority shall take enforcement action on any regulated entity that fails to comply with the provisions of these Regulations invoke the powers with due care and act in good faith in the interest of preserving safety.

Enforcement of directions.

(2) Inspectors of the Authority holding valid delegations shall take necessary action to preserve safety where an undesirable condition has been detected.

(3) The actions referred to in sub regulation (2) may include—

- (a) in the case of a regulated entity, imposition of operating restrictions until such a time that the existing undesirable condition has been resolved;
- (b) in the case of a licensed personnel, require that the individual does not exercise the privileges of the license until such a time that the undesirable condition has been resolved.

(4) In carrying out the enforcement actions pursuant to the provisions of sub regulation (2), the inspectors of the Authority shall invoke the powers with due care and act in good faith in the interest of preserving safety.

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

Aeronautical user fees.

(2) Upon application being made in connection with which a fee is chargeable in accordance with the provisions of subregulation (1), the applicant shall be required, before the application is entertained, to pay the fee so chargeable.

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

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

Application of regulations to Government and visiting forces, etc.

- (a) in so far as they apply, whether by express reference or otherwise, to Aeroplane registered in Kenya, apply to such Aeroplane wherever they may be;
- (b) in so far as they apply, whether by express reference or otherwise, to other Aeroplane, apply to such Aeroplane when they are within the Kenya;
- (c) in so far as they prohibit, require or regulate, whether by express reference or otherwise, the doing of anything by any person in, or by any of the crew of, any Aeroplane registered in Kenya, shall apply to such persons and crew, wherever they may be; and

- (d) in so far as they prohibit, require or regulate, whether by express reference or otherwise, the doing of anything in relation to any Aeroplane registered in Kenya by other persons shall, where such persons are citizens of the Kenya, apply to them wherever they may be.

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

Extra-territorial
application of
Regulations.

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

PART X—OFFENCES AND PENALTIES

230. An Operator who contravenes any provision of these Regulations may have his licence, certificate, approval, authorisation, exemption or such other document revoked or suspended.

Contravention of
Regulations.

231.(1) An Operator who contravenes any provision of these Regulations, orders, notices or proclamations made there under in relation to an Aeroplane, the operator of that Aeroplane and the pilot in-command, if the operator or, the pilot in command is not the person who contravened that provision he shall, without prejudice to the liability of any other person under these Regulations for that contravention, be deemed for the purposes of the following provisions of this regulation to have contravened that provision unless he proves that the contravention occurred without his consent or connivance and that he exercised all due diligence to prevent the contravention.

Penalties.

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

(3) Where an Operator is charged with contravening a provision of these Regulations, Orders, notices or proclamations made there under by reason of his having been a member of the flight crew of an

Aeroplane on a flight for the purpose of commercial air transport operations, the flight shall be treated, without prejudice to the liability of any other person under these Regulations, as not having been for that purpose if he proves that he neither knew nor had reason to know that the flight was for that purpose.

(4) An Operator who contravenes any provision of these Regulations, orders, notices or proclamations made thereunder not being a provision referred to in subregulation (11) shall, upon conviction, be liable to a fine, and in the case of a continuing contravention, each day of the contravention shall constitute a separate offence.

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

(6) Any Aeroplane subject to alien for the purpose of subregulation (5) may be seized by and placed in the custody of the Authority.

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

- (a) payment of the penalty or the amount agreed upon in compromise;
- (b) deposit of a bond in such amount as the Authority may prescribe, conditioned upon payment of the penalty or the amount agreed upon in compromise;
- (c) receiving an order of the court to that effect.

(8) An Operator who contravenes any provision specified as an “A” provision in the Tenth Schedule to these Regulations commits an offence and is liable on conviction to a fine not exceeding one million shillings for each offence or to imprisonment for a term not exceeding one year or to both.

(9) The Authority and any person specifically authorised by name by him or any police officer not below the rank of inspector specifically authorised by name by the Cabinet Secretary, may compound offences under Part A of the Tenth Schedule to these Regulations by assessing the contravention and requiring the person reasonably suspected of having committed the offence to pay to the Authority a sum equivalent in Kenya shillings of one hundred United States dollars and three hundred United States dollars for provisions referred to in subpart (i) and subpart (ii) respectively Part A of the Tenth Schedule to these Regulations.

(10) Where any person is aggrieved by any order made under sub regulation (9), the person may, within twenty-one days of such order being made, appeal against the order to the High Court and the provisions of the Criminal Procedure Act shall apply *mutatis mutandis*, to every such appeal as if it were an appeal against a

sentence passed by a district court in the exercise of its original jurisdiction.

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

232. The Civil Aviation (Instruments and Equipment) Regulations, 2018 are hereby revoked.

Revocation of LN
No. 131/2018.

FIRST SCHEDULE
LOCATION OF AN AEROPLANE IN DISTRESS

(rr. 5 and 45)

1. PURPOSE AND SCOPE

Location of an aeroplane in distress aims at establishing, to a reasonable extent, the location of an accident site within a 6 NM radius.

2. OPERATION

2.1 An aeroplane in distress shall automatically activate the transmission of information from which its position can be determined by the operator and the position information shall contain a time stamp. It shall also be possible for this transmission to be activated manually. The system used for the autonomous transmission of position information shall be capable of transmitting that information in the event of aircraft electrical power loss, at least for the expected duration of the entire flight.

2.2 An aircraft is in a distress condition when it is in a state that, if the aircraft behaviour event is left uncorrected, can result in an accident. Autonomous transmission of position information shall be active when an aircraft is in a distress condition.

This will provide a high probability of locating an accident site to within a 6 NM radius. The operator shall be alerted when an aircraft is in a distress condition with an acceptable low rate of false alerts. In case of a triggered transmission system, initial transmission of position information shall commence immediately or no later than five seconds after the detection of the activation event.

Note 1.— Aircraft behaviour events can include, but are not limited to, unusual attitudes, unusual speed conditions, collision with terrain and total loss of thrust/pulsation on all engines and ground proximity warnings.

Note 2.— A distress alert can be triggered using criteria that may vary as a result of aircraft position and phase of flight.

2.3 When an aircraft operator or an air traffic service unit (ATSU) has reason to believe that an aircraft is in distress, coordination shall be established between the ATSU and the aircraft operator.

2.4 The State of the Operator shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

- a) air traffic service unit(s) (ATSU); and
- b) SAR rescue coordination centre(s) (RCC) and sub-centres.

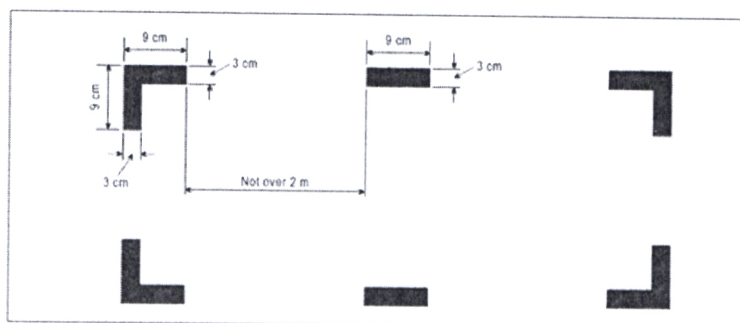
Note 1.— Refer to the Civil Aviation (Air Traffic Services) Regulations for emergency phase criteria.

Note 2.— Refer to Civil Aviation (Aeronautical Search and Rescue) Regulations for required notifications in the event of an emergency phase.

2.5 When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.

2.6 The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.

SECOND SCHEDULE (r.13, 68,137,186)
MARKING OF BREAK-IN POINTS



Where the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

THIRD SCHEDULE

(r.14, 15, 22, 25,26)

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 flight data recorder (FDR),
- a cock 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 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 minimized;
- (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 1st 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 minimized.

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 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 certifying 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 flight recorder system manufacturer shall provide the appropriate certifying 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; and
 - (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 Appendix.

Note 2.— Conditions related to the continued serviceability of a flight recorder system are defined in Section 7 of this Appendix. 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:

- 1) 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;

- 2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;

- 3) warnings and alerts; and

- 4) 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:

- 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 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 certificating 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:

- deployment shall take place when the aeroplane structure has been significantly deformed;
- deployment shall take place when an aeroplane sinks in water;
- ADFR shall not be capable of manual deployment;
- the ADFR shall be able to float on water;
- the ADFR deployment shall not compromise the safe continuation of the flight;
- the ADFR deployment shall not significantly reduce the chance of survival of the recorder and of successful transmission by its ELT;

- the ADFR deployment shall not release more than one piece;
- an alert shall be made to the flight crew when the ADFR is no longer captive to the aircraft;
- the flight crew shall have no means to disable ADFR deployment when the aircraft is airborne;
- 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
- 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 authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note. — Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

5.1.2 Messages applying to the applications listed 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:

- any switch or selector that will affect the operation and the navigation of the aircraft; and
- 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:

- primary flight and navigation displays;
- aircraft system monitoring displays;
- engine indication displays;
- traffic, terrain, and weather displays;
- crew alerting systems displays;
- stand-by instruments; and
- 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; 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.

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 an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall 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 at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two years.

Table A8-1. Parameter characteristics for flight data recorders

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when 24 hours available, otherwise relative time count or GNSS time sync)					
2	Pressure-altitude certified altitude of aircraft	-300 m (-1 000 ft) to m (±100 ft to +1 500 m (+5 000 ft) ±700 ft)	1	±30 m to ±200	1.5 m (5 ft) maximum	
3	Indicated airspeed or calibrated airspeed	95 km/h (50 kt) to max V_{So} (Note 1) V_{So} to 1.2 V_D (Note 2)	1	±5% recommended)	1 kt (0.5 kt)	
4	Heading (primary 360° ±2° 0.5° flight crew reference)					
5	Normal acceleration	Application for type certification is 0.004 g (Note 8) submitted to a Contracting State before maximum range 1 January 2016 excluding datum error of ±5% Application for type certification is submitted to a Contracting State on or after 1 January 2016 excluding	-3 g to +6 g		0.125 ±1% of	
			-3 g to +6 g	0.0625	±1% of	0.004 g

datum error of

$\pm 5\%$

6 Pitch attitude $\pm 75^\circ$ or usable range 0.25 $\pm 2^\circ$ 0.5° whichever is greater

7 Roll attitude $\pm 180^\circ$ 0.25 $\pm 2^\circ$ 0.5°

8 Radio transmission On-off (one discrete) 1 keying

9 Power on each Full range 1 (per $\pm 2\%$ 0.2% of full engine engine) range or the

(Note 3) resolution

required to operate the aircraft

10 Trailing edge flap Full range or each 2 $\pm 5\%$ or as 0.5% of full and cockpit discrete position pilot's range or the control selection indicator resolution

required to operate the aircraft

11 Leading edge flap Full range or each 2 $\pm 5\%$ or as 0.5% of full and cockpit discrete position pilot's range or the control selection indicator resolution

required to operate the

aircraft

12 Thrust reverser Stowed, in transit, 1 (per position and reverse engine)

13 Ground spoiler/speed Full range or each 1 $\pm 2\%$ unless 0.2% of full brake discrete position higher range selection (selection accuracy and position) uniquely

required

14 Outside air Sensor range 2 $\pm 2^\circ\text{C}$ 0.3°C temperature

15 Autopilot/auto A suitable 1 throttle/AFCS combination mode and of disretes engagement status

16 Longitudinal Application for type certification $\pm 1\text{ g}$ 0.25 $\pm 0.015\text{ g}$ 0.004 g acceleration submitted to a Contracting State before excluding a

(Note 8) 1 January 2016 datum error of

$\pm 0.05\text{ g}$

Application for type certification $\pm 1\text{ g}$ 0.0625 $\pm 0.015\text{ g}$ 0.004 g submitted to a Contracting State on or excluding a

after 1 January 2016 datum error of

$\pm 0.05\text{ g}$

17 Lateral acceleration Application for type certification $\pm 1\text{ g}$ 0.25 $\pm 0.015\text{ g}$ 0.004 g

(Note 8) submitted to a Contracting State before excluding a

1 January 2016	datum error of			
±0.05 g				
Application for type certification Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g	0.004 g submitted to a
datum error of				
±0.05 g				
18 Pilot input and/or Application for type certification Full range	0.25		±2°	unless 0.2% of full
control submitted to a Contracting State before higher range or as surface position- 1 January 2016				accuracy
installed				
primary	uniquely controls (pitch, roll, required yaw)			
<i>(Notes 4 and 8)</i>				
Application for type certification Full range	0.125		±2°	unless 0.2% of full
submitted to a Contracting State on or	higher			range or as
after 1 January 2016	accuracy	installed		
uniquely				
required				
19 Pitch trim position	Full range	1	±3% unless	0.3% of full higher range or as
accuracy	installed uniquely			
required				
20 Radio altitude	-6 m to 750 m	1	±0.6 m (±2 ft)	0.3 m (1 ft)
(-20 ft to 2 500 ft)	or ±3% below 150 m			
whichever is (500 ft) 0.3 m				
greater below (1 ft) + 0.5% of				
150 m full range above				
(500 ft) and 150 m (500 ft)				
±5% above				
150 m				
(500 ft)				
21 Vertical beam Signal range	1	±3% of full deviation		range
(ILS/GNSS/GLS glide path, MLS elevation,				
IRNAV/IAN vertical deviation)				

- 22 Horizontal beam Signal range $1 \pm 3\%$ 0.3% of full deviation range
(ILS/GNSS/GLS localizer, MLS azimuth,
IRNAV/IAN lateral deviation)
- 23 Marker beacon Discrete 1 passage
- 24 Master warning Discrete 1
- 25 Each NAV receiver Full range 4 As installed frequency selection (Note 5)
- 26 DME 1 and 2 0 – 370 km 4 1 852 m (1 NM) distance (includes (0 – 200 NM)
Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN))
(Notes 5 and 6)
- 27 Air/ground status Discrete 1
- 28 GPWS/TAWS/GCA Discrete 1
S 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)
- 29 Angle of attack Full range 0.5 As installed 0.3 % of full range
- 30 Hydraulics, each Discrete 2 0.5% of full system range (low pressure)
- 31 Navigation data As installed 1 As installed (latitude/longitude, ground speed and drift angle) (Note 7)
- 32 Landing gear and Discrete 4 As installed gear selector position
- 33 Groundspeed As installed 1 Data shall be 1 kt obtained from the most accurate system
- 34 Brakes (left and right (Maximum metered 1 $\pm 5\%$ 2% of full brake pressure, left brake range, discretes range and right brake pedal or full range) position)
- 35* Additional engine Engine fuel metering As installed Each 2% of full range
valve position: parameters (EPR, N_1 , engine
Application for type certification is each
indicated vibration level, N_2 , submitted to a second
EGT, fuel flow, fuel cut-off Contracting
lever position, N_1 , engine fuel State on or
metering valve position) after 1 January
2023
- 36* TCAS/ACAS (traffic alert Discretes 1 As installed
and collision avoidance
system)

37*	Wind shear warning	Discrete	1	As installed	
38*	Selected barometric setting (pilot, copilot)	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 operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))		1	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*	Multifunction/engine/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		
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 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 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 over speed	As installed	1	As installed
66*	Yaw trim surface position	Full range	2	$\pm 3\%$ unless 0.3% of full range accuracy uniquely required
67*	Roll trim surface position	Full range	2	$\pm 3\%$ unless 0.3% of full range accuracy uniquely

				required	
68*	Yaw or sideslip angle	Full range	1	±5%	0.5°
69*	De-icing and/or antiicing 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 column, rudder pedal)	Full range 1 (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5%	0.2% of full range or as installed
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	Application for typeft to certification submitted to a Contracting State on or after 1 January 2023	As installed (01 40 000 ft recommended)	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	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	$\pm 2^\circ$	0.5°
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_{S0} stalling speed or minimum steady flight speed in the landing configuration is in Section “Abbreviations and Symbols”.
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

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 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 M* 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.
6	Aeronautical operational control data	This includes any application transmitting M* or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).

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
1	Heading	a) Heading (Magnetic preferred, if not or True)	±180°	1	±2°	Heading is available, yaw rate shall be recorded
		b) Yaw rate	±300°/s	0.25	±1% + drift	2°/s of 360°/h
2	Pitch	a) Pitch attitude preferred, if not available, pitch rate shall be recorded	±90°	0.25	±2°	0.5° Pitch attitude is
		b) Pitch rate	±300°/s	0.25	±1% + drift	2°/s of 360°/h
3	Roll	a) Roll attitude preferred, if	±180°	0.25	±2°	0.5° Roll attitude is

not available, roll rate shall be recorded

b) Roll rate $\pm 300^\circ/\text{s}$ 0.25 $\pm 1\%$ + drift 2°/s of 360°/h

4 Positioning system:

a) Time 24 hours 1 ± 0.5 s 0.1 s UTC time preferred where available.

b) Latitude/longitude Latitude: $\pm 90^\circ$ 2 As installed
0.00005° Longitude: $\pm 180^\circ$ (1 if available)
(0.00015° recommended)

c) Altitude -300 m (-1 000 ft) to 2 As installed 1.5 m (5 ft)
maximum certificated (1 if available) (± 15 m (± 50 ft)
altitude of aeroplane recommended) +1 500 m (5 000 ft)

d) Ground speed 0-1 000 kt 2 As installed 1 kt
(1 if available) (± 5 kt recommended)

e) Track 0-360° 2 As installed 0.5°
(1 if available) ($\pm 2^\circ$ recommended)

f) Estimated error Available range 2 As installed
As installed Shall be recorded if readily
(1 if available) available

5 Normal acceleration -3 g to +6 g (*) 0.25 (0.125 if As installed (± 0.09 g 0.004 g
available) excluding a datum error of ± 0.45 g recommended)

6 Longitudinal ± 1 g (*) 0.25 (0.125 if As installed (± 0.015 g 0.004 g
acceleration available) excluding a datum error of ± 0.05 g recommended)

7 Lateral acceleration ± 1 g (*) 0.25 (0.125 if available)

8 External static pressure 34.4 mb (3.44 in-Hg) to 1 (or pressure altitude) 310.2 mb (31.02 in-Hg) or
available sensor range

9 Outside air -50° to +90°C or 2 temperature (or total available sensor range air
temperature)

10 Indicated air speed As the installed pilot 1 display measuring system or available sensor range

11 Engine RPM Full range including Each engine overspeed condition each second

12 Engine oil pressure Full range Each engine each second

13 Engine oil temperature Full range Each engine each second

14 Fuel flow or pressure Full range Each engine each second

15 Manifold pressure Full range Each engine each second

16	Engine	Full range	Each engine thrust/power/torque	each second	parameters required to determine propulsive thrust/power*
17	Engine gas generator	0-150%	Each engine speed (Ng)	each second	
18	Free power turbine	0-150%	Each engine speed (Nf)	each second	
19	Coolant temperature	Full range	1		
20	Main voltage	Full range	Each engine	each second	
21	Cylinder head	Full range	Each cylinder temperature	each second	
22	Flaps position	Full range or each	2 discrete position		
As installed (± 0.015 g)			0.004 g		
excluding a datum error of ± 0.05 g recommended)					
As installed (± 1 mb)			0.1 mb		
(0.1 in-Hg) or			(0.01 in-Hg) or 1.5 m (5 ft)		
± 30 m (± 100 ft) to					
± 210 m (± 700 ft) recommended)					
As installed			1°C		
(±2°C recommended)					
As installed			1 kt (0.5 kt recommended)		
(±3 % recommended)					
As installed			0.2% of full range		
As installed			2% of full range		
(5% of full range recommended)					
As installed			2% of full range		
(5% of full range recommended)					
As installed			2% of full range		
As installed			0.2% of full range		
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 shall be provided.	

	As installed			0.2% of full range		
	As installed			0.2% of full range		
	As installed			1° C		
	(±5°C recommended)					
	As installed			1 Volt		
	As installed			2% of full range		
	As installed			0.5°		
23	Primary control position	flight surface	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 temperature	gas	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 position	surface	Full range or each discrete position	1	As installed	0.3% of full range
28	Landing position	gear	Each discrete position*	Each gear every two seconds	As installed	* Where available, record up-and-down and locked and down-and-locked position
29	Novel/unique aircraft features		As required	As required	As required	As required

FOURTH SCHEDULE

(r. 38)

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.

FIFTH SCHEDULE (r. 61)

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.

SIXTH SCHEDULE

(r. 76)

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 plane” Planes perpendicular to the horizontal plane.

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

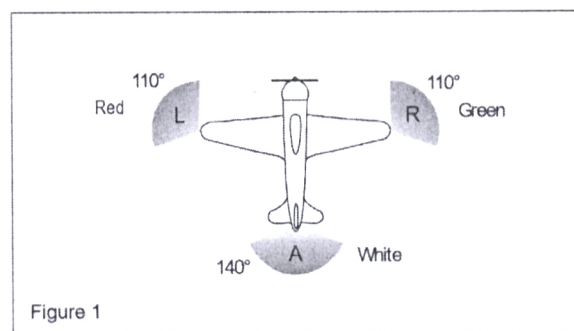
2. NAVIGATION LIGHTS TO BE DISPLAYED IN THE AIR

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 applicable 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

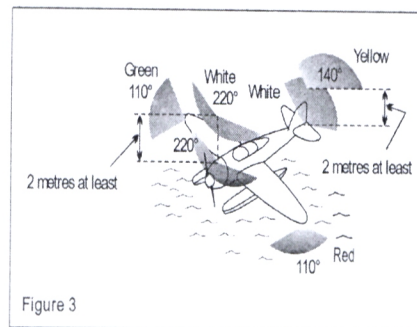
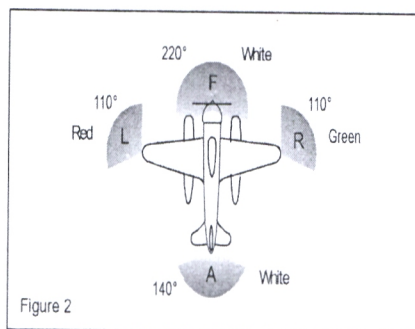
- (d) a white light projected through angle of coverage F.

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.

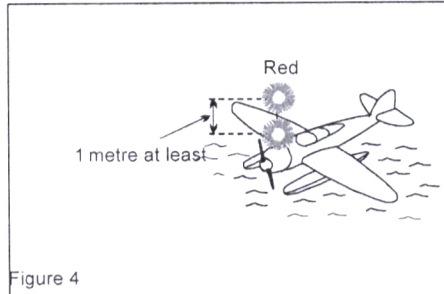


Figure 4

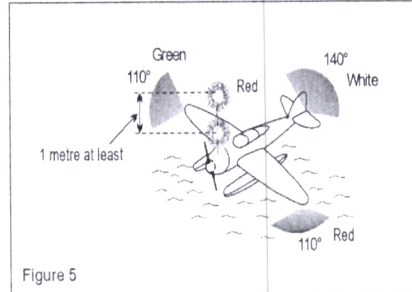


Figure 5

3.7 When at anchor

- a) If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).
- b) If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).

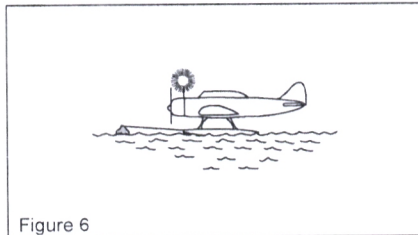


Figure 6

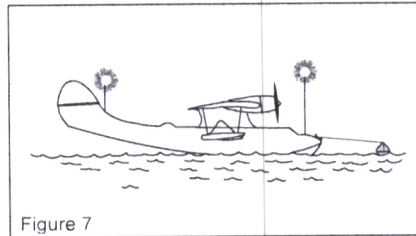


Figure 7

- 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.

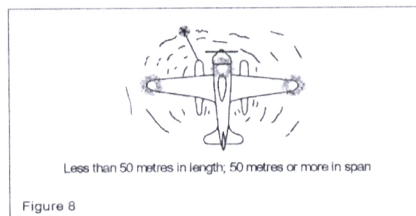


Figure 8

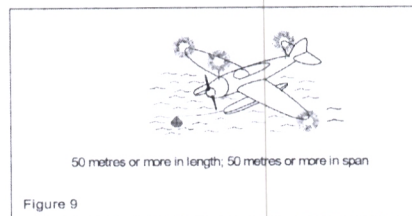


Figure 9

SEVENTH SCHEDULE

FLIGHT RECORDERS (GENERAL AVIATION — AEROPLANES)

(rr. 84, 85, 91, 96 and 111)

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 minimized;
- (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 1st 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 minimized.

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; and
 - (c) manufacturer's test reports.

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:

- 1) 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;
- 2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;
- 3) warnings and alerts; and
- 4) 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.

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.

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.

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 authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

-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.
 - (c) Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;
 - (d) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
 - (e) an examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
 - (f) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and
 - (g) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.
 - (h) 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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling recording interval (seconds)	Accuracy limits and (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	$\pm 0.125\%/h$ 1 s	
2	Pressure altitude		-300 m (-1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)		± 30 m to ± 200 m (± 100 ft to ± 700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (501 kt) to max V_{SO} (Note 1)		$\pm 5\%$ 1 kt (0.5 kt recommended)	
4	Heading (primary flight crew reference)		V to $1.21 V_{SO}$ D (Note 2)		$\pm 3\%$ 0.5°	
5	Normal acceleration		360° 0.125		$\pm 2^\circ$ 0.004 g	
6	Pitch attitude		-3 g to +6 g 0.25		$\pm 1\%$ of 0.5° maximum range excluding datum error of	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling recording interval compared to (seconds)	Accuracy limits and (sensor input recording interval compared to FDR readout)	Recording resolution
7	Roll attitude		$\pm 75^\circ$ or usable range whichever is greater	0.25	$\pm 5\%$	0.5°
8	Radio transmission keying		$\pm 180^\circ$	1	$\pm 2^\circ$	0.2% of full range or the resolution required to operate the aircraft
9	Power on each engine (Note 3)		On-off (one discrete) Full range	(one 1 (per engine) $\pm 2^\circ$)	$\pm 2^\circ$	0.5% 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	(500ft)
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/speed brake selection (selection and position)		Full range or each discrete position	1	$\pm 2\%$ higher accuracy uniquely required	unless 0.2% of full range

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits and (sensor input compared to FDR readout)	Recording resolution
14	Outside air temperature	Sensor range		2	$\pm 2^{\circ}\text{C}$	0.3°C
	0.004 g					
	0.004 g					
	0.2% of full range or as installed					
	0.2% of full range or as installed					
	0.3% of full range or as installed					
	0.3 m (1 ft) below 150 m (500 ft)					
	0.3 m (500 ft)					
	(1 ft) + 0.5% of full range above 150 m (500 ft)					
15*	Autopilot/auto status	A suitable combination of	1 throttle/AFCS mode		of discretised	and engagement
16	Longitudinal	$\pm 1 \text{ g}$	$0.25 \pm 0.015 \text{ g}$ acceleration		excluding a datum error of	$\pm 0.05 \text{ g}$
17	Lateral acceleration	$\pm 1 \text{ g}$	$0.25 \pm 0.015 \text{ g}$ (Note 3)		excluding a datum error of	$\pm 0.05 \text{ g}$
18	Pilot input and/or Application for type	Full range	$0.25 \pm 2^{\circ}$ unless control surface certification submitted to a higher accuracy position-primary Contracting State before uniquely controls (pitch, roll, 1 January 2016 required yaw) (Notes 4 and 8) Application for type		Full range	$0.125 \pm 2^{\circ}$ unless certification submitted to a higher accuracy Contracting State on or uniquely after 1 January 2016 required
19	Pitch trim position	Full range	$1 \pm 3\%$ unless higher accuracy uniquely required			
20*	Radio altitude or $\pm 3\%$	-6 m to 750 m	1		$\pm 0.6 \text{ m}$ ($\pm 2 \text{ ft}$)	(-20 ft to $2\,500 \text{ ft}$)
	whichever is greater below 150 m		500 ft) and $\pm 5\%$ above 150 m		(500 ft)	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
21*	Vertical beam deviation (ILS/GNSS/GLS glide path MLS elevation, IRNAV/IAN vertical deviation)		Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	±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/IAN) (Notes 5 and 6)		0–370 km (0–2004 NM)		As installed	1 852 m (1 NM)
27	Air/ground status		Discrete	1		

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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 drift angle) (Note 7)		As installed	1	As installed	
32*	Landing gear and gear selector position		Discrete	4	As installed	
33*	Groundspeed		As installed	1	Data shall be 1 kt obtained from the most accurate system	
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discrete or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N1, indicated vibration level, position: metering valve)	Engine fuel	As installed	Each engine each second	As installed	2% of full range

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Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
	N2, EGT, fuel flow, fuel Application for cut-off lever position, N3 type engine fuel metering certification is submitted to a Contracting State on or after 1 January 2023					
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 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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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/DSTRK, path angle, final approach path (IRNAV/IAN))			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/alerts 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		Discrete(s)	4	As installed	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
	position					
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 glide slope)		As installed	4	As installed	
61*	Ice detection		As installed	4	As installed	
62*	Engine warning each		As installed	1	As installed	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
	engine vibration					
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 over speed		As installed	1	As installed	
66*	Yaw trim surface position		Full range	2	±3% higher accuracy uniquely required	unless 0.3% of full range
67*	Roll trim surface position		Full range	2	±3% higher accuracy uniquely required	unless 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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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 column, rudder pedal)		Full range (±311 N (±70 lbf), ±378 N (±85 lbf), ±734 N (±165 lbf))		±5%	0.2% of full range 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)		As installed	100 ft
80*	Aeroplane weight	computedApplication for type certification submitted to a Contracting State on or after	As installed	64	As installed	1% of full range

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1 January 2023						
81*	Flight director command (left flight director pitch command, left flight director roll command, right flight director pitch command, right flight director roll command)	Application for certification submitted to a Contracting State on or after 1 January 2023	Full range	1	$\pm 2^\circ$	0.5°
82*	Vertical speed	Application for 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 is in Section “Abbreviations and Symbols”.

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

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 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 surveillance	broadcastThis 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 in	Minimum recording resolution	Remarks
1	Heading:					
	+ a) Heading (Magnetic or is True) preferred, if not available, yaw rate shall be recorded			$\pm 180^\circ$	1	$\pm 2^\circ$ 0.5° * Heading
	b) Yaw rate	$\pm 300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of}$	$2^\circ/\text{s}$	
						360°/h
2	Pitch:					
	a) Pitch attitude		$\pm 90^\circ$	0.25	$\pm 2^\circ$	0.5° * Pitch altitude
	is preferred, if not available, pitch rate shall be recorded					
	b) Pitch rate	$300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of}$	$2^\circ/\text{s}$	
						360°/h
3	Roll:					
	a) Roll attitude		$\pm 180^\circ$	0.25	$\pm 2^\circ$	0.5° * If not
	available, roll rate shall be recorded					
	b) Roll rate	$300^\circ/\text{s}$	0.25	$\pm 1\% + \text{drift of}$	$2^\circ/\text{s}$	
						360°/h
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: $\pm 90^\circ$	2	As installed	0.00005°
	Longitude: $\pm 180^\circ$	(1 if available)		(0.00015°		
	recommended)					
	c) Altitude	-300 m (-1 000 ft)	2	As installed	1.5 m	(5 ft)

to maximum (1 if available) (± 15 m (± 50 ft) certificated altitude recommended) of aircraft + 1
500 m (5 000 ft)

d) Ground speed 0–1 000 kt 2 As installed 1 kt

(1 if available) (± 5 kt

recommended)

e) Track 0–360° 2 As installed 0.5°

(1 if ($\pm 2^\circ$
available) recommended)

f) Estimated error Available range 2 As installed As installed Shall be recorded
(1 if if readily available
available)

5 Normal acceleration -3 g to $+6$ g (*) 0.25 As installed 0.004 g

(0.125 if (± 0.09 g
available) excluding a
datum error of
 ± 0.45 g
recommended)

6 Longitudinal acceleration ± 1 g (*) 0.25 As installed 0.004 g

(0.125 if (± 0.015 g
available) excluding a
datum error of
 ± 0.05 g
recommended)

7 Lateral acceleration ± 1 g (*) 0.25 As installed 0.004 g

(0.125 if (± 0.015 g
available) excluding a
datum error of
 ± 0.05 g
recommended)

8	External pressure (or altitude)	static 34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (± 1 mb) (0.1 in-Hg) or ± 30 m (± 100 ft) to ± 210 m (± 700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)
9	Outside temperature total (temperature)	air -50° to $+90^{\circ}\text{C}$ or 2 (or available sensor air range)		As installed ($\pm 2^{\circ}\text{C}$ recommended)	1°C
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed ($\pm 3\%$ 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 (5% of full range recommended)	As installed	2% of full range
13	Engine temperature	oil Full range	Each engine each second (5% of full range recommended)	As installed	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 engineAs installed each second	0.1% of full*	Sufficient parameters e.g. EPR/N_1 or torque/ N_p as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed shall be provided.
17	Engine generator speed (Ng)	gas0–150%	Each engineAs installed each second	0.2% of full range	
18	Free power turbine speed (Nf)	0–150%	Each engineAs installed each second	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 engineAs installed each second	1 Volt	
21	Cylinder head temperature	Full range	Each cylinderAs installed each second	2% of full range	
22	Flaps position	Full range or each discrete position	2 As installed	0.5°	
23	Primary control surface position	flightFull range	0.25 As installed	0.2% of full range	
24	Fuel quantity	Full range	4 As installed	1% of full range	
25	Exhaust temperature	gasFull range	Each engineAs installed each second	2% of full range	
26	Emergency voltage	Full range	Each engineAs installed each second	1 Volt	
27	Trim surface position	Full range or each discrete	1 As installed	0.3% of full range	

		position					
28	Landing position	gearEach position*	discrete	Each gear every two seconds	As installed		* Where available, record up-and-down-locked and down-andlocked position
29	Novel/unique aircraft features	As required	As required	As required	As required		

EIGHTH SCHEDULE

(r. 106)

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.

NINTH SCHEDULE (*rr.138, 139, 140, 146,195, 196, 197, 203*)

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 flight data recorder (FDR),
- a cockpit voice recorder (CVR), — an airborne imagerecorder (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 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 minimized;
- (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 1st 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 minimized.

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; and
 - (c) manufacturer's test reports.

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 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 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.

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.

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.

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 authorized 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

Serial Parameter		Applicability	Measurement range	Maximum Accuracy	limits	Recording number	sampling and
		(sensor input resolution)					
	recording	compared to FDR					
	interval	readout)					
	(seconds)						
1.	Time (UTC	24 hours	4 ±0.125% /h	1 s when available, otherwise relative time count or GNSS time sync)			
2.	Pressure altitude	–300 m (–1 000 ft) to	1	±30 m to ±200 m	1.5 m (5		
	ft) maximum certificated	(±100 ft to ±700 ft) altitude of aircraft		+1 500 m (+5 000 ft)			
3.	Indicated airspeed	As the installed pilot	1	±3%	1 kt display measuring system		
4.	Heading	360°	1	±2°	0.5°		
5.	Normal acceleration	–3 g to +6 g	0.125	±0.09 g excluding a	0.004 g		
	datum error of ±0.045 g						
6.	Pitch attitude	±75° or 100% of	0.5	±2°	0.5°	usable range	
	whichever is greater						
7.	Roll attitude	±180°	0.5	±2°	0.5°		
8.	Radio	On-off (one discrete)	1	—	—	transmission keying	
9.	Power on each	Full range	1 (per engine)	±2%	0.1% of full range	engine	
10.	Main rotor: Main rotor speed		50–130%	0.51	±2%	0.3% of full range	
	—Rotor brake	Discrete	—				
11.	Pilot input and/or	Full range	0.5 ±2% unless higher	0.5% of operating range	control surface	(0.25	
	accuracy uniquely	position recommended)		required	— primary controls		
	(collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)						
12.	Hydraulics, each	Discrete	1 — —	system (low pressure and selection)			
13.	Outside air	Sensor range	2	±2°C	0.3°C temperature		
14*	Autopilot/	A suitable combination	1	—	—		
	autothrottle/AFCS	of discretely					
	mode and						
	engagement status						
15*	Stability	Discrete	1	—	—		
	augmentation system						
	engagement						

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	±400°/second	0.25	±1.5% maximum range excluding datum error of ±5%	±2°/s
19*	Sling load force	0 to 200% of certified load	0.5	±3% of maximum range	0.5% maximum certified load for
20	Longitudinal acceleration	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 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)		±0.6 m (±2 ft) or ±3% whichever is greater	0.3 m (1 ft) below 150 m (500 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation	Signal range	1	±3%	0.3% of full range
24*	Horizontal beam deviation	Signal range	1	±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	As	2	As	As
(latitude/longitude, installed ground speed, drift angle, wind speed, wind direction)			installed	installed
30* Landing gear and Discrete 4 gear selector position			—	—
31* Engine exhaust gas As 1 temperature installed			As installed	
(T ₄)				
32* Turbine inlet As 1 temperature installed			As installed	
(TIT/ITT)				
33* Fuel contents As 4 installed			As installed	
34* Altitude rate As 1 installed			As installed	
35* Ice detection As 4 installed			As installed	
36* Helicopter health As — and usage monitor installed system			As installed	—
37 Engine control Discrete 1 modes			—	—
38* Selected As barometric setting installed 64 (pilot and co-pilot) (4 recommended)			As installed	0.1 mb (0.01 in Hg)
39* Selected altitude As 1 (all pilot selectable installed modes of operation)			As installed	Sufficient to determine crew selection
40* Selected speed As 1 (all pilot selectable installed modes of operation)			As installed	Sufficient to determine crew selection

41*	Selected Mach	As installed	1	As installed	Sufficient to determine crew selection
	(all pilot selectable modes of operation)				
42*	Selected vertical speed	As installed	1	As installed	Sufficient to determine crew selection
	(all pilot selectable modes of operation)				
43*	Selected heading	As installed	1	As installed	Sufficient to determine crew selection
	(all pilot selectable modes of operation)				
44*	Selected flight path	(all As installed pilot selectable modes of operation)	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	Discrete(s)	4	—	—
	(pilot and co-pilot)				
47*	Multi-function/ engine/alerts display format	Discrete(s)	4	—	—
48*	Event marker	Discrete	1	—	—
49*	GPWS/TAWS/GCAS Application for status (selection of type terrain display mode certification is including pop-up submitted to a display status) and	Discrete(s)	1	As installed	

	Contracting (terrain alerts, both State on or cautions and warnings, after 1 January and advisories) and 2023 (on/off switch position) and (operational status)					
50*	TCAS/ACAS (trafficDiscrete(s) Application for alert and collision type avoidance system) and certification is (operational status) submitted to a Contracting State on or after 1 January 2023	1	As installed			
51*	Primary flight controlsFull range Application for – pilot input forces type certification is submitted to a Contracting State on or after 1 January 2023	0.125 (0.0625± recommended) unless higher range accuracy is uniquely required	3%0.5% of operating range			
Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
52*	Computed centre gravity	Application for of type certification is submitted to a Contracting State on or after	As installed	64	As installed	1% of full range

		1 January				
		2023				
53*	Helicopter computed weight	Application for As installed type certification is submitted to a Contracting State on or after 1 January 2023	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 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 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

Maximum						
recording Minimum Minimum Minimum interval in recording recording						
N°	Parameter name	recording range	seconds	accuracy	resolution	Remarks
1	Heading:					
a)	Heading (Magnetic±180° or True)	1	±2°		0.5°	*Heading is preferred, if not available, yaw rate shall be recorded
b)	Yaw rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
2	Pitch:					
a)	Pitch attitude	±90°	0.25	±2°	0.5°	*Pitch attitude is preferred, if not available, pitch rate shall be recorded
b)	Pitch rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
3	Roll:					
a)	Roll attitude	±180°	0.25	±2°	0.5°	* Roll attitude is preferred, if not available, roll rate shall be recorded
b)	Roll rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
4	Positioning system:					
a)	Time	24 hours	1	±0.5°	0.1°	UTC time preferred where available
b)	Latitude/longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (if 0.00015° recommended)	0.00005°	

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11	Main rotor speed (Nr) available sensor range	50% to 130% or range	0.5	As installed	0.3%	of	full
12	Engine RPM (*) *For piston-overspeed condition	Full range including second	Each engine each range	As installed engined helicopters	0.2%	of	full
13	Engine oil pressure second	Full range (5% of full range recommended)	Each engine each	As installed	2%	of	full range
14	Engine oil temperature second	Full range (5% of full range recommended)	Each engine each	As installed	2%	of	full range
15	Fuel flow or pressure second	Full range	Each engine each	As installed	2%	of	full range
16	Manifold pressure (*) *For piston-overspeed condition	Full range second	Each engine each engined helicopters	As installed Maximum recording Minimum interval in recording	0.2%	of	full
N°	Parameter name	recording range	seconds	accuracy	resolution	Remarks	
17	Engine thrust/power/ *Sufficient torque parameters propulsive thrust/power*	Full range second	Each engine each range	As installed parameters e.g. required to determine EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed shall be provided. Only for turbineengined helicopters.	0.1%	of	full
18	Engine gas generator *Only for speed (Ng) (*)	0-150% second	Each engine each range	As installed turbine-engined helicopters	0.2%	of	full
19	Free power turbine speed *Only for	0-150% (Nf) (*)	Each engine each second	As installed turbine-engined helicopters	0.2%	of	full
20	Collective pitch	Full range	0.5	As installed	0.1% of full	range	
21	Coolant temperature (*) (±5°C)	Full range engined recommended)	1	As installed	1° C	*Only for piston- engined helicopters	
22	Main voltage	Full range	Each engine each	As installed	1 Volt	second	
23	Cylinder head	Full range	Each cylinder	As installed	2% of full range	*Only for piston-temperature (*) each engined helicopters	
24	Fuel quantity	Full range	4	As installed	1% of full range		
25	Exhaust gas temperature second	Full range	Each engine each	As installed	2%	of	full range
26	Emergency voltage	Full range	Each engine each	As installed	1 Volt	second	
27	Trim surface position discrete position range	Full range or each range	1	As installed	0.3%	of	full

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2019

28 Landing gear position *Where available,	Each discrete position*	Each gear every two seconds record up-and-	As installed locked and downand-locked position	
29 Novel/unique aircraft required features	As required	As required	As required	As

TENTH SCHEDULE

PENALTIES

(r. 231(8), (9), (11))

REGULATION NUMBER AND TITLE	PART
4. General instruments and equipment requirements.	A
5. Aeroplane operated under an Article 83 bis agreement	A
6. All Aeroplanes on all flights	A
7. Medical supplies	A
8. Portable fire extinguishers	A
9. Seat, berth and seat belt or safety harness	A
10. Fasten seat belt, use of oxygen, no smoking, life jackets and emergency exit	A
11. Spare electrical fuses	A
12. Lavatory fire extinguisher	A
13. Marking of break-in points	A
14. Flight recorders	A
15. Flight data recorders or FDR, and aircraft data recording systems - applicability	A
16. Recording technology	A
17. Duration of FDR	A
18. Cockpit voice recorders and cockpit audio recording systems - applicability	A
19. CVR-recording technology	A
20. CVR- duration	A
21. CVR - alternate power source	A
22. Data link recorders	A
23. Data link recorders - duration	A
24. Data link recorders - correlation	A
25. Flight crew-machine interface recordings	A
26. Flight recorders — general	A
27. Inspection of cockpit voice recorders	A
28. Combination recorders	A
29. Flight recorder data recovery	A
30. All aeroplanes operated as VFR flights	A
31. All aeroplanes on flights over water	A
32. All aeroplanes on long-range over-water flights	A
33. All Aeroplanes on flights over designated land areas	A
34. All aeroplanes on high altitude flights	A
35. All aeroplanes in icing conditions	A
36. All aeroplanes operated in accordance with instrument flight rules	A
37. All aeroplanes over 5 700 kg — emergency power supply for electrically operated attitude indicating instruments	A
38. All aeroplanes when operated at night	A
39. Pressurized aeroplanes when carrying passengers — weather radar	A
40. All aeroplanes operated above 15 000 m or 49 000 ft — radiation indicator	A

41. Mach number indicator	A
42. Aeroplanes required to be equipped with ground proximity warning systems or GPWS	A
43. Aeroplanes carrying passengers — cabin crew seats	A
44. Emergency locator transmitter or ELT	A
45. Location of aeroplane in distress	A
46. Aeroplanes required to be equipped with airborne collision avoidance system or ACAS II	A
47. Requirements for pressure-altitude reporting transponders	A
48. Microphones	A
49. Turbo-jet aeroplanes — forward-looking wind shear warning system	A
50. All aeroplanes operated by a single pilot under IFR or at night	A
52. Aeroplanes equipped with automatic landing systems, a head-up display or HUD or equivalent displays, enhanced vision systems or EVS, synthetic vision systems or SVS or combined vision systems or CVS, and Electronic Flight Bag (EFB)	A
57. Communication equipment	A
58. Navigation equipment	A
59. Performance-based navigation or PBN	A
60. Minimum navigation performance specifications or MNPS	A
61. Reduced vertical separation minimum or RVSM	A
62. Instrument meteorological conditions or IMC	A
63. Surveillance equipment	A
64. Installation	A
65. Electronic navigation data management	A
66. General	A
67. Aeroplanes on all flights	A
68. Marking of break-in points	A
69. VFR operations	A
70. Aeroplanes on flights over water - seaplanes	A
71. Landplanes	A
72. Aeroplanes on extended flights over water	A
73. Aeroplanes on flights over designated land areas	A
74. Aeroplanes on high altitude flights	A
75. All aeroplanes operated in accordance with IFR	A
76. Aeroplanes when operated at night	A
78. Mach number indicator	A
79. Aeroplanes required to be equipped with ground proximity warning system or GPWS	A
80. Emergency Locator Transmitter or ELT	A
81. Aeroplanes required to be equipped with pressure altitude reporting transponder	A
82. Microphones	A
83. Aeroplanes equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS.	A
84. Flight recorders	A
85. FDR and ADRS – applicability	A
86. FDR and ADRS – recording technology	A

87. FDR and ADRS -duration	A
88. CVR and CARS-applicability	A
89. CVR and CARS -recording technology	A
90. CVR and CARS -duration	A
91. Data link recorders – applicability	A
92. Data link recorders – duration	A
93. Data link recorders – correlation	A
94. Flight recorders — general	A
95. Flight recorder records	A
96. Continued serviceability	A
97. Flight recorder electronic documentation	A
98. EFBs- equipment	A
99. EFBs - functions	A
100. EFB specific approval	A
101. Aeroplane operated under an Article 83 bis agreement	A
102. Communication equipment	A
103. Navigation equipment-General	A
104. Navigation equipment Performance-based.	A
105. Minimum navigation performance specifications	A
106. Reduced vertical separation minimum	A
107. Instrument meteorological conditions	A
108. Surveillance equipment	A
109. General	A
110. Aeroplanes on all flights	A
111. Flight recorders – FDR	A
112. Cockpit voice recorders	A
113. Combination recorders	A
114. Aeroplanes on long-range over-water flights	A
115. Aeroplanes for which the individual certificate of airworthiness was first issued before 1 st January 1990	A
116. Aeroplanes in icing conditions	A
117. Aeroplanes operated in accordance with the instrument flight rules	A
118. Aeroplanes over 5 700 kg —emergency power supply for electrically operated attitude indicating instruments	A
119. Pressurized aeroplanes when carrying passengers - weather-detecting equipment	A
120. Aeroplanes operated above 15 000 m or 49 000 ft radiation indicator	A
121. Aeroplanes carrying passengers — cabin crew seats	A
122. Aeroplanes required to be equipped with an airborne collision avoidance system or ACAS	A
123. Aeroplanes required to be equipped with pressure-altitude reporting transponder	A
124. Microphones	A
125. Communication equipment	A
126. Installation	A
127. Electronic navigation data management	A
128. General	A
129. Helicopter operated under an Article 83 bis agreement	A

130. All helicopters on all flights	A
131. Medical supplies	A
132. Portable fire extinguishers	A
133. Seat, berth and seat belt or safety harness	A
134. Fasten seat belt, use of oxygen, no smoking, life jackets and emergency exit	A
135. Spare electrical fuses	A
136. Lavatory fire extinguisher	A
137. Marking of break-in points	A
138. Flight recorders	A
139. FDR and ADRS	A
140. FDR and ADRS - applicability	A
141. FDR and ADRS-recording technology	A
142. FDR and ADRS - duration	A
143. CVR and cockpit audio recording systems- applicability	A
144. CVR- recording technology	A
145. CVR- duration	A
146. Data link recorders- applicability	A
147. Data link recorders- duration	A
148. Data link recorders- correlation	A
149. Flight recorders - general, construction and installation	A
150. Flight recorders - operation	A
151. Continued serviceability	A
152. Flight recorders electronic documentation	A
153. Instruments and equipment for flights operated under VFR and IFR.	A
157. Ground proximity warning system	A
159. Emergency equipment	A
160. All helicopters on flights over designated sea areas	A
161. All helicopters on flights over designated land areas	A
162. Emergency locator transmitter or ELT	A
163. All helicopters on high altitude flights	A
164. All helicopters in icing conditions	A
165. Helicopters when carrying passengers — significant-weather detection	A
167. Helicopters carrying passengers — cabin crew seats	A
168. Helicopters required to be equipped with a pressure-altitude reporting transponder	A
169. Microphones	A
170. Vibration health monitoring system	A
171. Helicopters equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS	A
172. Electronic Flight Bags - equipment	A
173. EFB functions	A
175. EFB specific approval	A
176. Communication equipment	A
177. Navigation equipment	A
178. Surveillance equipment	A
179. Installation	A

180. Electronic navigation data management	A
181. General	A
182. Instruments	A
183. Equipment	A
185. Lavatory fire extinguisher	A
186. Marking of break-in points	A
187. Instruments and equipment for flights operated under VFR and IFR	A
188. Instruments and equipment for flights operated under VFR by day.	A
189. Instruments and equipment for flights operated under VFR by night	A
190. Instruments and equipment for flights operated under IFR	A
191. All helicopters on flights over water - means of flotation	A
192. Emergency equipment	A
193. All helicopters on flights over designated land areas	A
194. All helicopters on high altitude flights	A
195. Flight Recorders	A
196. FDR and ADRS	A
197. FDR and ADRS-applicability	A
198. FDR and ADRS-recording technology	A
199. FDR and ADRS - duration	A
200. CVR – Cockpit audio recording systems or CARS – applicability	A
201. CVR- recording technology	A
202. CVR- duration	A
203. Data link recorders- applicability	A
204. Data link recorders- duration	A
205. Data link recorders- correlation	A
206. Flight recorders general - construction and installation	A
207. Flight recorders - operation	A
208. Continued serviceability	A
209. Flight recorders electronic documentation	A
210. Emergency Locator Transmitter	A
211. Helicopters required to be equipped with pressure-altitude reporting transponder	A
212. Microphones	A
213. Helicopters equipped with automatic landing systems,a HUD or equivalent displays, EVS, SVS or CVS	A
214. Electronic flight bags - equipment	A
215. EFB functions	A
216. EFB specific approval	A
217. Helicopter operated under an Article 83 bis agreement	A
218. Communication equipment	A
219. Navigation equipment	A
220. Surveillance equipment	A
221. Application for exemptions	A
222. Exemption	A
223. Suspension, revocation of approval.	A
224. Use and retention of records.	A
225. Reports of violation.	A

226. Enforcement of directions.	A
227. Aeronautical user fees.	A
228. Application of regulations to Government and visiting forces, etc.	A
229. Extra-territorial application of Regulations	A

Made on the 15th December, 2025.

DAVIS CHIRCHIR,
Cabinet Secretary for Roads and Transport.