

**STATUTORY INSTRUMENTS SUPPLEMENT**

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**S T A T U T O R Y I N S T R U M E N T S**

**2022 No. 75**

**THE CIVIL AVIATION (AIRCRAFT INSTRUMENTS AND  
EQUIPMENT) REGULATIONS, 2022**

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# STATUTORY INSTRUMENTS

2022 No. 75

## **The Civil Aviation (Aircraft Instruments and Equipment) Regulations, 2022** *(Under section 61 of the Civil Aviation Authority Act, Cap. 354)*

IN EXERCISE of the powers conferred upon the Minister responsible for Civil Aviation by section 61 of the Civil Aviation Authority Act, Cap. 354 and on the recommendation of the Uganda Civil Aviation Authority, these Regulations are made, this 27th day of June, 2022.

### PART I— PRELIMINARY

#### **1. Title**

These Regulations may be cited as the Civil Aviation (Aircraft Instruments and Equipment) Regulations, 2022.

#### **2. Interpretation**

In these Regulations, unless the context otherwise requires—

“aerial work” means an aircraft operation in which an aircraft is used for specialised services such as agriculture, construction, photography, surveying, observation, patrol, aerial, fire fighting, 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;

“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 (AOC)” means a certificate authorizing an operator to carry out specified commercial air transport operations;

“air traffic service or ATS” includes flight information service, alerting service, air traffic advisory service, air traffic control service including area control service, approach control service or aerodrome control service;

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

“alternate aerodrome” means an aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities

are available, where aircraft performance requirements can be met and which is operational at the expected time of use; and alternate aerodromes include the following-

- (a) take-off alternate which is 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 which is 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 which is 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; and alternate heliports include the following—

- (a) take-off alternate which is 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 which is 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 which is 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 bailed 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 the Uganda, 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 Civil Aviation Authority;

“automatic deployable flight recorder or ADFR” means a combination flight recorder installed on the aircraft which is capable of automatically deploying from the aircraft;

“cabin crew member” means a crew member who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member;

“calibration” means a set of operations, performed in accordance with a definite documented procedure, that compares the measurement performed by a measurement device or working standard for the purpose of detecting and reporting or eliminating by adjustment errors in the measurement device, working standard, or aircraft component tested;

“cargo compartment classifications” includes-

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

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

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

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

“combined vision system or CVS” means a system to display images from a combination of an enhanced vision system or EVS and a synthetic vision system (SVS);

“commercial air transport operations” means an aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire;

“Contracting States” means all states that are signatories to the Convention on International Civil Aviation or Chicago Convention;

- “controlled flight” means any flight which is subject to an air traffic control clearance;
- “contaminated runway” means a runway is contaminated when a significant portion of the runway surface area, whether in isolated areas or not within the length and width being used is covered by one or more of the substances listed in the runway surface condition descriptors;
- “continuing airworthiness” means a set of processes by which an aircraft, engine, rotor or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life;
- “continuing airworthiness records” means records which are related to the continuing airworthiness status of an aircraft, engine, rotor or associated part;
- “corporate aviation operation” means the non-commercial operation or use of aircraft by a company for the carriage of passengers or goods as an aid to the conduct of company business, flown by a professional pilot or pilots employed to fly the aircraft;
- “continuous descent final approach or CDFA” means a technique, consistent with stabilized approach procedures, for flying the final approach segment or FAS of an instrument non-precision approach or NPA procedure as a continuous descent, without level-off, from an altitude or height at or above the final approach fix altitude/height to a point approximately 15 m or 50 ft above the landing runway threshold or the point where the flare maneuver begins for the type of aircraft flown, for the FAS of an NPA procedure followed by a circling approach, the CDFA technique applies until circling approach minima (circling OCA/H) or visual flight manoeuvre altitude or height are reached;

“crew member” means a person assigned by an operator to duty on an aircraft during a flight duty period;

“critical engine” means the engine whose failure would most adversely affect the performance or handling qualities of an aircraft;

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

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

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

“defined point before landing or DPBL” means a point, within the approach and landing phase, after which the

helicopter's ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.

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

“elevated heliport” means a heliport located on a raised structure on land;

“emergency locator transmitter or ELT” means equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated; and an ELT may be any of the following—

- (a) “automatic fixed ELT or ELT-AF” means an automatically activated ELT which is permanently attached to an aircraft;
- (b) “automatic portable ELT or ELT-AP” means an automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft.
- (c) “automatic deployable ELT or 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 and manual deployment is also provided; and
- (d) “survival ELT or 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 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 HUD” means a display system that presents flight information into the pilot’s forward external field of view;

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

“heliport operating minima” means the limits of usability of a heliport for—

- (a) take-off, expressed in terms of runway visual range or visibility and, if necessary, cloud conditions;
- (b) landing in 2D instrument approach operations, expressed in terms of visibility or runway visual

range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions; and

- (c) landing in 3D instrument approach operations, expressed in terms of visibility or runway visual range and decision altitude/height (DA/H) as appropriate to the type or category of the operation.

“hostile environment” means an environment in which—

- (a) a safe forced landing cannot be accomplished because the surface and surrounding environment are inadequate;
- (b) the helicopter occupants cannot be adequately protected from the elements;
- (c) search and rescue response or capability is not provided consistent with anticipated exposure; or
- (d) there is an unacceptable risk of endangering persons or property on the ground;

“human factors principles” means principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance;

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

“instrument approach operations” means an approach and landing using instruments for navigation guidance based on an instrument approach procedure; and 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;

“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 organisation responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight and the MMEL may be associated with special operating conditions, limitations or procedures;

“maximum mass” means maximum certificated take-off mass;

“meteorological information” means meteorological report, analysis, forecast and any other statement relating to existing or expected meteorological conditions;

“minimum descent altitude (MDA) or minimum descent height (MDH)” means a specified altitude or height in a 2D instrument approach operation or circling approach operation below which descent must not be made without the required visual reference;

“minimum equipment list or MEL” means a list that 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 namely—

- (a) “required navigation performance or RNP specification”, 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”, a navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, such as RNAV 5, RNAV 1;

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

“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;

“obstacle clearance altitude (OCA) or obstacle clearance height (OCH)” means the lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria;

“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, 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-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;

“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;

“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;

“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 certificate of airworthiness and the design of which has previously been investigated in connection with any such application;
- “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 aircraft” means an aircraft 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;
- “State of the principal location of a general aviation operator” means the State in which the operator of a general aviation aircraft has its principal place of business or, if there is no such place of business, its 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;
- “Technical Guidance Materials” means any guidance published by the authority that helps to illustrate the meaning of a requirement or specifications and is used to support the interpretation of the Regulation, issued in two categories; namely, Advisory Circulars and Forms for Aviation Industry and Orders, Checklists and Manuals for Authority Inspectors;

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

“VFR” means the abbreviation used to designate the Visual Flight Rules; and

“visual meteorological conditions or VMC” means meteorological conditions expressed in terms of visibility, distance from cloud and ceiling, □teorological conditions expressed in ter.

### **3. Application**

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

(2) Subject to subregulation (1), these Regulations apply to operations as follows—

- (a) Part II-applies to all aircraft in all operations;
- (b) Part III-applies to all aeroplanes for both domestic and international commercial air transport operations;
- (c) Part IV-applies to aeroplanes for general aviation operations;

- (d) Part V- applies to all large aeroplanes and turbo jet aeroplanes for general aviation operations;
- (e) Part VI- applies to all helicopters for both domestic and commercial air transport operations; and
- (f) Part VII- applies to all helicopters for general aviation operations.

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

**4. All aircraft in all operations-applicability**

This Part provides for aircraft instruments, equipment and flight documents requirements for all aircraft in all operations.

**5. General instruments, equipment and flight documents requirements**

(1) A person or an operator shall not fly an aircraft into Uganda or registered in Uganda, unless the aircraft is equipped as specified under these Regulations.

(2) A person or an operator may, in addition to the instruments or equipment specified in these Regulations, install additional or special equipment for aircraft operating or registered in Uganda.

(3) An operator operating an aircraft in Uganda shall ensure that all the required emergency equipment as installed on board the aircraft, are clearly marked, and the aircraft is stowed or maintained so as to not be the source of danger on the aircraft.

(4) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment, and flight documents required in these Regulations shall be installed or carried, as appropriate, in all aircraft according to the aircraft use and to the circumstances under which the flight is to be conducted.

(5) Subject to subregulation (4), all required instruments and equipment including their installation shall be approved or accepted by the authority.

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

(7) Prior to operation in Uganda of any foreign registered aircraft that uses an airworthiness maintenance program approved or accepted by the State of Registry, the owner or operator shall ensure that instruments and equipment required by these Regulations but not installed in the aircraft are properly installed and inspected in accordance with the requirements of the State of Registry.

(8) An owner or operator shall ensure that a flight does not commence unless the required equipment—

- (a) meets the minimum performance standard, the operational and airworthiness requirements in accordance with the Civil Aviation (Airworthiness of Aircraft) Regulations, 2022;
- (b) is installed such that the failure of any single unit required for either communication or navigation purposes, or both, shall not result in the inability to communicate or navigate safely on the route being flown; and
- (c) is in operable condition for the kind of operation being conducted, except as provided for in the minimum equipment list.

(9) Where equipment is to be used by one flight crewmember at his or her station during flight, that equipment shall be installed so as to be readily operable from his or her station.

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

(11) Where a means is provided on any aircraft for transferring an instrument from its primary operating system to an alternative system, the means shall include a positive positioning control and shall be marked to indicate clearly which system is being used.

(12) An instrument used by a flight crewmember shall be so arranged as to permit the flight crewmember to readily see the indications from station with the minimum practicable deviation from the position and line of vision, which the flight crewmember normally assumes when looking forward along the flight path.

## **6. Standby attitude indicator**

(1) An operator shall not operate an aeroplane with a maximum certificated take-off mass exceeding 5700 kg or a performance Class 1 or 2 helicopter unless it is equipped with a single standby attitude indicator that —

- (a) operates independently of any other attitude indicating system;
- (b) is powered continuously during normal operation; and
- (c) after a total failure of the normal electrical generating system is automatically powered for a minimum of 30 minutes from a source independent of the normal electrical generating system.

(2) Where the standby attitude indicator is being operated by emergency power, it shall be clearly operating and illuminated to the flight crew.

(3) Where the standby attitude indicator has its own dedicated power supply, there shall be an associated indication, either on the instrument or on the instrument panel when this supply is in use.

(4) Where the standby attitude instrument system is installed and usable through flight attitudes of 360 degrees of pitch and roll, the turn and slip indicators may be replaced by slip indicators.

## **7. Standby compass calibration**

(1) An operator of an aircraft shall ensure that an installed compass on an aircraft is calibrated every after twelve months except where the approved maintenance programme prescribes a different period.

(2) A compass shall be calibrated for out- of- phase occurrence's including —

- (a) whenever a magnetic sensing element has been changed or relocated;
- (b) where the compass has a deviation that is out of acceptable limits on any reading;
- (c) where the deviations of the compass are in any way different from those on the existing compass deviation card;
- (d) after a major overhaul of the aircraft, removal or replacement of any magnetic material which may affect the accuracy of the compass;
- (e) after installation of a new electrical or radio system or major medication of the existing electrical or radio system;
- (f) after installation of geographical survey equipment or other equipment that are likely to have strong external magnetic field;



- (g) if it is considered likely that carriage of a specific freight load that has a magnetic influence thereby affect compass readings;
- (h) whenever a compass has been subjected to shock like after a heavy landing;
- (i) after an aircraft has passed through a severe electrical storm;
- (j) when an aircraft operation is changed to a different geographical location with a major change in magnetic deviation;
- (k) positioning the aircraft within 92 meters from any metal object;
- (l) after an aircraft has been parked on one heading for over a year; and
- (m) when flax valves are replaced.

## **8. Aircraft lights and instruments illumination**

An operator shall not operate an aircraft unless it is equipped with—

- (a) for flight by day—
  - (i) anti-collision light system;
  - (ii) lighting supplied from the aircraft electrical system to provide adequate illumination for all instruments and equipment essential for the safe operation of the aircraft;
  - (iii) lighting supplied from the aircraft electrical system to provide adequate illumination in all passenger compartments; and
  - (iv) an electric torch for each required crewmember

readily accessible to crewmember when seated at their designated station;

- (b) for flight by night, in addition to the equipment specified in paragraph (a) —
  - (i) the lights required under the Civil Aviation (Rules of the Air) Regulations, 2020 for an aircraft in flight or operating on the movement area of an aerodrome.
  - (ii) lighting supplied from the aircraft electrical system to provide adequate illumination for all instruments and equipment essential for the safe operation of the aircraft;
  - (iii) lights in all passenger compartments.
  - (iv) an electric torch for each crewmember station;
  - (v) navigation or position lights; and
  - (vi) landing lights.

## **9. Engine instruments**

An operator shall not operate an engine-powered aircraft without the following engine instruments—

- (a) a means for indicating fuel quantity in each fuel tank to be used;
- (b) an oil pressure indicator for each engine;
- (c) an oil temperature indicator for each engine;
- (d) a manifold pressure indicator for each altitude engine; and
- (e) a tachometer for each engine.

## **10. Landing gear position indicator and aural warning device**

An operator shall not operate a powered civil aircraft with retractable landing gear unless it has a landing gear position indicator.

## **11. Survival kit**

An operator shall not operate an aircraft across land areas, which have been designated by the authority as areas in which search and rescue would be especially difficult, unless equipped with enough survival kits for the number of occupants of the aircraft appropriate for the route to be flown.

## **12. Emergency locator transmitter batteries**

(1) For each aircraft, batteries used in emergency locator transmitters shall be replaced or recharged, and the battery is rechargeable, when—

- (a) the transmitter has been in use for more than one cumulative hour; or
- (b) 50 percent of their useful life, or for rechargeable batteries, 50 percent of their useful life of charge, has expired.

(2) The expiration date for a replacement or recharged emergency locator transmitter battery shall be legibly marked on the outside of the transmitter on all aircraft.

## **13. Crash axe**

(1) An operator shall not operate an aeroplane with a maximum certificated take-off mass of over 5,700 kg or having a maximum approved passenger seating configuration of more than nine seats unless it is equipped with at least one crash axe or crowbar located in the cockpit.

(2) Where the maximum approved passenger-seating configuration is more than 200 passengers, an additional crash axe or crowbar shall be carried and located in or near the most rearward galley area.

(3) An operator shall not operate a helicopter with a maximum certificated mass of over 3,175 kg unless the helicopter is equipped

with atleast one crash axe.

(4) Crash axes or crowbars located in the passenger compartment shall not be visible to the passengers.

#### **14. Icing protection equipment**

(1) A person shall not operate an aircraft in expected or actual icing conditions unless it is equipped for the prevention or removal of ice on windshields, wings, control surfaces, empennage, propellers, rotor blades, or other parts of the aircraft where ice formation will adversely affect the safety of the aircraft.

(2) A person shall not operate an aircraft in expected or actual icing conditions at night unless it is equipped with a means to illuminate or detect the formation of ice.

(3) Subject to subregulation (2), any illumination that is used shall be of a type that will not cause glare or reflection that would handicap crewmembers in the performance of their duties.

#### **15. Pitot heat and indication systems**

(1) An operator shall not operate an aircraft in instrument flight conditions unless it is equipped with a pitot heat system.

(2) An operator shall not operate an aircraft equipped with a flight instrument pitot heating system unless the aircraft is also equipped with an operable pitot heat indication system.

(3) The indication provided shall incorporate an amber light that is in clear view of a flight crew member, the indication provided shall be designed to alert the flight crew if—

- (a) the pitot heating system is switched “off”;
- (b) the pitot heating system is switched “on”; and
- (c) any pitot tube heating element is inoperative.

(4) An operator shall not operate an aircraft equipped with an integrated flight crew alerting system that will notify the crew if the

pitot system is malfunctioning.

## **16. Static pressure system**

(1) An operator shall not operate an aircraft unless it is equipped with a static pressure system vented to the outside atmospheric pressure so that it is least affected by airflow variation or moisture or other foreign matter and installed so as to be airtight except for the vent.

(2) An operator shall not operate an aircraft in instrument flight rules or visual flight rules at night unless it is equipped with a static pressure system vented to the outside atmospheric pressure so that it is least affected by airflow variation or moisture or other foreign matter, and installed so as to be airtight except for the vent and a means of selecting an alternative source of static pressure.

(3) An operator shall not operate an aeroplane in accordance with instrument flight rules or by night unless the aeroplane is equipped with two independent static pressure systems, except that for propeller -driven aeroplanes with maximum certificated take-off mass of 5,700 kg or less, one static pressure system and one alternate source of static pressure is allowed.

## **17. Safety and survival equipment**

(1) A person shall not operate an aircraft unless safety and survival equipment that the crew or passengers are expected to use or operate at the time of an emergency are—

- (a) reliable;
- (b) readily accessible;
- (c) easily identified; and
- (d) its method of operation shall be plainly marked.

(2) An item of safety and survival equipment referred to in subregulation (1) shall be inspected regularly in accordance with

inspection periods approved by the authority.

## **18. Markings and placards**

(1) A person or operator shall not operate an aircraft unless markings and placards on instruments, equipment, controls include such limitations or information as necessary for the direct attention of the flight crew during flight.

(2) Subject to subregulation (1), markings and placards or instructions shall be provided to give any information that is essential to the ground crew in order to preclude the possibility of mistakes in ground servicing such as towing, refuelling that could pass unnoticed and that could jeopardize the safety of the aircraft in subsequent flights.

### PART III—COMMERCIAL AIR TRANSPORT —AEROPLANE INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

## **19. Aeroplanes for both domestic and international commercial air transport operations-applicability**

This Part provides for aircraft instruments, equipment and flight documents requirements for all aeroplanes for both domestic and international commercial air transport operations.

## **20. Air operator certificate**

(1) An aeroplane registered in Uganda shall, carry a certified true copy of the air operator certificate specified in the Civil Aviation (Air Operator Certification and Administration) Regulations, 2022 currently in force and a copy of the operations specifications relevant to the aeroplane, issued in conjunction with the certificate.

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

## **21. Minimum Equipment List (MEL)**

(1) The operator shall include in the operations manual a

MEL, approved by the State of the Operator which shall enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative.

(2) Where the State of the Operator is not the State of Registry, the State of the Operator shall ensure that the minimum equipment list does not affect the aeroplane's compliance with the airworthiness requirements applicable in the State of Registry.

## **22. Aircraft operating manual**

(1) The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft.

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

## **23. Aeroplane operated under Article 83 bis agreement**

(1) A person shall not operate an aeroplane under Article 83 bis agreement entered into between the State of Registry and the State of the Operator, without carrying on board the aircraft a certified true copy of the agreement summary, in either an electronic or hard copy format.

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

(3) The agreement summary of the Article 83 bis agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred under the agreement by the State of Registry to the State of the Operator, when conducting surveillance activities 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 transmitted with the Article 83 bis agreement registered with the ICAO Council shall contain the list of all aircraft affected by the agreement while the certified true copy required to be carried on board as required in subregulation (1) shall list only the specific aircraft carrying the copy.

(6) The agreement summary shall contain the information for the specific aircraft and shall follow the layout provided in the Schedule 1 to these Regulations.

#### **24. Aeroplane on all flights**

An operator shall not operate an aeroplane unless it is 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.

#### **25. Medical Supplies**

(1) An operator shall not operate an aeroplane unless it is equipped with adequate and accessible medical supplies comprising of—

- (a) one or more first-aid kits for the use of cabin crew in managing incidents of ill health.
- (b) for aeroplanes required to carry cabin crew as part of the operating crew, one universal precaution kit, two for aeroplanes 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 authorised to carry more than 100 passengers, on a sector length of more than two hours, a medical kit,



for the use of medical doctors or other qualified persons in treating in-flight medical emergencies.

(2) The type, number, location and content of the medical supplies referred to in subregulation (1) shall be specified in the applicable technical guidance materials.

## **26. Portable fire extinguishers**

(1) An operator shall not operate an aeroplane unless it is equipped with portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the aeroplane and at least one shall be located in—

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

(2) Subject to subregulation (1), an aircraft shall be equipped with portable fire extinguishers accessible for use in crew, passenger and cargo compartments as follows—

- (a) the type and quantity of extinguishing agent shall be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used;
- (b) portable fire extinguisher, containing new technology of halon alternative agent and shall be conveniently located on the cockpit for use by the flight crew;
- (c) at least one portable fire extinguisher shall be provided and conveniently located for use in each Class E cargo compartment which is accessible to crew members during flight, and at least one shall be located in each upper and lower lobe galley;
- (d) at least one portable fire extinguisher shall be conveniently located on the flight deck for use by the flight crew;

- (e) at least one portable fire extinguisher shall be conveniently located in the passenger compartment if the passenger compartment is separate from the flight deck and not readily accessible to the flight crew;
- (f) for each aeroplane having a passenger seating capacity of more than thirty, there shall be at least the following number of portable fire extinguishers conveniently located and uniformly distributed throughout the compartment—
  - (i) seven through twenty-nine one portable fire extinguisher;
  - (ii) thirty through sixty-two portable fire extinguisher;
  - (iii) sixty-one through two hundred -three portable fire extinguishers;
  - (iv) two hundred one through three hundred-four portable fire extinguishers;
  - (v) three hundred one through four hundred- five portable fire extinguishers;
  - (vi) four hundred and one through five hundred-six portable fire extinguishers;
  - (vii) five hundred and one through six hundred- seven portable fire extinguishers;and
  - (vii) six hundred and one and above- eight portable fire extinguishers;
- (g) at least one of the required fire extinguishers located in the passenger compartment of an Aeroplane with a maximum approved passenger seating configuration of at least thirtyone, and not more than sixty, and at least two of the fire extinguishers located in the passenger compartment of an aeroplane with a maximum approved passenger seating.

## **27. Seat, berth and seat belt or safety harness**

- (1) An aeroplane shall be equipped with—
- (a) a seat or berth with safety belt for each person on board over the age of two years;
  - (b) a seat belt for each seat and restraining belts for each berth; and
  - (c) a safety harness for each flight crew member 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 shall incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight controls.

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

An operator shall not operate an aeroplane unless it is equipped with means of ensuring that the following information and instructions are conveyed to passengers—

- (a) when seat belts are to be fastened;
- (b) when and how oxygen equipment is to be used where carriage of oxygen is applicable;
- (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.

## **29. Spare electrical fuses**

An operator shall not operate an aeroplane unless it is equipped with spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

## **30. Lavatory fire extinguisher**

(1) An operator shall not operate an aeroplane carrying passengers unless each lavatory in the aeroplane is equipped with a built-in fire extinguisher for each disposal receptacle for towels, paper, or waste located within the lavatory.

(2) 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 contain Halon 1211, Halon 1301, or Halon 2402.

(3) Built-in lavatory fire extinguishers shall be designed to discharge automatically into each disposal receptacle upon occurrence of a fire in the receptacle.

### **31. Operations manual, flight manual and charts**

An operator shall not operate an aeroplane unless it carries—

- (a) the operations manual prescribed in the Civil Aviation (Air Operator Certification and Administration) Regulations, 2022 or those parts of it that pertain to flight operations;
- (b) the flight manual for the aeroplane, or other documents containing performance data required for the application of aeroplane performance operating limitations in accordance with the Civil Aviation (Operation of Aircraft - Commercial Air Transport Aeroplanes) Regulations, 2022 and any other information necessary for the operation of the aeroplane within the terms of its certificate of airworthiness, unless these data are available in the operations manual; and

- (c) current and suitable charts to cover the route of the proposed flight and any route along which it is reasonable to expect that the flight may be diverted.

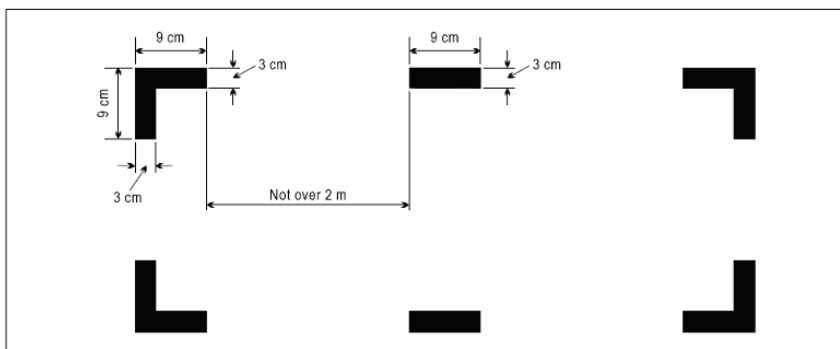
### 32. Marking of break-in points

(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 shown below in Figure 1.

(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 2m apart, intermediate lines  $9\text{ cm} \times 3\text{ cm}$  shall be inserted so that there is no more than 2m between adjacent markings.

Figure 1: Marking of break-in points



### 33. Flight recorders

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

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

(2) The image and data link information may be recorded on either the CVR or the FDR in accordance with Schedule 2 of these Regulations.

(3) 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.

(4) The image and data link information for lightweight flight recorders shall be recorded on either the CARS or the ADRS in accordance with Schedule 2 of these Regulations.

(5) The parameters to be recorded are listed in Schedule 2 to these Regulations.

### **34. Flight data recorders (FDR) and flight data recording systems - applicability**

(1) An operator shall not operate a turbine-engined aeroplane of a maximum certificated take-off mass of 5700 kg or less for which the application for type certification is submitted to the authority on or after 1 January 2016 unless the aeroplane is equipped with—

- (a) a FDR which shall record at least the first 16 parameters listed in table A8-1 in Schedule 2 to these Regulations;
- (b) a class C airborne image recording (AIR) or airborne image recording system (AIRS) which shall record at least the flight path and speed parameters displayed to the pilot or pilots as defined in Schedule 2 to these Regulations; or
- (c) an aircraft data recording system (ADRS) which shall record at least the first 7 parameters listed in table A8-3 in Schedule 2 to these Regulations.

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

- (a) a flight data recorder or (FDR) which shall record at least the first 16 parameters listed in table A8-1 in Schedule 2 to these Regulations; or
- (b) a class C airborne image recording (AIR) or airborne image recording system (AIRS) which shall record at least the flight path and speed parameters displayed to the pilot or pilots; as defined in Schedule 2 to these Regulations; or
- (c) an aircraft data recording system (ADRS) which shall record at least the first 7 parameters listed in table A8-3 in Schedule 2 to these Regulations.

(3) 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 1 January 1989 shall be equipped with FDR which shall record at least the first 32 parameters listed in table A8-1 of Schedule 2 to these Regulations.

(4) 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 1989, shall be equipped with an FDR which shall record at least the first 16 parameters listed in table A8-1 of Schedule 2 to these Regulations.

(5) All multi-engined turbine 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 1 January 1990 shall be equipped with an FDR which shall record at least the first 16 parameters listed in table A8-1 of Schedule 2 to these Regulations.

- (6) All turbine-engined aeroplanes, for which the individual

certificate of airworthiness was first issued before 1 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 Schedule 2 of these Regulations.

(7) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 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 shall record at least the first 9 parameters listed in table A8-1 of Schedule 2 to these Regulations.

(8) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 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 Schedule 2 to these Regulations.

(9) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1st January, 1987, with a maximum certificated take-off mass of over 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, in addition to the first 5 parameters listed in the table A8-1 of Schedule 2 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) All aeroplanes of a maximum certificated take-off mass of



over 5,700 kg for which the individual certificate of airworthiness is first issued after 1 January 2005 shall be equipped with a FDR which shall record at least the first 78 parameters listed in table A8-1 of Schedule 2 to these Regulations.

(11) 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 A8-1 of Schedule 2 to these Regulations.

(12) All aeroplanes of a maximum certificated take-off mass of over 5,700 kg for which individual certificate of airworthiness is first issued to a Contracting State on or after 1st January, 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in table A8-1 of Schedule 2 to these Regulations.

(13) Flight data recording system shall be inspected annually, and the inspection report submitted to the authority.

(14) The flight recorder referred to in subregulation (1) shall—

- (a) be calibrated and maintained in accordance with a maintenance program approved by the authority, and in any case not more than five years, with a valid certificate of release to service issued in accordance with these Regulations certifying that maintenance has been carried out in accordance with such maintenance schedule; and
- (b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz.

### **35. Recording technology**

An operator of an aeroplane shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape on flight data recorders or aircraft data recording systems.

### **36. Duration of FDR**

An operator shall not operate an aeroplane unless it is installed with an FDR capable of retaining information recorded during at least the last 25 hours of its operation, with exception of those installed on aeroplanes referenced in regulation 34 (5) for which the FDR retains the information recorded during at least the last 30 minutes of its operation, and in addition sufficient information from the preceding take-off for calibration purpose.

### **37. Cockpit voice recorders (CVR) and cockpit audio recording systems (CARS) - applicability**

(1) All turbine-engined aeroplanes 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.

(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 shall 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 5,700 kg that are of types of which the prototype was certificated by the appropriate national authority after 30th September, 1969 shall be equipped with a CVR.

### **38. CVR-recording technology**

An operator shall not operate an aeroplane equipped with CVRS and CARS that use magnetic tape or wire.

### **39. CVR- duration**

(1) An operator shall not operate an aeroplane unless it is equipped with a CVR capable of retaining the information recorded during at least the last 2 hours of its 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, 2021 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.

### **40. CVR - alternate power source**

(1) An alternate power source shall automatically engage and provide 10 minutes, plus or minus one minute, of operation whenever aeroplane power to the recorder ceases, either by normal shutdown or by any other loss of power.

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

(3) 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 shall be provided with an alternate power source, as defined in subregulation (1) that powers at least one CVR.

#### **41. Data link recorders (DLR)**

(1) An operator shall not operate an aeroplane for which the individual certificate of airworthiness is first issued on or after 1st January, 2016 and which uses any of the data link communications applications referred to in paragraph 5.1 (2) of Schedule 2 to these Regulations and is required to carry a CVR, unless the aeroplane records the data link communications messages on a crash-protected flight recorder.

(2) An operator shall not operate an aeroplane for which the individual certificate of airworthiness was first issued before 1st January, 2016 that is required to carry a CVR and is modified on or after 1st January, 2016 to use any of the data link communications applications referred to in paragraph 5.1(2) of Schedule 2 to these Regulations unless the aeroplane records the data link communications messages on a crash-protected flight recorder and the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1st January, 2016.

(3) An operator shall not operate an aeroplane for which the individual certificate of airworthiness was first issued before 1st January, 2016, that is required to carry a CVR and is modified on or after 1st January, 2016 to use any of the data link communications applications referred to in 5.1(2) of Schedule 2 to these Regulations shall 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 appropriate regulatory authority, this period may be extended to four years provided

these systems have demonstrated high integrity of serviceability and self-monitoring DLR systems.

**42. Data link recorders - duration**

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

**43. Data link recorders - correlation**

Data link recording shall be correlated with the recorded cockpit audio.

**44. Flight crew machine interface recordings**

(1) An operator shall not operate an aeroplane of a maximum 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 unless it is 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 Schedule 2 to these Regulations.

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

**45. Flight recorders — general**

(1) Flight recorders shall be constructed, located and installed—

- (a) so as to provide maximum practical protection for the recordings in order to preserve, recover or transcribe the recorded information;
- (b) so as to meet the prescribed crashworthiness and fire protection specifications.

(2) When operating an aeroplane, a flight recorder shall—

- (a) not be switched off during flight time;

- (b) be deactivated upon completion of flight time following an accident or incident to preserve flight recorder records;
- (c) not be reactivated before their disposition as determined in accordance with the Civil Aviation (Aircraft Accident and Incident Investigation) Regulations, 2022.

(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 Schedule 2 to these Regulations.

(4) Regarding flight recorder electronic documentation, 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.

#### **46. Inspection of cockpit voice recorders**

(1) Prior to the first flight of the day, a flight crewmember shall monitor the built-in test features on the cockpit for the cockpit voice recorder.

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

- (a) the read-out of the recorded data shall ensure that the recorder operates correctly for the nominal duration of the recording;
- (b) an annual examination of the recorded signal on the cockpit voice recorder shall be carried out by replay of the recording of cockpit voice recorder;
- (c) while installed in the aircraft, the cockpit voice recorder shall record text signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
- (d) during the annual examination, a sample of in-flight

recordings of the cockpit voice recorder shall be examined for evidence that the intelligibility of the signal is acceptable; and

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

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

#### **47. Combination recorders**

(1) An operator shall not operate an aeroplane of a maximum certificated take-off mass of over 5,700 kg for which the application for type certification is submitted to the Contracting State on or after 1st January, 2016, and which is required to be equipped with both a CVR and an FDR, unless it is equipped with two combination recorders, FDR/CVR.

(2) Subject to subregulation (1), one recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

(3) 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.

(4) Subject to subregulation (3), this regulation may be complied with by equipping the aeroplanes with two combination recorders, one forward and one after or separate devices.

(5) 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.

#### **48. Flight recorder data recovery**

(1) An operator shall not operate an aeroplane of a maximum certificated take-off mass of over 27,000 kg and authorized to carry

more than 19 passengers for which the application for type certification is submitted to a Contracting State on or after 1st January, 2021 unless it is equipped with a means approved by the State of the Operator, to recover flight recorder data and make it available in a timely manner.

(2) 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.

**49. All aeroplanes operated as VFR flights**

(1) An operator shall not operate an aeroplane for VFR flights unless it is equipped with—

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

(2) An operator shall not operate an aeroplane for VFR flights, which are operated as controlled flights unless the aeroplane is equipped in accordance with instruments flight rules.

**50. All aeroplanes on flights over water**

(1) An operator shall not operate a seaplane for all flights unless it is equipped with—



- (a) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
  - (b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable; and
  - (c) one sea anchor or drogue.
- (2) An operator shall not operate a landplane unless it carries 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 Civil Aviation (Operation of Aircraft - Commercial Air Transport Aeroplanes) Regulations, 2022;
  - (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 shall only be required when the seats or berths concerned are certified to be occupied during take-off and landing.

## **51. All aeroplanes on long-range over-water flights**

- (1) In addition to the equipment prescribed in regulation 50,

the following equipment shall be installed in all aeroplanes when used over routes on which the aeroplane may be over water and at more than a distance corresponding to 120 minutes at cruising speed or 740km or 400NM, whichever is the lesser, away from land suitable for making an emergency landing in the case of aircraft operated in accordance with the Civil Aviation (Operation of Aircraft - Commercial Air Transport Aeroplanes) Regulations, 2022, and 30 minutes or 185km or 100NM, whichever is the lesser, for all other aeroplanes—

- (a) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken;
- (b) equipment for making the pyrotechnical distress signals described in Civil Aviation (Rules of the Air) Regulations, 2020;
- (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 30 days and shall not be installed in wings or empennage.

(2) 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, except where the requirement of regulation 50(2) (c) is met by the provision of individual flotation devices other than life jackets.

**52. All aeroplanes on flights over designated land areas**

An operator shall not operate an aeroplane, across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, unless

the aeroplane is equipped with such signaling devices and life-saving equipment, including means of sustaining life as may be appropriate to the area overflown.

**53. All aeroplanes on high altitude flights**

(1) Approximate altitude in the Standard Atmosphere corresponding to the value of absolute pressure used in these Regulations shall be as follows—

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

(2) An operator shall not operate an aeroplane at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments unless the aeroplane is equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required under the Civil Aviation (Operation of Aircraft – Commercial Air Transport- Aeroplanes) Regulations, 2022.

(3) An operator of an aeroplane shall not operate 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 unless the aeroplane is 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, 2022.

(4) An operator shall not operate a pressurized aeroplane at flight altitudes at which the atmospheric pressure is less than 376 hPa unless it is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

(5) An operator shall not operate an aeroplane 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 unless it is provided with automatically deployable oxygen equipment to satisfy the requirements of the Civil Aviation (Operation of Aircraft – Commercial Air Transport- Aeroplanes) Regulations, 2022.

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

**54. All aeroplanes in icing conditions**

(1) An operator shall not operate an aeroplane unless it is 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.

(2) An operator shall not operate an aeroplane in expected or actual icing conditions at night unless it is equipped with a means to illuminate or detect the formation of ice.

(3) Any illumination that is used shall be of a type that will not cause glare or reflection that would handicap crewmembers in the performance of their duties.

**55. All aeroplanes operated in accordance with instrument flight rules (IFR)**

(1) An operator shall not operate an aeroplane 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, unless the aeroplane is equipped with—

- (a) a magnetic compass;
- (b) an accurate time piece indicating the time in hours, minutes

and seconds;

- (c) two sensitive pressure altimeters with counter drum-pointer or equivalent presentation;
- (d) an air speed 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.

**56. All aeroplanes over 5,700 kg- emergency power supply for electrically operated attitude indicating instruments**

(1) An operator shall not operate an aeroplane of a maximum certificated take-off mass of over 5,700 kg newly introduced into service after 1st January 1975 unless it is fitted with an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating, for a minimum period of 30 minutes, an attitude indicating instrument or artificial horizon, clearly visible to the pilot-in-command.

(2) Subject to subregulation (1), the emergency power supply

shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given on the instrument panel that the attitude indicator or indicators is or are respectively being operated by emergency power.

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

**57. All aeroplanes when operated at night**

(1) A person shall not operate an aeroplane at night unless it is equipped with—

- (a) all equipment specified in regulation 55;
- (b) the lights required by the Civil Aviation (Rules of the Air) Regulations, 2020 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, 2020 for navigation lights are contained in Schedule 3 to these Regulations.

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

**58. Pressurized aeroplanes when carrying passengers — weather**

## **radar**

An operator shall not carry passengers in a pressurized aeroplane unless it is 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.

### **59. All aeroplanes operated above 15,000 m or 49,000 ft-radiation indicator**

(1) An operator shall not operate an aeroplane above 15,000 m or 49,000 ft unless it carries equipment to measure and indicate continuously the dose rate of total cosmic radiation received, being the total of ionizing and neutron radiation of galactic and solar origin, and the cumulative dose on each flight.

(2) Subject to subregulation (1), the display unit of the equipment shall be readily visible to a flight crewmember.

### **60. Document attesting noise certification**

(1) An operator of an aeroplane required to comply with noise certification requirements in the Civil Aviation (Airworthiness of Aircraft) Regulations, 2022 shall carry on board a document attesting noise certification.

(2) When the document, or 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.

### **61. Mach number indicator**

An operator shall not operate an aeroplane with speed limitations expressed in terms of Mach number unless the aeroplane is equipped with a Mach number indicator.

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

(1) An operator shall not operate a turbine-engined aeroplane of a maximum certificated take-off mass in excess of 5700 kg or authorized to carry more than nine passengers unless it is 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 authorised to carry more than five but not more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings excessive descent rate and excessive altitude loss after take-off or go-around, warning of unsafe terrain clearance and a forward-looking terrain avoidance function.

(4) All piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5,700 kg or authorised to carry more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings in excessive descent rate and excessive altitude loss after take-off or go-around, warning of unsafe terrain clearance and a forward-looking terrain avoidance function.

(5) A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface.

(6) A ground proximity warning system shall provide, unless otherwise specified in these Regulations, warnings of 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 where—
  - (i) gear not locked down; and
  - (ii) flaps not in a landing position;
- (e) excessive descent below the instrument glide path.

### **63. Aeroplanes carrying passengers -cabin crew seats**

(1) An operator shall not operate an aeroplane unless it is 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 – Commercial Air Transport Aeroplanes) Regulation in respect of emergency evacuation.

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

### **64. Emergency locator transmitter or ELT**

(1) An operator shall not operate an aeroplane unless it carries an automatic ELT operating on 121.5 MHz and 406 MHz.

(2) Except as provided for in subregulation (3), an operator shall not operate an aeroplane authorised to carry more than 19 passengers unless it is equipped with at least one automatic ELT or two ELTs of any type.

(3) All aeroplanes authorised to carry more than 19 passengers for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with either—

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

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

(5) All aeroplanes authorised to carry 19 passengers or less for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.

(6) ELT equipment carried in accordance with this regulation shall operate in compliance with the Civil Aviation (Aeronautical Communication Systems) Regulations, 2022.

#### **65. Location of aeroplane in distress**

(1) 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, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress, in accordance with the Regulations applicable to location of aircraft in distress.

(2) The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the State of the Operator.

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

(1) An operator shall not operate a turbine-engined aeroplane of a maximum certificated take-off mass in excess of 5,700 kg or authorised to carry more than 19 passengers unless it is equipped with an airborne collision avoidance system.

(2) An airborne collision avoidance system shall operate in accordance with the relevant provisions of the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations, 2022.

#### **67. Requirements for pressure-altitude reporting transponders**

(1) An operator shall not operate an aeroplane unless it is equipped with a pressure-altitude reporting transponder, which operates in accordance with the relevant provisions of the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations, 2022.

(2) All aeroplanes for which the individual certificate of airworthiness is first issued after 1st January, 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (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 on-the-ground status if the aeroplane is equipped with an automatic means of detecting such status.

## **68. Microphones**

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

## **69. Turbo-jet aeroplanes — forward-looking wind shear warning system**

(1) An operator shall not operate a turbo-jet aeroplane of a maximum certificated take-off mass in excess of 5,700 kg or authorised to carry more than 9 passengers unless it is equipped with a forward-looking wind shear warning system.

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

(3) Subject to subregulation (2), the system shall 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.

**70. All aeroplanes operated by a single pilot under IFR or at night**

For approval in accordance with the Civil Aviation (Operation of Aircraft – Commercial Air Transport Aeroplanes) Regulations, 2022, all aeroplanes operated by a single pilot under the IFR or at night shall be equipped with—

- (a) a serviceable autopilot that has at least altitude hold and heading select modes;
- (b) a headset with a boom microphone, transmit button on the control wheel or equivalent; and
- (c) means of displaying charts that enables them to be readable in all ambient light conditions.

**71. 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**

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

(2) The authority shall not approve the operational use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, unless the operator—

- (a) ensures that the equipment meets the appropriate airworthiness certification requirements;
- (b) 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) 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.

## **72. Electronic Flight Bag- equipment**

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.

## **73. Electronic Flight Bag Functions**

(1) Where EFBs are used on board an aeroplane, the operator shall—

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

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

## **74. Electronic Flight Bag specific approval**

(1) An operator shall not operate an EFB on board an aeroplane unless the EFB is issued a specific approval by the State of the Operator in accordance with the appropriate airworthiness requirements and the criteria for the safe operation of the aeroplane.

(2) Subject to subregulation (1), in meeting the criteria for the safe operation of the aeroplane, the operator shall-

- (a) assess the EFB equipment and its associated installation hardware, including interaction with aeroplane systems

where applicable, meet the appropriate airworthiness certification requirements;

- (b) assess the safety risks associated with the operations supported by the EFB functions;
- (c) establish requirements for redundancy of the information where appropriate as contained in and displayed by the EFB functions;
- (d) establish and document procedures for the management of the EFB functions including any database it may use; and
- (e) establish and document the procedures for the use of, and training requirements for, the EFB and the EFB function.

*Aeroplane Communication, Navigation and Surveillance Equipment*

**75. Communication equipment**

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

- (a) conducting two-way communication for aerodrome control purposes;
- (b) receiving meteorological information at any time during flight; and
- (c) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by Uganda Communication Commission.

(2) The requirements of subregulation (1) are considered fulfilled if the ability to conduct the communications specified in subregulation (1) 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 specified 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 State of Registry; 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 the aeroplane referred to in subregulation (4), adequate provisions exist for—

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

Regulations, 2022; and

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

## **76. Navigation equipment**

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

- (a) in accordance with its operational flight plan;
- (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.

## **77. Performance-based navigation (PBN)**

(1) An operator shall not operate an aeroplane where a navigation specification for PBN has been prescribed, unless the aeroplane in addition to the requirements specified in subregulation (2)—

- (a) is provided with navigation equipment which enables it to operate in accordance with the prescribed navigation specifications;
- (b) has information relevant to the aeroplane navigation specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of the Design or State of Registry; and
- (c) has information relevant to the aeroplane navigation specification capabilities included in the MEL.



(2) Prior to the authority issuing a specific approval for PBN, the Operator shall, for operations where a navigation specification for PBN has been prescribed, establish and document—

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

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

**78. Minimum navigation performance specifications (MNPS)**

An operator shall not operate an aeroplane for flights in defined portions of airspace where, based on regional air navigation agreement, MNPS are prescribed, unless the aeroplane is provided with navigation equipment which—

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

**79. Reduced vertical separation minimum (RVSM)**

(1) An operator shall not operate an aeroplane 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 unless—

- (a) the aeroplane is provided with equipment which is capable

of—

- (i) indicating to the flight crew the flight level being flown;
  - (ii) automatically maintaining a selected flight level;
  - (iii) providing an alert to the flight crew when a deviation occurs from the selected flight level and the threshold for the alert shall not exceed  $\pm 90$  m or 300 ft; and
  - (iv) automatically reporting pressure-altitude; and
- (b) the authority shall issue a specific approval for RVSM operations.

(2) An operator shall ensure that aeroplanes operated in RVSM airspace in addition to complying with the requirements of these Regulations shall be equipped with the following—

- (a) two independent altitude measurement system;
- (b) an altitude altering system;
- (c) an automatic altitude control system; and
- (d) secondary surveillance radar (SSR) transponder system that can be connected to the altitude measurement system in the use for altitude keeping.

(3) 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 Schedule 4 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.

(4) 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.

(5) The State of the Operator, in consultation with the State of Registry where appropriate, shall ensure that, in respect of the aeroplane referred to 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 Civil Aviation (Air Traffic Services) Regulations, 2022; 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.

(6) The State of the Operator 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.

(7) Where the operator of the aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

(8) Subject to subregulation (7), monitoring data from any regional monitoring programme established in accordance with ICAO Annex 11, may be used to satisfy these requirements.

(9) The authority shall take appropriate action with respect to aircraft and operators for which it has regulatory oversight

responsibility is found to be operating in RVSM airspace in Uganda or another State without a valid RVSM specific approval.

(10) The separation requirements within RVSM airspace (between FL 290 and FL 410 inclusive) for the verticle separation minimum are—

- (a) 1,000 ft (300m) between RVSM approved aircraft;
- (b) 2,000 ft (600m) between non-RVSM approved state aircraft and other aircraft operating within RVSM airspace;
- (c) 2,000 ft (600m) between non-RVSM aircraft operating as general air traffic (GAT) and any other aircraft within RVSM airspace.

(11) On flights in which it is intended to land in instrument meteorological conditions ( 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.

(12) The equipment referred to in subregulation (11), 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.

## **80. Surveillance equipment**

(1) An operator shall not operate an aeroplane unless it is provided with surveillance equipment, which will enable it to operate in accordance with the requirements of air traffic services.

(2) For operations where surveillance equipment is required to meet required surveillance performance (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 RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or State of Registry; and
  - (c) have information relevant to the aeroplane RSP specification capabilities included in the MEL.
- (3) Where an RSP specification for PBS has been prescribed, the operator shall establish and document—
- (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 the aeroplanes referred to in subregulation (2), adequate provisions exist for—
- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations, 2022; and
  - (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specifications.

## **81. Installation**

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.

## **82. Electronic navigation data management**

(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 State of the Operator 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) Subject to subregulation (1), the operator shall continue 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 IV— GENERAL AVIATION — AEROPLANES (GENERAL AVIATION OPERATIONS)

#### *Aeroplane Instruments, Equipment and Flight Documents*

## **83. Aeroplanes for general aviation operations-applicability**

This Part provides for aircraft instruments, equipment and flight documents requirements for all aeroplanes for general aviation operations.

## **84. General**

(1) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, an aeroplane shall not fly unless the instruments, equipment and flight documents prescribed in these Regulations are installed or carried, as appropriate, in aeroplanes according to the aeroplane used and to the circumstances under which the flight is to be conducted.

(2) The prescribed instruments and equipment, including their installation, shall be acceptable to the authority.

## **85. Aeroplanes on all flights**

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

- (2) An aeroplane shall be equipped with or carry on board—
  - (a) an accessible first-aid kit;
  - (b) portable fire extinguishers of a type which, when discharged, 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) a seat or berth for each person over 2 years of age;
  - (d) a seat belt for each seat and restraining belts for each berth;
  - (e) 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 Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022
    - (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 Civil Aviation (Rules of the Air) Regulations, 2020 for pilots-in-command of intercepted aircraft;
  - (v) visual signals for use by intercepting and intercepted aircraft in accordance with the Civil Aviation (Rules of the Air) Regulations, 2020; and
  - (vi) the journey log book for the aeroplane;
- (f) spare electrical fuses of appropriate ratings where the aeroplane is fitted with fuses that are accessible in flight, for replacement of those fuses.

(3) Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in an aeroplane for which the individual certificate of airworthiness is first issued on or after 31st December 2011 and any extinguishing agent used in a portable fire extinguisher in an aeroplane for which the individual certificate of airworthiness is first issued on or after 31st December 2018 shall—

- (a) meet the applicable minimum performance requirements of the State of Registry; 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.

(4) Aeroplanes on all flights shall be equipped with the ground air signal codes for search and rescue purposes.

(5) All aeroplanes on all flights shall be equipped with a safety harness for each flight crewmember seat.

## **86. Marking of break-in points**

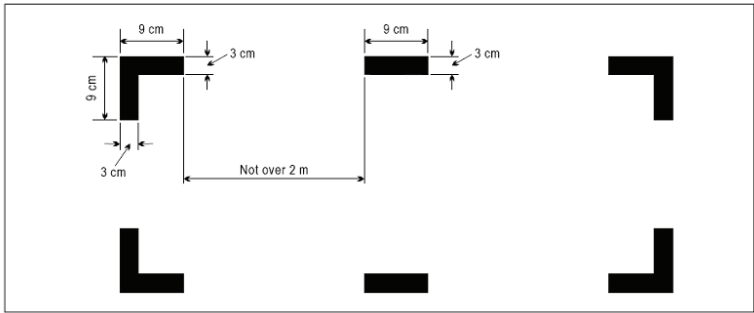
(1) Where areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane, such areas shall be marked as shown in Figure 2 below.



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

Figure 2. Marking of break-in points



87.

**All aeroplanes operated as Visual Flight Rule (VFR) Flights**

(1) All aeroplanes operated as VFR flights shall be—

- (a) equipped with a means of measuring and displaying—
  - (i) magnetic heading;
  - (ii) barometric altitude; and
  - (iii) indicated airspeed;
- (b) equipped with, or shall carry, a means of measuring and displaying time in hours, minutes and seconds; and
- (c) equipped with such additional equipment as may be prescribed by the authority.

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

**88. Aeroplanes on flights over water - seaplanes**

(1) An operator shall not operate a seaplane for any flight over

water unless it is equipped with—

- (a) one life jacket, or equivalent individual floatation device, for each person on board, stowed in a position readily accessible from the seat or berth;
- (b) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable;
- (c) one anchor; and
- (d) one sea anchor (drogue), when necessary to assist in manoeuvring.

(2) For purposes of subregulation (1), “seaplanes” includes amphibians operated as seaplanes.

### **89. Single engine landplanes**

(1) An operator shall not operate a single-engined landplane unless it carries 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—

- (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.

(2) For purposes of subregulation (1), “landplanes” includes amphibians operated as landplanes.

### **90. Aeroplanes on extended flights over water**

(1) An operator shall not operate an aeroplane on extended flights over water unless it is equipped with, at a minimum, one life jacket or equivalent individual floatation device for each person on board, stowed in a position easily accessible from the seat or berth of

the person for whose use it is provided.

(2) The pilot-in-command of an aeroplane operated on an extended flight over water shall determine the risks to survival of the occupants of the aeroplane in the event of a ditching.

(3) The pilot-in-command shall take into account the operating environment and conditions including—

- (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 the 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 Civil Aviation (Rules of the Air) Regulations, 2020

### **91. Aeroplanes on flights over designated land areas**

An operator shall not operate an aeroplane, across land areas which have been designated by the state concerned as areas in which search and rescue would be especially difficult, unless it is equipped with such signalling devices and life-saving equipment, including means of sustaining life as may be appropriate to the area overflown.

### **92. Aeroplanes on high altitude flights**

(1) An operator shall not operate an aeroplane at high altitudes unless it is equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required

under the Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022

(2) An operator shall not operate a pressurized aeroplane at flight altitudes at which the atmospheric pressure is less than 376 hPa unless it is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

### **93. All aeroplanes operated in accordance with Instrument Flight Rule**

(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 of subregulation (1) (a) (iv), (v) and (vi)

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.

#### **94. Aeroplanes when operated at night**

An operator shall not operate an aeroplane at night unless it is equipped with—

- (a) the equipment specified in regulation 93;
- (b) the lights required by the Civil Aviation (Rules of the Air) Regulations, 2020 and the Schedule 5 to these Regulations, for aircraft in flight or operating on the movement area of an aerodrome and the general characteristics of which are specified in Schedule 5 of these Regulations;
- (c) a landing light;
- (d) illumination for all flight instruments and equipment that are essential for the safe operation of the aeroplane that are used by the flight crew;
- (e) lights in all passenger compartments; and
- (f) an independent portable light for each crew member station.

#### **95. Document attesting noise certification**

(1) An operator of an aeroplane shall carry a document attesting noise certification in accordance with the Civil Aviation (Airworthiness of Aircraft) Regulations, 2022.

(2) The attestation in subregulation (1), may be contained in any document, carried on board, and approved by the State of Registry.

#### **96. Mach number indicator**

An operator shall not operate an aeroplane with speed limitations expressed in terms of Mach number unless it is equipped with a means of displaying Mach number.

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

(1) An operator shall not operate an all turbine-engined aeroplane of a maximum certificated take-off mass in excess of 5,700 kg or authorised to carry more than nine passengers unless it is equipped with a ground proximity warning system, which has a forward-looking terrain avoidance function.

(2) An operator shall not operate an all turbine-engined aeroplane of a maximum certificated take-off mass in excess of 5,700 kg or authorised to carry more than five passengers but not more than nine passengers unless it is equipped with a ground proximity warning system, which has a forward-looking terrain avoidance function.

(3) An operator shall not operate of a piston engine aeroplane of maximum certificated take-off mass in excess of 5,700 kg or authorised to carry more than nine passengers unless it is 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
- (a) unsafe terrain clearance while not in landing configuration;
- (b) gear not locked down;
- (c) flaps not in a landing position; and
- (d) excessive descent below the instrument glide path.

(6) A ground proximity warning system installed in turbine-engined aeroplanes of a maximum certificated take-off mass in excess

of 5,700 kg or authorised to carry more than nine passengers for which the individual certificate of airworthiness is 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;
- (e) gear not locked down;
- (f) flaps not in a landing position; and
- (g) excessive descent below the instrument glide path.

**98. Emergency Locator Transmitter or ELT**

(1) An operator shall not operate an aeroplane unless it carries an automatic 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 Civil Aviation (Aeronautical Communication Systems) Regulations, 2022.

**99. Aeroplanes required to be equipped with pressure altitude reporting transponder**

(1) An operator shall not operate an aeroplane unless it is equipped with a pressure-altitude reporting transponder, which operates in accordance with the relevant provisions of the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations, 2022.

(2) Subject to subregulation (1) 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 Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations, 2022.

**100. Microphones**

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

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

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

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

- (a) the equipment meets the appropriate airworthiness certification requirements;
- (b) he or she conducts a safety risk assessment of the operations supported by the automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS; and
- (c) he or she establishes and documents the procedures for the use of, and training requirements for, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.

**102. Flight recorders**

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

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



- (c) an airborne image recorder or AIR; and
- (d) a data link recorder or DLR.

(2) Image and data link information relating to crash protected flight recorders shall be recorded on either the CVR or FDR in accordance with Schedule 6 to these Regulations.

(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) Image and data link information related to lightweight flight recorders shall be recorded on either the CARS or the ADRS in accordance with Schedule 6 to these Regulations.

(5) Detailed requirements on flight recorders and parameters to be recorded are provided in the Schedule 6 to these Regulations.

### **103. FDR and ADRS – applicability**

(1) An operator shall not operate a turbine-engined aeroplane 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 unless it is equipped with—

- (a) an FDR which shall record at least the first 16 parameters in table A2.3-1 of Schedule 6 to these Regulations; or
- (b) a class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilot(s) as defined in paragraph 2.2(2) of Schedule 6 to these Regulations; or
- (c) an ADRS which shall record at least the first 7 parameters

listed in table A2-3.3 in Schedule 6 to these Regulations.

(2) All aeroplanes of a maximum certificated take-off mass of over 5,700kg 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 to Schedule 6 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 shall be equipped with an FDR capable of recording at least the 82 parameters listed in table A2.3-1 to Schedule 6 to these Regulations.

#### **104. FDR and ADRS – recording technology**

An operator of an aeroplane shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape on flight data recorders or aircraft data recording systems or airborne image recording systems.

#### **105. FDR and ADRS -duration**

An operator shall use FDRs that retains the information recorded during at least the last 25 hours of their operation.

#### **106. CVR and CARS–applicability**

An operator shall not operate a turbine-engined aeroplane with a seating configuration of more than 5 passenger seats and a maximum certificated take-off mass of 5700 kg or less for which the individual certificate of airworthiness was first issued on or after 1 January 2016 and required to be operated by more than one pilot unless it is equipped with either a CVR or a CARS.

#### **107. CVR and CARS –recording technology**

An operator of an aeroplane shall not use magnetic tape or wire on CVR and CARS

#### **108. CVR and CARS -duration**

(1) An operator shall ensure that the CVRs retain the information recorded during at least the last 2 hours of their operation.

(2) An operator shall not operate an aeroplane that is required to be equipped with CARS, and for which the individual certificate of airworthiness is first issued on or after 1st January 2025, unless it is equipped with a CARS which shall retain the information recorded during at least the last two hours of their operation.

### **109. Data link recorders – applicability**

(1) An operator shall not operate an aeroplane 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 Schedule 6 to these Regulations and are required to carry a CVR, unless it records 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 install and use any of the data link communications applications referred to in paragraph 5.1(2) of Schedule 6 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 paragraph 5.1(2) to Schedule 6 to these Regulations shall record the data link communications messages on a crash-protected flight recorder.

### **110. Data link recorders – duration**

The minimum recording duration shall be equal to the duration of the

CVR.

**111. Data link recorders – correlation**

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

**112. Flight recorders — general**

(1) Flight recorders shall be constructed, located and installed—

(a) to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed;

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

(2) Flight recorders shall—

(a) not be switched off during flight time;

(b) be deactivated upon completion of flight time following an accident or incident in order to preserve flight recorder records.

(3) The flight recorders shall not be reactivated before their disposition as determined in accordance with the Civil Aviation (Aircraft Accident and Incident Investigations) Regulations, 2022.

(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.

(5) The responsibilities of the pilot-in-command regarding the retention of flight recorder records are contained in regulation 113.

**113. Flight recorder records**

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, 2022.

**114. Continued serviceability**

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

(2) Procedures for the inspections of the flight recorder systems shall be in accordance with Schedule 6 to these Regulations.

**115. Flight recorder electronic documentation**

(1) The documentation requirement concerning FDR and ADRS parameters provided by operators to accident investigation authorities should be in electronic format and takes account of industry specifications.

(2) The industry specifications concerning flight recorder parameters referred to in subregulation (1) maybe found in ARINC 647A, flight recorder electronic documentation or equivalent.

**116. EFB - equipment**

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.

**117. EFB - functions**

(1) Where EFB is used on board the aeroplane, the operator or pilot-in-command 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
- (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.

### **118. EFB specific approval**

Prior to the authority issuing a specific approval for the use of EFBs, the Owner or Operator shall—

- (a) meet the appropriate airworthiness certification requirements for the EFB equipment and its associated installation hardware, including interaction with aeroplane systems where applicable,
- (b) shall assess the risks associated with the operations supported by the EFB functions;
- (c) establish requirements for redundancy of the information, if appropriate, contained in and displayed by the EFB functions;
- (d) establish and document procedures for the management of the EFB functions including any databases that may be used; and
- (e) establish and document the procedures for the use of, and training requirements for, the EFB functions.

### **119. Aeroplane operated under Article 83 bis agreement**

(1) An operator shall not operate an aeroplane, 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, unless it carries a certified true copy of the agreement summary, in either an electronic or hard copy format.

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

shall be included.

(3) The agreement summary of the Article 83 bis agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred under the agreement by the State of Registry to the State of a principle location of a general aviation 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 principal location of a general aviation operator.

(5) The agreement summary transmitted with the Article 83 bis agreement registered with the ICAO Council shall contain the list of all aircraft affected by the agreement while the certified true copy required to be carried on board as required in subregulation (1) shall list only the specific aircraft carrying the copy.

(6) The agreement summary shall contain the information for the specific aircraft and shall follow the layout provided in Schedule 7 of these Regulations.

### *Aeroplane Communication, Navigation and Surveillance Equipment*

#### **120. Communication equipment**

(1) An operator shall not operate an aeroplane operated in accordance with the instrument flight rules or at night unless it is provided with radio communication equipment.

(2) Subject to subregulation (1), the communication equipment shall be capable of conducting two-way communication with the aeronautical stations and on the frequencies prescribed by the Uganda Communication Commission.

(3) Where more than one communication equipment unit is provided, each shall be independent of the other or others to the extent

that a failure in anyone will not result in failure of any other.

(4) 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 in the aeronautical information publications.

(5) An aeroplane to be operated on a flight to which the provisions of regulations 90 or 91 apply, unless exempted by the authority, shall be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the authority in the aeronautical information publications.

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

(7) For operations where communication equipment is required to meet a required communication performance or RCP specification for performance based communication or PBC, an aeroplane shall, in addition to the requirements specified in this regulation-

- (a) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specifications;
  - (b) have information relevant to the aeroplane RCP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or State of Registry; and
  - (c) where the aeroplane is operated in accordance with a MEL, have information relevant to the aeroplane RCP specification capabilities included in the MEL.
- (8) The authority shall establish criteria for operations where



an RCP specification for PBC has been prescribed.

(9) 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.

(10) 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, 2020; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RCP specifications.

## **121. Navigation equipment**

(1) An operator shall not operate an aeroplane unless it is provided with navigation equipment which will enable it to proceed in accordance with—

- (a) its flight plan; and
- (b) the requirements of air traffic services; except when, if not so precluded by the authority, navigation for flights under VFR is accomplished by visual reference to

landmarks.

(2) The aeroplane shall be 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.

## **122. Performance-based navigation**

(1) For operations where a navigation specification for PBN has been prescribed, an aeroplane shall, in addition to the requirements specified in regulation 121—

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

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

(3) In establishing criteria for operations where a navigation specification for PBN 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 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 authorisation required or AR navigation specifications.

### **123. Minimum navigation performance specifications**

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 authorised by the State of Registry for the MNPS operations concerned.

### **124. Reduced vertical separation minimum (RVSM)**

(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  $\pm 90$  m or 300 ft; and
  - (iv) automatically reporting pressure altitude;

(b) the State of Registry shall issue a specific approval for RVSM operations.

(2) Prior to the authority granting the RVSM specific approval required in accordance with subregulation (1) (b), the owner or operator shall—

(a) ensure that the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Schedule 8 to these Regulations;

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

(c) institute 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 State of Registry 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 Civil Aviation (Air Traffic Services) Regulations, 2022; 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 an owner or operator shall ensure that a minimum of two aeroplanes of each aircraft type grouping have their height-keeping performance monitored, at least once every two years or within intervals of 1000

flight hours per aeroplane, whichever period is longer.

(6) Subject to subregulation (5), where an owner or operator of 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 as specified in Schedule 11 to these Regulations in respect of aircraft and owners or operators found to be operating in RVSM airspace without a valid RVSM specific approval.

(8) Subject to subregulation (7) action shall be taken where—

(a) the aircraft in question is of foreign or Uganda registered found was operating without a specific approval in the airspace of Uganda; and

(b) an owner or operator for which Uganda has regulatory oversight responsibility is found to be operating without the required specific approval in the airspace of another State.

(9) The aeroplane shall be 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.

## **125. Instrument Meteorological Conditions (IMC)**

(1) An operator or owner shall not operate an aeroplane on a flight in which it is intended to land in IMC, unless the aeroplane is provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected.

(2) The equipment specified in 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.

## **126. Surveillance equipment**

(1) An owner or operator shall not operate an aeroplane unless it is provided with surveillance equipment, which shall enable it to

operate in accordance with the requirements of air traffic services.

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

(3) The authority shall 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 operator or owner shall 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 the 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 Civil Aviation (Air Traffic Services) Regulations, 2022; and
- (b) taking immediate corrective action for individual aircraft, aircraft types or operators, identified in such reports as not complying with the RSP specifications.

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

*Aeroplane Instruments, Equipment and Flight Documents*

**127. Large aeroplanes and turbojet aeroplanes for general aviation operation-applicability**

(1) This Part provides for aircraft instruments, equipment and flight documents requirements for large and turbojet aeroplanes for general aviation operations.

(2) This Part also applies to general aviation-large and turbojet aeroplanes—

- (a) with a maximum certificated take-off mass exceeding 5 700 kg;
- (b) equipped with one or more turbojet engines; and
- (c) operation involving an aeroplane with a seating configuration of more than 9 passenger seats.

**128. General**

(1) An operator or owner shall not operate an aeroplane with a maximum certificated take off mass above 5,700 kgs and turbo jet aeroplanes for general aviation unless it complies with all requirements specified in Part IV and V of the Civil Aviation (Operation of Aircraft)

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

(4) The operating manual shall be consistent with the aircraft flight manual or pilot's operating handbook and checklists to be used and its design shall observe human factors principles.

## **129. Aeroplanes on all flights**

(1) In addition to the requirements contained in regulation 128 (2), an aeroplane shall be equipped with—

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



- (i) when seat belts are to be fastened;
  - (ii) when and how oxygen equipment is to be used where the carriage of oxygen is required;
  - (iii) restrictions on smoking;
  - (iv) location and use of life jackets or equivalent individual flotation devices where their carriage is required;
  - (v) location of emergency equipment; and
  - (vi) location and method of opening emergency exits.
- (2) An operator or owner shall not operate an aeroplane unless it carries—
- (a) the operations manual as required by the Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022 or those parts of it that pertain to flight operations;
  - (b) the flight manual for the aeroplane, or other documents containing performance data required for the application of Aeroplane Performance Operating Limitations in accordance with the Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022 and any other information necessary for the operation of the aeroplane within the terms of its certificate of airworthiness; and
  - (c) the checklists required by the Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022.

### **130. Flight recorders**

- (1) An operator or owner shall not—
  - (a) operate an aeroplane of a maximum certificated take-off mass of over 5,700kg for which the individual certificate of airworthiness was first issued on or after 1st January,

2005 unless it is equipped with an FDR which shall record at least 78 parameters listed in table A2.3-1 of Schedule 6 to these Regulations;

- (b) operate an aeroplane of a maximum certificated take-off mass of over 27,000kg for which the individual certificate of airworthiness is first issued on or after 1st January, 1989 unless it is equipped with an FDR which shall record at least 32 parameters listed in table A2.3-1 of Schedule 6 to these Regulations; and
- (c) operate an aeroplane of a maximum certificated take-off mass of over 5,700kg, up to and including 27,000kg, for which the individual certificate of airworthiness is first issued on or after 1st January, 1989, unless it is equipped with an FDR which shall record at least 16 parameters listed in table A2.3-1 of Schedule 6 to these Regulations.

### **131. Cockpit voice recorders**

(1) An operator or owner shall not operate a turbine-engined aeroplane of a maximum certificated take-off mass of over 5,700kg 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 unless it is equipped with a CVR.

(2) An operator or owner shall not operate an aeroplane of a maximum certificated take-off mass of over 27,000kg for which the individual certificate of airworthiness is first issued on or after 1st January, 1987 unless it is equipped with a CVR.

(3) An operator or owner shall not operate an aeroplane of a maximum certificated take-off mass of over 5,700kg, up to and including 27,000 kg, for which the individual certificate of airworthiness is first issued on or after 1st January, 1987, unless it is equipped with a CVR.

(4) An operator or owner shall not operate an aeroplane of a maximum certificated take-off mass of over 27,000 kg for which the individual certificate of airworthiness is first issued on or after 1st

January, 2021 unless it is equipped with a CVR capable of retaining the information recorded during at least the last 25 hours of its operation.

### **132. Combination recorders**

An operator or owner who operates an aeroplane 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.

### **133. Aeroplanes on long-range over-water flights**

(1) An operator or owner shall not operate an aeroplane on an extended flight over water unless he or she has determined the risks to survival of the occupants of the aeroplane in the event of a ditching.

(2) An operator or owner shall not operate an aeroplane unless he or she has taken into account the operating environment and conditions, including, sea state, 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, an operator or owner shall not operate an aeroplane unless, in addition to the equipment required in regulation 90, 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, 2020.

(4) Each life jacket and equivalent individual flotation device, when carried in accordance with regulation 90, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of regulation 90

is met by the provision of individual flotation devices other than life jackets.

### **134. Aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 1990**

(1) An operator or owner shall not operate a pressurized aeroplane operated at flight altitudes at which the atmospheric pressure is less than 376 hPa unless it is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

(2) An operator or owner shall not operate an aeroplane operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments unless it is 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) (Aeroplanes) Regulations, 2022

(3) An operator or owner shall not operate 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 unless it is 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) (Aeroplanes) Regulations, 2022

### **135. Aeroplanes in icing conditions**

An operator or owner shall not operate an aeroplane unless it is 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.

### **136. Aeroplanes operated in accordance with the instrument flight rules**

In addition to the requirements in regulation 93, an operator or owner shall not operate an aeroplane 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, unless it is equipped with two independent altitude measuring and display systems.

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

(1) An operator or owner shall not operate an aeroplane of a maximum certificated take-off mass of over 5,700kg unless it is 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) An aeroplane with advanced cockpit automation systems, glass cockpits, shall have system redundancy that provides the flight crew with attitude, heading, air speed and altitude indications in case of failure of the primary system or display.

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

**138. Pressurized aeroplanes when carrying passengers — weather-detecting equipment**

An operator or owner shall not operate a pressurized aeroplane carrying passengers unless it is equipped with operative weather-detecting equipment capable of detecting thunderstorms whenever such aeroplane is being operated in areas where such conditions may be expected to exist along the route either at night or under instrument

meteorological conditions.

**139. Aeroplanes operated above 15,000 m or 49,000 ft —radiation indicator**

(1) An operator or owner shall not primarily operate an aeroplane above 15,000 m or 49,000 ft unless it carries an 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.

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

**140. Aeroplanes carrying passengers — cabin crew seats**

(1) An owner or operator shall not operate an aeroplane unless it is 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 crewmember in compliance with the Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022

in respect of emergency evacuation.

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

**141. Aeroplanes required to be equipped with an airborne collision avoidance system (ACAS)**

(1) An operator or owner shall not operate a turbine-engined aeroplane of a maximum certificated take-off mass in excess of 15,000kg, or authorised to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 24th November, 2005, unless it is equipped with ACAS II.

(2) An owner or operator shall not operate a turbine-engined aeroplane of a maximum certificated take-off mass in excess of 5,700kg but not exceeding 15,000kg, or authorised to carry more than

19 passengers, for which the individual airworthiness certificate is first issued after 1st January, 2008, unless it is equipped with ACAS II.

#### **142. Aeroplanes required to be equipped with pressure-altitude reporting transponder**

An owner or operator shall not operate an aeroplane unless it is equipped with a pressure-altitude reporting transponder which operates in accordance with the Civil Aviation ( Surveillance and Collision Avoidance Systems) Regulations, 2022.

#### **143. Microphones**

All flight crewmembers 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*

#### **144. Communication equipment**

In addition to the requirements of the Civil Aviation Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022

, an operator or owner shall not operate an aeroplane unless it is 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 Uganda Communication Commission.

#### **145. Installation**

An owner or operator shall not operate an aeroplane unless the equipment installation is 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.

**146. Electronic navigation data management**

(1) An operator or owner 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) Subject to subregulation (1), the operator shall continue to monitor both the process and products.

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

PART VI—HELICOPTER OPERATIONS – COMMERCIAL AIR TRANSPORT

*Helicopter Instruments, Equipment and Flight Documents*

**147. Helicopters for both domestic and commercial air transport operations-applicability**

This Part provides for aircraft instruments, equipment and flight documents requirements for helicopters for both domestic and commercial air transport operations.

**148. General**

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

(2) Subject to subregulation (1), the required instruments and



equipment, including their installation, shall be approved or accepted by the State of Registry.

#### **149. Air operator certificate**

(1) An operator shall not operate a helicopter for international flights unless it carries a certified true copy of the air operator certificate specified in the Civil Aviation (Air Operator Certification and Administration) Regulations, 2022 and a copy of the operations specifications relevant to the helicopter type, issued in conjunction with the certificate.

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

#### **150. Minimum Equipment List (MEL)**

(1) The operator shall include in the operations manual a minimum equipment list, approved by the State of the Operator, which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative.

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

#### **151. Aircraft operating manual**

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

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

(3) The manual shall be easily accessible to the flight crew during all flight operations.

## **152. Helicopter operated under Article 83 bis agreement**

(1) An operator shall not operate a helicopter, under Article 83 bis agreement entered into between the State of Registry and the State of the Operator, unless it carries a certified true copy of the agreement summary, in either an electronic or hard copy format.

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

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

(4) The agreement summary shall be transmitted to ICAO together with Article 83 bis Agreement for registration with the ICAO Council by the State of Registry or the State of the Operator.

(5) The agreement summary shall contain the information for the specific helicopter and the layout specified in Part A of Schedule 9 to these Regulations.

(6) The agreement summary transmitted with the Article 83 bis agreement registered with the ICAO Council shall contain the list of all aircraft affected by the agreement while the certified true copy required to be carried on board as required in subregulation (1) shall list only the specific aircraft carrying the copy.

## **153. All helicopters on all flights**

An operator shall not operate a helicopter unless it is 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.

## **154. Medical supplies**

(1) An operator shall not operate a helicopter unless it is

equipped with accessible and adequate medical supplies, which shall comprise—

- (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.

(2) The type, number, location and content of the medical supplies comprising of first aids kit and universal precaution kit referred to in subregulation (1) shall be as specified in the applicable technical guidance materials.

### **155. Portable fire extinguishers**

An operator shall not operate a helicopter unless it is 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.

### **156. Seat, berth and seat belt or safety harness**

(1) An operator shall not operate a helicopter unless it is equipped with—

- (a) a seat or berth for each person over two years of age and above;
- (b) a seat belt for each seat and restraining belts for each berth;
- (c) a safety harness for each flight crew seat; and
- (d) a safety harness for each pilot seat incorporating a device which shall automatically restrain the occupant's torso in the event of rapid deceleration.

(2) 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.

### **157. Passenger information, signs and instructions**

An operator shall not operate a helicopter unless it is equipped with means of ensuring that the following information and instructions are conveyed to passengers—

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

### **158. Spare electrical fuses**

Where fuses are used, an operator shall not operate a helicopter unless it has spare electrical fuses of appropriate ratings for replacement of those accessible in flight.

### **159. Lavatory fire extinguisher**

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 31<sup>st</sup> 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 31<sup>st</sup> December, 2018 shall—

- (a) meet the applicable minimum performance requirements of the State of Registry; 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.

**160. Operations manual, flight manual and charts**

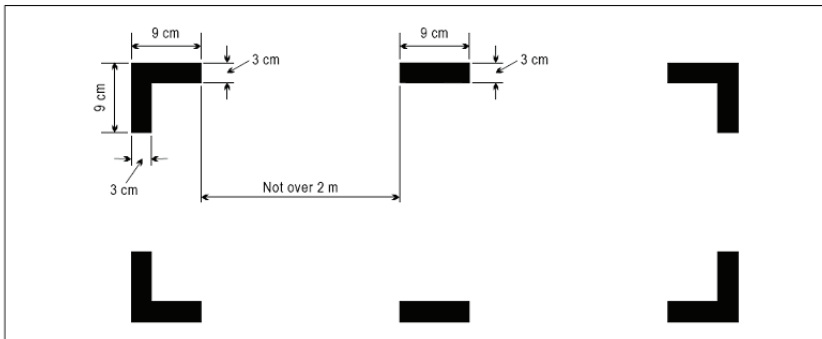
An operator shall not operate a helicopter unless it carries—

- (a) the operations manual prescribed in the Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022;
- (b) the helicopter flight manual for the helicopter, or other documents containing performance data required for the application of the Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022 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.

**161. Marking of break-in points**

(1) Where areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a helicopter, the areas shall be marked as shown in figure 3 below.

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

## **162. Flight recorders**

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

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

(2) Image and data link information may be recorded on either the CVR or the FDR in accordance with Schedule 10 to these Regulations.

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

(4) Detailed requirements on flight recorders are contained in Schedule 10 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) Image and data link information may be recorded on either the CARS or the ADRS in accordance with Schedule 10 to these Regulations.

### **163. FDR and ADRS**

Parameters to be recorded shall be those listed in Schedule 10 to these Regulations.

### **164. FDR and ADRS - applicability**

(1) An operator shall not operate a helicopter of a maximum certificated take-off mass of over 3,175kg for which the individual certificate of airworthiness is first issued on or after 1<sup>st</sup> January 2016 unless it is equipped with an FDR which shall record at least the first 48 parameters listed in table A4-1 of Schedule 10 to these Regulations.

(2) An operator shall not operate a helicopter 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 1<sup>st</sup> January, 1989 unless it is equipped with an FDR which shall record at least the first 30 parameters listed in table A4-1 of Schedule 10 to these Regulations.

(3) An operator shall not operate a helicopter 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 1<sup>st</sup> January, 1989, unless it is equipped with an FDR which shall record at least the first 15 parameters listed in table A4-1 of Schedule 10 to these Regulations.

(4) An operator shall not operate a turbine-engined helicopter 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<sup>st</sup> January, 2018 unless it is equipped with—

- (a) an FDR which shall record at least the first 48 parameters listed in table A4-1 of Schedule 10 to these Regulations;
  - (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 Schedule 10 to these Regulations;
- or

(c) an ADRS which shall record the first 7 parameters listed in table A4-3 of Schedule 10 of these Regulations.

(5) An operator shall not operate a helicopter of a maximum certificated take-off mass of 3,175 kg or less for which the individual certificate of airworthiness is first issued on or after 1st January, 2018 unless it is equipped with—

(a) an FDR which shall record at least the first 48 parameters listed in table A4-1 of Schedule 10 of these Regulations; or

(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 Schedule 10 of these Regulations; or

(c) an ADRS which shall record the first 7 parameters listed in table A4-3 of Schedule 10 of these Regulations.

(6) An operator shall not operate a helicopter 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 unless it is equipped with an FDR capable of recording at least the first 53 parameters listed in table A4-1 of Schedule 10 of these Regulations.

(7) An operator shall not operate a helicopter 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 unless it is equipped with an FDR capable of recording at least the first 53 parameters listed in table A4-1 of Schedule 10 of these Regulations.

### **165. FDR and ADRS—recording technology**

An operator of a helicopter shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape on flight data recorders or aircraft data recording systems or airborne image recorders or airborne image recording systems.

### **166. FDR and ADRS - duration**

An operator of a helicopter shall use FDRs that retain the information recorded during at least the last 10 hours of their operation.



### **167. CVR and audio recording systems- applicability**

(1) An operator shall not operate a helicopter of a maximum certificated take-off mass of over 7,000 kg unless it is equipped with a CVR.

(2) Subject to subregulation (1) for helicopters not equipped with FDR, at least main rotor speed shall be recorded on the CVR.

(3) An operator shall not operate a helicopter 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 unless it is equipped with a CVR.

(4) Subject to subregulation (3) for helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

### **168. CVR and CARS- recording technology**

An operator shall not operate a helicopter equipped with CVRS and CARS that use magnetic tape or wire.

### **169. CVR- duration**

An operator shall not operate a helicopter required to be equipped with a CVR unless it is equipped with a CVR which shall retain the information recorded during at least the last 2 hours of its operation.

### **170. Data link recorders- applicability**

(1) An operator shall not operate a helicopter for which the individual certificate of airworthiness is first issued on or after 1st January, 2016, which uses any of the data link communication applications referred to in paragraph 5.1(2) in Schedule 10 to these Regulations and is required to carry a CVR, unless it records the data link communication messages on a crash-protected flight recorder.

(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 Schedule 10 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 Schedule 10 to these Regulations shall record the data link communications messages on a crash-protected flight recorder.

**171. Data link recorders- duration**

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

**172. Data link recorders- correlation**

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

**173. Flight recorders — general construction and installation**

(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.

**174. Flight recorders — operation**

(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 determined in accordance with the Civil Aviation (Aircraft Accident and Incident Investigations) Regulations, 2022.

(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.

### **175. Continued serviceability**

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

### **176. Flight recorders electronic documentation**

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

(2) Subject to subregulation (1), industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation or equivalent document.

### **177. Instruments and equipment for flights operated under VFR and IFR**

The flight instrument requirements referred to in regulations 178, 179 and 190 shall be met by combinations of instruments or by electronic displays.

### **178. VFR by day**

An operator shall not operate a helicopter in accordance with VFR by day unless it is equipped with—

- (a) a magnetic compass;
- (b) an accurate timepiece indicating the time in hours, minutes and seconds;

- (c) a sensitive pressure altimeter;
- (d) an airspeed indicator; and
- (e) such additional instruments or equipment as may be prescribed by the authority.

### **179. VFR by night**

(1) An operator shall not operate a helicopter in accordance with VFR at night unless it is equipped with—

- (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) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
  - (f) a slip indicator;
  - (g) a heading indicator or directional gyroscope;
  - (h) a rate of climb and descent indicator;
  - (i) such additional instruments or equipment as may be prescribed by the authority and the following lights—
    - (i) the lights required under the Civil Aviation (Rules of the Air) Regulations, 2020 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.

### **180. IFR**

(1) An operator shall not operate a helicopter in accordance with IFR, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, unless it is equipped with—

- (a) a magnetic compass;
- (b) an accurate time piece indicating the time in hours, minutes and seconds;
- (c) two sensitive pressure altimeters;
- (d) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;
- (e) a slip indicator;
- (f) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (g) a heading indicator or directional gyroscope;
- (h) a means of indicating whether the power supply to the gyroscope instrument is adequate;
- (i) a means of indicating on the flight deck the outside air temperature;
- (j) a rate of climb and descent indicator;
- (k) a 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 regulation 179 (1) (i) and (2) .

(2) An operator shall not operate a helicopter in accordance with IFR unless it is 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 indicator is being operated by emergency power.

### **181. Ground Proximity Warning System**

An operator shall not operate a helicopter 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 unless it is equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

### **182. All helicopters on flights over water - means of flotation**

(1) An operator shall not operate a helicopter over water unless it is fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when-

- (a) engaged in offshore operations or other over water operations as prescribed by the authority; or
- (b) flying 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; or
- (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 auto rotational or safe forced landing distance from land when operating in performance class 3.

(2) When operating in a hostile environment, a safe ditching requires a helicopter to be designed for landing on water or certificated in accordance with ditching provisions.

(3) When considering the distance beyond which flotation equipment is required, the State shall take into consideration the certification standard of the helicopter.

### **183. Emergency equipment**

(1) An operator shall not operate a helicopter in performance Class 1 or 2 and in accordance with the provisions of regulation 182 unless it is equipped with—

- (a) one life jacket or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
- (b) for offshore operations the life jacket shall be worn constantly unless the occupant is wearing an integrated survival suit that includes the functionality of the life jacket;
- (c) life-saving rafts in sufficient numbers to carry all persons on board, stowed to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken;
- (d) when two life rafts are fitted, each shall be capable to carry all occupants in the overload state; and
- (e) equipment for making the pyrotechnical distress signals described in the Civil Aviation (Rules of the Air) Regulations, 2020.

(2) An operator shall not operate a helicopter 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 unless it is 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) An operator shall not operate a helicopter in performance Class 3 when operating beyond the distance specified in subregulation (2) unless it is equipped in compliance with these Regulations.

(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 (8) and (9) shall be complied with.

#### **184. All helicopters on flights over designated sea areas**

(1) An operator shall not operate a helicopter over sea areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, unless it is equipped



with life-saving equipment including means of sustaining life as may be appropriate to the area overflown.

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

(3) 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 this regulation.

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

**185. All helicopters on flights over designated land areas**

An operator shall not operate a helicopter, across land areas which have been designated by the state concerned as areas in which search and rescue would be especially difficult, unless it is equipped with such signalling devices and life-saving equipment including means of sustaining life as may be appropriate to the area overflown.

**186. Emergency locator transmitter (ELT)**

(1) All helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in regulation 182 ( a) and (b) with at least one automatic ELT and one ELT(S) in a raft or life jacket.

(2) ELT equipment carried to satisfy the requirements of subregulation (1) shall operate in accordance with the relevant provisions of the Civil Aviation (Aeronautical Telecommunication – Communication Systems) Regulations, 2022.

**187. All helicopters on high altitude flights**

(1) Approximate altitude in the standard atmosphere corresponding to the value of absolute pressure used in this regulation is as follows—

Absolute Pressure	Metres	feet
700 hPa	3000	10000
620 hPa	4000	13000

376 hPa	7600	25000
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(2) An operator shall not operate a helicopter at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments unless it is equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required by the Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022.

(3) An operator shall not operate a helicopter 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 unless it is 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) (General Aviation) (Helicopters) Regulations, 2022.

(4) An operator shall not operate a helicopter 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, unless it is provided with automatically deployable oxygen equipment to comply with the requirements of the Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022.

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

**188. All helicopters in icing conditions**

An operator shall not operate a helicopter unless it is 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.

**189. Helicopters when carrying passengers —significant-weather detection**

An operator shall not operate a helicopter carrying passengers unless it is equipped with operative weather radar or other significant-weather detection equipment whenever such helicopter 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.

**190. Document attesting noise certification**

(1) An operator of a helicopter required to comply with noise certification requirements in the Civil Aviation (Airworthiness of Aircraft) Regulations, 2022 shall carry on board a document attesting noise certification.

(2) When the document, or 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.

**191. Helicopters carrying passengers — cabin crew seats**

(1) An operator shall not operate a helicopter unless it is 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 Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022.

(2) Subject to regulation 154, 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.

**192. Helicopters required to be equipped with a pressure-altitude reporting transponder**

Except otherwise authorised by the authority, an operator shall not operate a helicopter unless it is equipped with a pressure-altitude reporting transponder which operates in accordance with the requirements of the Civil Aviation (Surveillance and Collision

Avoidance Systems) Regulations, 2022.

### **193. Microphones**

All flight crewmembers required to be on flight deck duty shall communicate through boom or throat microphones.

### **194. Vibration health monitoring system**

An operator shall not operate 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 passengers unless it is equipped with a vibration health monitoring system.

### **195. Helicopters equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS**

(1) An owner or operator shall not operate a helicopter equipped with automatic landing systems, Head-Up Display(HUD) or equivalent displays, Enhanced Vision Systems (EVS) , Synthetic Vision Systems (SVS) or Combines Vision Systems (CVS) or any combination of those systems into a hybrid system, unless the use of such systems for the safe operation of the helicopter is approved by the State of the Operator.

(2) The authority shall not approve the operational use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, unless the operator—

- (a) ensures that the equipment meets the appropriate airworthiness certification requirements;
- (b) 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) 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.

### **196. Electronic Flight Bag - equipment**

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.

### **197. EFB functions**

(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 State of the Operator shall issue a specific approval for the operational use of EFB functions to be used for the safe operation of helicopters.

### **198. EFB specific approval**

Prior to the authority issuing a specific approval for the operational use of EFBs, the operator shall—

- (a) ensure that the EFB equipment and its associated installation hardware, including interaction with helicopter systems where applicable, meet the appropriate airworthiness certification requirements;
- (b) assess the safety risks associated with the operations supported by the EFB functions;
- (c) establish requirements for redundancy of the information where appropriate contained and displayed by the EFB functions;
- (d) establish and document procedures for the management of the EFB functions including any databases that may be used; and
- (e) establish and document the procedures for the use of, and

training requirements for the EFB functions.

*Helicopter Communication, Navigation and Surveillance Equipment*

**199. Communication equipment**

(1) An operator shall not operate a helicopter unless it is provided with radio communication equipment capable of—

- (a) conducting two-way communication for heliport control purposes;
- (b) receiving meteorological information at any time during flight; and
- (c) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the Uganda Communication Commission.

(2) The requirements of subregulation (1) are considered fulfilled where the ability to conduct the communications specified in this regulation 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 the Required Communication Performance (RCP) specification for Performance Based Communication (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 State of Registry; and

- (c) have information relevant to the helicopter RCP specification capabilities included in the Minimum Equipment List (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 the helicopters referred to in subregulation (4), adequate provisions exist for—

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations, 2022;
- (b) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specifications.

## **200. Navigation equipment**

(1) An operator shall not operate a helicopter unless it is 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 authorised by the appropriate authority, navigation for

flights under VFR is accomplished by visual reference to landmarks.

(2) An operator shall not operate a helicopter where a navigation specification for PBN has been prescribed, unless the helicopter in addition to the requirements specified in subregulation (1)—

- (a) is provided with navigation equipment which enables it to operate in accordance with the prescribed navigation specifications;
- (b) has information relevant to the helicopter navigation specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or State of Registry; and
- (c) has 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) the normal and abnormal procedures, including contingency procedures;
- (b) the flight crew qualification and proficiency requirements, in accordance with the appropriate navigation specifications;
- (c) a training programme for relevant personnel consistent with the intended operations; and
- (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate navigation specifications.

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

(5) An operator shall not operate a helicopter unless it is 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 these Regulations.

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

## **201. Surveillance equipment**

(1) An operator shall not operate a helicopter unless it is provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.

(2) For operations where surveillance equipment is required to meet an Required Surveillance Performance (RSP) specification for performance-based surveillance, an operator shall not operate a helicopter unless, in addition to the requirements specified in subregulation (1)—

- (a) it is provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specifications;
- (b) has information relevant to the helicopter RSP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or State of Registry; and
- (c) has 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 establish and document—

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

- (b) the 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 not operate a helicopter, referred to in subregulation (2), unless adequate provisions exist for—
- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations, 2022, and
  - (b) taking immediate corrective action for individual helicopter, helicopter types or operators, identified in such reports as not complying with the RSP specifications.

## **202. Installation**

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.

## **203. Electronic navigation data management**

(1) The operator shall not employ electronic navigation data products that have been processed for application in the air and on the ground, unless the authority has approved the operator's procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the existing equipment.

(2) Subject to subregulation (1), the operator shall continue 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.

## PART VII—HELICOPTER OPERATIONS - GENERAL AVIATION

### *Helicopter Instruments, Equipment and Flight Documents*

#### **204. Helicopters for general aviation operations-applicability**

This Part provides for aircraft instruments, equipment and flight documents requirements for helicopters for general aviation operations.

#### **205. General**

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

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

#### **206. Instruments**

An owner or operator shall not operate a helicopter unless it is 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.

#### **207. Equipment – first aid**

An owner or operator shall not operate a helicopter unless it is equipped with or carries on board an accessible first-aid kit.

#### **208. Portable fire extinguishers**

An owner or operator shall not operate a helicopter unless it is equipped with or carries 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.

### **209. Seat, berth and seat belt or safety harness**

An owner or operator shall not operate a helicopter unless it is 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.

### **210. Operations manual, flight manual, pilots's operating handbook, owner's manual and charts**

An owner or operator shall not operate a helicopter unless it carries—

- (a) the flight manual, pilot's operating handbook, owner's manual or other documents or information concerning any operating limitations prescribed for the helicopter by the certificating authority of the State of Registry, required for the compliance with the Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022.;
- (b) any specific approval issued by the State of Registry, where applicable, for the operations to be conducted;
- (c) current and suitable charts for the route of the proposed flight and all routes along which the flight may be diverted;
- (d) procedures, as prescribed in the Civil Aviation (Rules of the Air) Regulations, 2020 for pilots-in-command of intercepted aircraft;
- (e) a list of visual signals for use by intercepting and intercepted aircraft, as contained in the applicable Civil aviation (Rules of the Air) Regulations 2020; and
- (f) the journey log book for the helicopter.

### **211. Spare electrical fuses**

Where fuses are used, an owner or operator shall not operate a helicopter unless it has spare electrical fuses of appropriate ratings for

replacement of those accessible in flight.

## **212. Lavatory fire extinguisher**

(1) Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter for which the individual certificate of airworthiness is first issued on or after 31st December, 2011 and any extinguishing agent used in a portable fire extinguisher in a helicopter for which the individual certificate of airworthiness is first issued on or after 31st December, 2018 shall-

- (a) meet the applicable minimum performance requirements of the State of Registry; and
- (b) not be of a type 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) An owner or operator shall not operate a helicopter on all flights unless it is equipped with the ground-air signal codes for search and rescue purposes.

(3) An owner or operator shall not operate a helicopter on all flights unless it is equipped with a safety harness for each flight crewmember seat.

## **213. Marking of break-in points**

(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 figure 4 below.

(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.

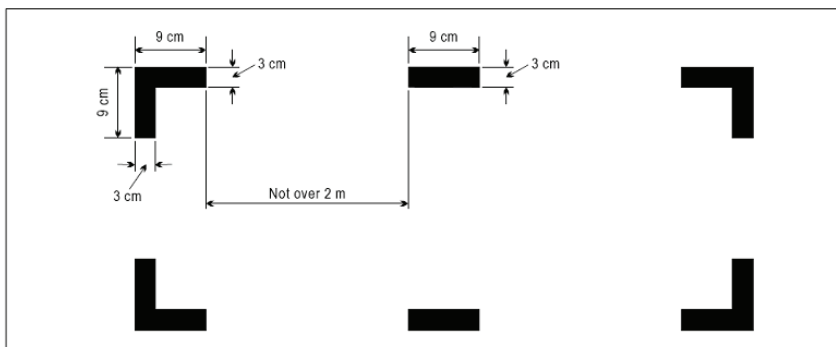


Figure 4. Marking of break-in points

## 214. Instruments and equipment for flights operated under VFR and IFR

The flight instrument requirements referred to in regulations 215, 216 and 217 in these Regulations shall be met by combinations of instruments or by electronic displays.

## 215. VFR by day

An owner or operator shall not operate a helicopter when operating in accordance with VFR by day unless it is equipped with—

- (a) a magnetic compass;
- (b) a sensitive pressure altimeter;
- (c) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (d) a heading indicator or directional gyroscope;
- (e) an air speed indicator;
- (f) a means of measuring and displaying the timing in hours, minutes and seconds; and
- (g) such additional instruments or equipment as may be prescribed by the authority.

## **216. VFR by night**

(1) An owner or operator shall not operate a helicopter when operating in accordance with VFR at night unless it is equipped with—

- (a) magnetic compass;
- (b) a sensitive pressure altimeter;
- (c) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (d) a heading indicator or directional gyroscope;
- (e) an airspeed indicator;
- (f) a means of measuring and displaying the timing in hours, minutes and seconds;
- (g) a slip indicator;
- (h) a rate of climb and descent indicator;
- (i) such additional instruments or equipment as may be prescribed by the authority;
- (j) the following lights—
  - (i) the lights required by the applicable Civil Aviation (Rules of the Air) Regulations, 2020 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) The landing light specified in subregulation (1) shall be trainable, at least in the vertical plane.

## **217. IFR**

An owner or operator shall not operate a helicopter in accordance

with IFR, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, unless it is equipped with—

- (a) a magnetic compass;
- (b) two sensitive pressure altimeters;
- (c) an airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;
- (d) a slip indicator;
- (e) an attitude indicator or artificial horizon for each required pilot and one additional attitude indicator;
- (f) a heading indicator or directional gyroscope;
- (g) a means of indicating whether the power supply to the gyroscope instrument is adequate;
- (h) a means of indicating on the flight deck the outside air temperature;
- (i) a rate of climb and descent indicator;
- (j) such additional instruments or equipment as may be prescribed by the authority;
- (k) where operated at night, the lights specified in regulation 216 (1) (j) and (2); and
- (l) means of measuring and displaying the time in hours, minutes and seconds.

**218. All helicopters on flights over water - means of flotation**

(1) An owner or operator shall not operate a helicopter flown over water unless it is fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when—

- (a) engaged in offshore operations or other over water operations as prescribed by the State of Registry; 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.

## **219. Emergency equipment**

(1) An owner or operator shall not operate a helicopter in accordance with the provisions of regulation 218 unless it is equipped with—

- (a) one life jacket or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
- (b) when not precluded by consideration related to the type of helicopter used—
  - (i) life-saving rafts in sufficient numbers to carry all persons on board stowed to facilitate their ready use in emergency;
  - (ii) 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 Civil Aviation (Rules of the Air) Regulations, 2020.

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

(3) Each life jacket and equivalent individual flotation device, when carried in accordance with regulation 218, 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 this regulation shall be deployable by remote control.

(5) Rafts which are not deployable by remote control and which have a mass of more than 40 kgs shall 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) shall be complied with.

### **220. All helicopters on flights over designated land areas**

An owner or operator shall not operate a helicopter, across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, unless it is equipped with such signaling devices and life-saving equipment, including means of sustaining life as may be appropriate to the area overflown.

### **221. All helicopters on high altitude flights**

(1) An owner or operator shall not operate an unpressurized helicopter at high altitude unless it carries equipment for storing and dispensing the oxygen supplies required in the applicable Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022

(2) An owner or operator shall not operate a pressurized helicopter at high altitude unless it carries emergency oxygen storage and dispensing equipment capable of storing and dispensing the oxygen supplies required in the applicable Civil Aviation (Operation of Aircraft) (Commercial Air Transport) (General Aviation) (Helicopters) Regulations, 2022

### **222. Document attesting noise certification**

(1) An owner or operator of a helicopter required to comply with noise certification requirements in the Civil Aviation (Airworthiness of Aircraft) Regulations, 2022 shall carry on board a document attesting noise certification.

(2) When the document, or 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.

**223. Flight Recorders**

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

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

(2) Image and data link information may be recorded on either the CVR or the FDR in accordance with Schedule 10 to these Regulations.

(3) Combination recorders, Flight Data Recorder and Cockpit Voice Recorder may be used to meet the flight recorder equipage requirements in these Regulations and Schedule 10 to these Regulations.

(4) Detailed requirements on flight recorders are contained in Schedule 10 to these Regulations.

(5) Light weight 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; and
- (d) a data link recording system or DLRS.

(6) Image and data link information may be recorded on either the CARS or the ADRS in accordance with the Schedule 10 to these Regulations.

## **224. FDR and ADRS**

Parameters to be recorded shall be those listed in Schedule 10 to these Regulations

## **225. FDR and ADRS—applicability**

(1) An owner or operator shall not operate a helicopter 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 unless it is equipped with an FDR which shall record at least the first 48 parameters listed in table A4-1 of Schedule 10 to these Regulations.

(2) An owner or operator shall not operate a helicopter 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 unless it is equipped with an FDR which shall record at least the first 48 parameters listed in table A4-1 of Schedule 10 to these Regulations.

(3) An owner of operator shall not operate a helicopter 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, unless it is equipped with a FDR which shall record atleast the first fifteen parameters listed in table A4-1 of Schedule 10 to these Regulations.

## **226. FDR and ADRS—recording technology**

An operator or owner of a helicopter shall not use engraving metal foil, frequency modulation, photographic film or magnetic tape on flight data recorders or aircraft data recording systems or airborne image recorders or airborne image recording systems.

## **227. FDR and ADRS - duration**

An owner or operator of a helicopter shall use FDRs that retain the information recorded during at least the last 10 hours of their operation.

## **228. Cockpit audio recording systems (CARS) – applicability**

(1) An owner or operator shall not operate a helicopter of

a maximum certificated take-off mass of over 7,000 kgs unless it is equipped with a CVR.

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

(3) An owner or operator shall not operate a helicopter of a maximum certificated take-off mass of over 3,175 kgs for which the individual certificate of airworthiness is first issued on or after 1st January 1987 unless it is equipped with a CVR.

**229. CVR- recording technology**

An owner or operator of a helicopter shall not use magnetic tape or wire on CVR.

**230. CVR- duration**

An owner or operator shall not operate a helicopter required to be equipped with a CVR unless it is equipped with a CVR, which shall retain the information recorded during at least the last 2 hours of its operation.

**231. Data link recorders- applicability**

(1) An owner or operator shall not operate a helicopter 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 Schedule 10 to these Regulations and are required to carry a CVR, unless it records the data link communications messages on a crash-protected flight recorder.

(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 1<sup>st</sup> January, 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of Schedule 10 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<sup>st</sup> 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<sup>st</sup> January 2016, that are required to carry a CVR and are modified on or after 1<sup>st</sup> January, 2016 to use any of the data link communications applications referred to in paragraph 5.1.2 of Schedule 10 to these Regulations shall record the data link communications messages on a crash-protected flight recorder.

### **232. Data link recorders- duration**

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

### **233. Data link recorders- correlation**

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

### **234. Flight recorders — general, construction and installation**

(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.

### **235. Flight recorders — operation**

(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 Investigations) Regulations, 2022.

(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.

### **236. Continued serviceability**

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

### **237. Flight recorders electronic documentation**

(1) The documentation requirement concerning FDR parameters provided by an owner or operator to accident investigation authorities shall be in electronic format and shall take into account industry specifications.

(2) The industry specifications referred to in subregulation (1) may be found in ARINC 647A, flight recorder electronic documentation or equivalent.

### **238. Emergency Locator Transmitter**

(1) The owner or operator shall not operate a helicopter in performance Class 1, 2 and 3 unless it is equipped with at least one automatic ELT and, when operating on flights over water as described in regulation 218 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 Civil Aviation (Aeronautical Communication Systems) Regulations, 2022.

### **239. Helicopters required to be equipped with pressure-altitude reporting transponder**

An owner or operator shall not operate a helicopter unless it is equipped with a pressure-altitude reporting transponder, which operates in accordance with the requirements of the Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations, 2022.

## **240. Microphones**

All flight crewmembers required to be on flight deck duty shall communicate through boom or throat microphones.

## **241. Helicopters equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS**

(1) An owner or operator shall not operate a helicopter equipped with automatic landing systems, Head-Up Display(HUD) or equivalent displays, Enhanced Vision Systems (EVS) , Synthetic Vision Systems (SVS) or Combines Vision Systems (CVS), or any combination of those systems into a hybrid system, unless approved by the State of Registry based on the criteria for the use of such systems for the safe operation of the helicopter.

(2) Subject to subregulation (1), in establishing operational criteria for the use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the State of Registry shall require that—

- (a) the equipment meets the appropriate airworthiness certification requirements;
- (b) the owner or 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 owner or 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.

## **242. Electronic Flight Bag -equipment**

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.

## **243. EFB functions**

(1) Where EFBs are used on board a helicopter the pilot-in-command or the owner 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
- (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.

#### **244. EFB specific approval**

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 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 that may be used; and
- (e) the owner has established and documented the procedures for the use of, and training requirements for the EFB functions.

#### **245. Helicopter operated under Article 83 bis agreement**

(1) An owner or operator shall not operate a helicopter, 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, unless it carries a certified true copy of the agreement summary, in either an electronic or hard copy format.

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

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

(5) The agreement summary shall contain the information for the specific aircraft and follow the layout specified in the Part B of Schedule 9 to these Regulations.

(6) The agreement summary transmitted with the Article 83 bis agreement registered with the ICAO Council shall contain the list of all aircraft affected by the agreement while the certified true copy required to be carried on board as required in subregulation (1) shall list only the specific aircraft carrying the copy.

### *Helicopter Communication, Navigation and Surveillance Equipment*

#### **246. Communication equipment**

(1) An owner or operator shall not operate a helicopter with IFR or at night unless it is provided with radio communication equipment.

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

(3) The requirements of subregulation (1) shall be considered fulfilled if the ability to conduct the communications specified in this

regulation 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) An owner or operator shall not operate a helicopter in accordance with VFR controlled flight, unless it is 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 owner or operator shall not operate a helicopter on a flight to which the provisions of subregulations (2) or (5) apply, unless it is 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 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 performance-based communication, an owner or operator shall not operate a helicopter unless, in addition to the requirements specified in these Regulations-

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

(9) The State of Registry shall establish the criteria for operations where RCP specification for PBC has been prescribed.

(10) In establishing the criteria for operations where RCP specification for PBC has been prescribed by the authority, the operator or owner shall 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 the helicopters referred to in subregulation (8), adequate provisions exist for—

- (a) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations, 2022; and
- (b) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specifications.

#### **247. Navigation equipment**

(1) An owner or operator shall not operate a helicopter unless it is provided with navigation equipment which shall enable it to proceed in accordance with—

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

except when authorised by the 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 (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 specification;
- (b) have information relevant to the helicopter navigation specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or State of Registry; and
- (c) have information relevant to the helicopter navigation specification capabilities included in the MEL.

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

(5) In establishing the criteria for operations where a navigation specification for PBN has been prescribed by the authority, 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 navigation specifications;
- (c) a training programme for relevant personnel consistent with the intended operations; and
- (d) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate navigation specifications.

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

(7) An owner or operator shall not operate a helicopter unless it is provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the helicopter to navigate in accordance with subregulations (1) and (2).

(8) 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 effected.

(9) The equipment in subregulation (8) 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.

#### **248. Surveillance equipment**

(1) An owner or operator shall not operate a helicopter unless it is provided with surveillance equipment, which shall enable it to operate in accordance with the requirements of air traffic services.

(2) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance, an owner or operator shall not operate a helicopter unless, in addition to the requirements specified in subregulation (1)—

- (a) it is provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification;
- (b) has information relevant to the helicopter RSP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or State of Registry; and
- (c) has information relevant to the helicopter 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) Subject to subregulation (3), when establishing criteria for

operations where an RSP specification for PBS has been prescribed by the authority, the operator or owner shall 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 owner or operator shall not operate a helicopter referred to subregulation (2) unless adequate provisions exist for—
- (a) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with the Civil Aviation (Air Traffic Services) Regulations, 2022; 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 VIII— GENERAL

### **249. Application for exemptions**

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

(2) A request for exemption shall be made in accordance with the requirements of these Regulations and an application for the exemption shall be submitted and processed in a manner prescribed by the authority in the applicable technical guidance material.

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

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

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

## **250. Exemptions**

(1) The authority may, upon consideration of the circumstances of the application for exemption, 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.

## **251. Suspension and revocation of approval**

(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.

(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 aircraft from flying.

(4) A holder or any person having the possession or custody of any approval, exemption or other document 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.

(5) The breach of any condition subject to which any approval, exemption or any 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.

## **252. Use and retention of records**

(1) A person shall not—

(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 or she 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 herself 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) A person shall not purport to issue any approvals, authorisations or exemptions under these Regulations unless he or she is authorised by the authority to do so.

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

### **253. Reports of violation**

(1) Any person who knows of a violation of the Act or these Regulations, rule or order issued by the authority shall report it to the authority.

(2) The authority shall determine the nature and type of any additional investigation or enforcement action that may be taken.

### **254. Enforcement of directions**

(1) The authority shall take enforcement action on any regulated entity that fails to comply with the provisions of these Regulations.

(2) The Inspectors of the authority holding valid delegations shall take necessary action to preserve safety where undesirable conditions have been detected.

(3) The action referred to in subregulation (2) may include—

(a) in the case of a regulated entity, imposition of operating restrictions until such a time when the existing and undesirable conditions has been resolved;

(b) in the case of a licenced personnel, require that an individual does not exercise the privileges of the licence until such a time that the undesirable condition has been resolved.

(4) In carrying out the enforcement actions under subregulation (2), the inspectors of the authority shall invoke the powers with due

care and act in good faith in the interest of preserving safety.

### **255. Aeronautical user fees**

(1) The authority may notify the fees to be charged in connection with the issue, validation, renewal, extension or variation of any certificate, licence, exemption 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 under these Regulations.

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

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

### **256. Application of these Regulations to Government and visiting forces, etc**

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

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

### **257. Extra-territorial application of these Regulations**

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

(a) in so far as they apply, whether by express reference or

otherwise, to aircraft registered in Uganda, apply to such aircraft wherever they may be;

- (b) in so far as they apply, whether by express reference or otherwise, to other aircraft, apply to such aircraft when they are within Uganda;
- (c) in so far as they prohibit, require or regulate, whether by express reference or otherwise, the doing of anything by any person in, or by any of the crew of, any aircraft registered in Uganda, shall apply to such persons and crew, wherever they may be; and
- (d) in so far as they prohibit, require or regulate, whether by express reference or otherwise, the doing of anything in relation to any aircraft registered in Uganda by other persons shall, where such persons are citizens of Uganda, apply to them wherever they may be.

#### PART IX— OFFENCES AND PENALTIES

##### **258. Offences and penalties**

(1) A person who contravenes any provision of these Regulations may have his or her licence, certificate, approval, authorisation, exemption or other document revoked or suspended by the authority.

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

(3) A person who contravenes any provision specified as an “A” provision in Schedule 11 to these Regulations commits an offence and is liable, on conviction, to a fine not exceeding fifty currency points

for each offence or each flight or to imprisonment not exceeding one year or both.

(4) A person who contravenes any provision specified as a “B” provision in Schedule 11 to these Regulations commits an offence and is liable, on conviction, to a fine not exceeding one hundred currency points for each offence or each flight or to imprisonment for a term not exceeding three years or to both.

(5) A person who contravenes any provision of these Regulations not being a provision referred to in Schedule 11 to these Regulations, commits an offence and is liable, on conviction, to a fine not exceeding one hundred currency points and in the case of a second or subsequent conviction for the same offence to a fine not exceeding two hundred currency points.

#### PART X— REVOCATION AND SAVINGS

### **259. Revocation of S.I. No. 35 of 2020, savings and transitional**

(1) The Civil Aviation (Instruments and Equipment) Regulations, 2020, S.I. No.35 of 2020 are revoked.

(2) A licence, certificate, authorisation, exemption or other approval granted by the authority under the Regulations revoked by subregulation (1) and which is in force immediately before the commencement of these Regulations, shall have effect and shall continue in force as if granted under these Regulations, until it expires or is cancelled by the authority.

(3) Notwithstanding the continuance of any licence, certificate, authorisation, exemption or other approval under subregulation (2), a person who, at the commencement of these Regulations is carrying out any act, duty or operation affected by these Regulations shall, within six months from the commencement of these Regulations, or within such longer period as the Minister may, by notice in the Gazette prescribe, comply with the requirements of these Regulations.

(4) Notwithstanding regulation 258, a person granted

a licence, certificate, authorisation, exemption or other approval, continued under subregulation (2) who does not comply with the requirements of these Regulations within the time prescribed under subregulation (3), shall have the licence, certificate, authorisation, exemption cancelled by the authority.

**SCHEDULE 1**

*Regulation 23(6)*

**ARTICLE 83 bis AGREEMENT SUMMARY  
Commercial Air Transport- Aeroplanes**

*Note.— A certified true copy of the agreement summary to be carried on board.*

**1. Purpose and scope**

*The Article 83 bis agreement summary shall contain the information in the template in paragraph 2, in a standardized format.*

**1. Article 83 bis agreement summary**

<b>ARTICLE 83 bis AGREEMENT SUMMARY</b>		
Title of the Agreement:		
State of Registry:		Focal point:
State of the Operator:		Focal point:
Date of signature:	By State of Registry <sup>1</sup> :	
	By State of the Operator <sup>1</sup> :	
Duration:	Start Date <sup>1</sup> :	End Date (if applicable) <sup>2</sup> :

Languages of the Agreement	
ICAO Registration No.:	
Umbrella Agreement (if any) with	
ICAO Registration number:	

<b>Chicago Convention</b>	<b>ICAO Annexes affected by the transfer to the State of the Operator of responsibility in respect of certain functions and duties</b>		
Article 12: Rules of the Air	Annex 2, all chapters	Yes	
		No	
Article 30 a): Aircraft radio equipment	Annex 2, Radio Station Licence	Yes	
		No	
	Annex 1, Chapters 1, 2, 3 and 6	Yes	Annex 6: [Specify Part and paragraph] <sup>3</sup>
Articles 30 b)	and Annex 6 Part I, Radio Operator or	No	
and 32 a):	Annex 6, Part II (qualifications and /or Flight crew member Licencing); or Annex 6, Part III, section II, (Composition of the flight crew) (radio operator) and/or Annex 6 Part III section III, (qualifications)		
Personnel Licensing			

	Annex 6	Yes	[Specify Part and chapters] <sup>3</sup>
Article 31: Certificates of Airworthiness	Part I or Part III, Section II	No	
	Annex 6	Yes	[Specify Part and chapters] <sup>3</sup>
	Part II or Part III, Section III	No	
	Annex 8	Yes	[Specify chapters] <sup>3</sup>
	Part II, Chapters 3 and 4	No	

### Aircraft affected by the transfer of responsibilities to the State of the Operator

Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From <sup>1</sup>	To (if applicable) <sup>2</sup>
			JHB		

*Notes.—*

1. *dd/mm/yyyy.*
2. *dd/mm/yyyy or N/A if not applicable.*
3. *Square brackets indicate information that needs to be provided.*



## **SCHEDULE 2**

*Regulations 33(2), 34,41,44 and 45*

### **FLIGHT RECORDERS (COMMERCIAL AIR TRANSPORT — AEROPLANES)**

The material in this Schedule concerns flight recorders intended for installation in aeroplanes engaged in international air navigation. Crash-protected flight recorders comprise one or more of the following-

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

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

Lightweight flight recorders comprise one or more of the following-

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

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

#### **1. GENERAL REQUIREMENTS**

- (1) Non-deployable flight recorder containers shall be painted a distinctive

orange colour.

- (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.
- (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.
- (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 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be 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.*

- (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.

- (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.
- (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.
- (8) Means shall be provided for an accurate time correlation between the flight recorder systems recordings.
- (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 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**

- (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) Where further FDR recording capacity is available, recording of the following additional information shall be considered—
  - (a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority—
    - (i) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;
    - (ii) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;
    - (iii) warnings and alerts; and
    - (iv) the identity of displayed pages for emergency procedures and checklists; and
  - (b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.
- (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—
  - (a) pressure altitude;
  - (b) indicated airspeed or calibrated airspeed;
  - (c) heading (primary flight crew reference);
  - (d) pitch attitude;
  - (e) roll attitude;

- (f) engine thrust/power;
  - (g) landing-gear status\* ;
  - (h) total or outside air temperature\*;
  - (i) time\*;
  - (j) navigation data\*: drift angle, wind speed, wind direction, latitude/longitude;
  - (k) radio altitude\* .
- (4) The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in Table A8-3.
- (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**

- (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) 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**

- (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.
- (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) 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.
- (4) The preferred CARS audio allocation shall be as follows—
  - (a) voice communication; and
  - (b) aural environment on the flight deck.

## **4. AUTOMATIC DEPLOYABLE FLIGHT RECORDER (ADFR)**

### **4.1 Operation**

The following requirements shall apply to an ADFR—

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

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

*Note 2.— where an integrated ELT of a type that is activated in flight is used within an ADFR, it could be a means to comply with the requirements of Regulation 65-location of Aeroplane in distress*

## **5. DATA LINK RECORDER (DLR)**

### **5.1 APPLICATIONS TO BE RECORDED**

- (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.*

- (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**

- (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**

- (2) 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.
- (3) The recording of operation of switches and selectors by the flight crew shall include the following—
  - (a) any switch or selector that will affect the operation and the navigation of the aircraft; and
  - (b) selection of normal and alternate systems.
- (4) The recording of the information displayed to the flight crew from electronic displays shall include the following:
  - (a) primary flight and navigation displays;
  - (b) aircraft system monitoring displays;
  - (c) engine indication displays;
  - (d) traffic, terrain, and weather displays;
  - (e) crew alerting systems displays;
  - (f) stand-by instruments; and
  - (g) installed EFB to the extent it is practical.
- (5) 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**

- (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.
- (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 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 authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.

(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.

- (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.
- (5) A report of the recording inspection shall be made available on request to the authority for monitoring purposes.
- (6) Calibration of the FDR system—
  - (a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and
  - (b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

**Table A8-1. Parameter characteristics for flight data recorders**

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 available, otherwise relative time count or GNSS time sync)		24 hours	4	±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)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max $V_{So}$ ( <i>Note 1</i> ) $V_{So}$ to 1.2 $V_D$ ( <i>Note 2</i> )	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration ( <i>Note 8</i> )	Application for type certification is submitted to a Contracting State before 1 January 2016	-3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
		Application for type certification is submitted to a Contracting State on or after 1 January 2016	-3 g to +6 g	0.0625	±1% of maximum range excluding	0.004 g

6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission Keying		On-off (one discrete)	1		
9	Power on each Engine <i>(Note 3)</i>		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser Position		Stowed, in transit, and reverse	1 (per engine)		
13*	Ground spoiler/speed Brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air Temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretess	1		
16	Longitudinal Acceleration <i>(Note 8)</i>	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration <i>(Note 8)</i>	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) <i>(Notes 4 and 8)</i>	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed

19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude	-6 m to 750 m (-20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
21*	Vertical beam deviation (ILS/GNSS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)	Signal range	1	±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 ( <i>Note 5</i> )	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)) ( <i>Notes 5 and 6</i> )	0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)
27	Air/ground status	Discrete	1		
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)	Discrete	1		
29*	Angle of attack	Full range	0.5	As installed	0.3 % of full range
30*	Hydraulics, each system (low pressure)	Discrete	2		0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) ( <i>Note 7</i> )	As installed	1	As installed	

32*	Landing gear and gear selector position		Discrete	4	As installed	
33*	Groundspeed		As installed	1	Data should be obtained from the most accurate system	1 kt
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discrete or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N <sub>1</sub> , indicated vibration level, N <sub>2</sub> , EGT, fuel flow, fuel cut-off lever position, N <sub>3</sub> , engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discrete	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of 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*	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 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	±3% unless higher accuracy uniquely required	0.3% of full range

67*	Roll trim surface position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle	Full range	1	±5%	0.5°



69*	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)		Full range (±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 type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
81*	Flight director command	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	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.  $V_{So}$  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. *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 A8-1. 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 available, otherwise relative time count or GNSS time sync)		24 hours	4	±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) (95 km/h (50 kt) to max	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		$V_{so}$ (Note 1) $V_{so}$ to 1.2 $V_D$ (Note 2)	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration (Note 8)	Application for type certification is submitted to a Contracting State before 1 January 2016	-3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
		Application for type certification is submitted to a Contracting State on or after 1 January 2016	-3 g to +6 g	0.0625	±1% of maximum range excluding datum error of ±5%	0.004 g

6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
9	Power on each engine <i>(Note 3)</i>		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and		A suitable combination of discrettes	1		

	engagement status					
16	Longitudinal acceleration (Note 8)	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g	0.004 g
					excluding a datum error of ±0.05 g	
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g	0.004 g
					excluding a datum error of ±0.05 g	
17	Lateral acceleration (Note 8)	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g	0.004 g
					excluding a datum error of ±0.05 g	
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a	0.004 g
					datum error of ±0.05 g	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) (Notes 4 and 8)	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed

		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	$\pm 2^\circ$ unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position		Full range	1	$\pm 3\%$ unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude		-6 m to 750 m (-20 ft to 2 500 ft)	1	$\pm 0.6$ m ( $\pm 2$ ft) or $\pm 3\%$ whichever is greater below 150 m (500 ft) and $\pm 5\%$ above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) + 0.5% of full range above 150 m (500 ft)
21*	Vertical beam deviation (ILS/GNSS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)		Signal range	1	$\pm 3\%$	0.3% of full range
22*	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	$\pm 3\%$	0.3% of full range
23	Marker beacon passage		Discrete	1		
24	Master warning		Discrete	1		
25	Each NAV receiver frequency selection ( <i>Note 5</i> )		Full range	4	As installed	

Serial number	Parameter	Applicability	Measurement range	Accuracy limits (sensor sampling and input recording interval compared to FDR readout)		Recording resolution
				(seconds)		
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/ IAN)) <i>(Notes 5 and 6)</i>		0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)
27	Air/ground status		Discrete	1		
28*	GPWS/TAWS/ GCA 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)		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) <i>(Note 7)</i>		As installed	1	As installed	
32*	Landing gear and gear selector position		Discrete	4	As installed	
33*	Groundspeed		As installed	1	Data should be obtained from the most accurate system	1 kt
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretised or full range)	1	±5%	2% of full range

Serial number	Parameter	Applicability	Measurement range	Accuracy		
				Maximum sampling and recording interval (seconds)	limits (sensor input compared to FDR readout)	Recording resolution
35*	Additional engine parameters (EPR, N <sub>1</sub> , indicated vibration level, N <sub>2</sub> , EGT, fuel flow, fuel cut-off lever position, N <sub>3</sub> , engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discretes	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection



44*	Selected flight path (all pilot selectable modes of 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*	Multi- function/ engine/alert s display format	Discrete(s)	4	As installed	
48*	AC electrical bus status	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
49*	DC electrical bus status		Discrete(s)	4	As installed	
50*	Engine bleed valve position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust command		As installed	2	As installed	
54*	Engine thrust target		As installed	4	As installed	2% of full range
55*	Computed centre of gravity		As installed	64	As installed	1% of full range
56*	Fuel quantity 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)	As installed	4	As installed	
61*	glideslope) face 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	±3% unless higher accuracy uniquely required	0.3% of full range

Serial number	Parameter	Applicability	Measurement range	Accuracy limits		
				Maximum (sensor sampling input and recording interval (seconds) to FDR readout)	Recording resolution	
67*	Roll trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle		Full range	1	±5%	0.5°

69*	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)		Full range (±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 type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
81*	Flight director command	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	±2°	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.  $V_{S_0}$  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 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 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.	M	*

Key:

C: Complete contents recorded.

M: Information that enables correlation to any associated records stored separately from the aeroplane.

\*: Applications to be recorded only as far as is practicable given the architecture of the system.

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

	Minimum	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution		
1	Heading					
a)	Heading (Magnetic or True)	±180°	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 s	0.1 s	UTC time preferred where available.
b)	Latitude/longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
c)	Altitude	-300 m (-1 000 ft) to maximum certified altitude of aeroplane +1 500 m (5 000 ft)	2 (1 if available)	As installed	1.5 m (5 ft)	
d)	Ground speed	0-1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
e)	Track	0-360°	2 (1 if available)	As installed (± 2° recommended)	0.5°	
f)	Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5	Normal acceleration	-3 g to + 6 g (*)	0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ±0.45 g recommended)	0.004 g	
6	Longitudinal Acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	

10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
17	Engine gas generator speed (Ng)	0-150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (Nf)	0-150%	Each engine each second	As installed	0.2% of full range	
19	Coolant temperature	Full range	1	As installed (±5°C recommended)	1° C	
20	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22	Flaps position	Full range or each discrete position	2	As installed	0.5°	
23	Primary flight control surface position	Full range	0.25	As installed	0.2 % of full range	
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and- locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	



**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 or True)	±180°	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 s	0.1 s	UTC time preferred where available.
	b) Latitude/longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1 000 ft) to maximum certificated	2 (1 if available)	As installed (±15 m (±50 ft)	1.5 m (5 ft)	

		altitude of aeroplane +1 500 m (5 000 ft)		recommended)		
d)	Ground speed	0–1 000 kt	2	As installed	1 kt	
e)	Track	0–360°	(1 if available) 2	(±5 kt recommended) As installed	0.5°	
f)	Estimated error	Available range	(1 if available) 2	(± 2° recommended) As installed	As installed	Shall be recorded if readily available
5	Normal acceleration	–3 g to + 6 g (*)	(1 if available) 0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ±0.45 g  recommended)	0.004 g	
6	Longitudinal acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g  recommended)	0.004 g	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
7	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in- Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	

9	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16	Engine thrust/ power/ torque parameters required to determine propulsive thrust/ power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.

17	Engine gas generator speed (Ng)	0-150%	Each engine each second	As installed	0.2% of full range
18	Free power turbine speed (Nf)	0-150%	Each engine each second	As installed	0.2% of full range
19	Coolant temperature	Full range	1	As installed (±5°C recommended)	1° C
20	Main voltage	Full range	Each engine each second	As installed	1 Volt
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range
22	Flaps position	Full range or each discrete position	2	As installed	0.5°

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
23	Primary flight control surface position	Full range	0.25	As installed	0.2 % of full range	
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and- locked and down- and- locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	

## SCHEDULE 3

*Regulations 57(2),(3) and 95(b)*

### LIGHTS TO BE DISPLAYED BY AEROPLANE (COMMERCIAL AIR TRANSPORT — AEROPLANES)

#### 1. TERMINOLOGY

In this Schedule, unless the context otherwise requires—

“angles of coverage” includes-

- (a) angle of coverage A which 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 which 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 which 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 which is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis;

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

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

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

‘under command’ an aeroplane on the surface of the water is “under command” when it is able to execute manoeuvres as required by the International Regulations for Preventing Collisions at Sea for the purpose of avoiding other vessels;

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

‘vertical planes’ means planes perpendicular to the horizontal plane;

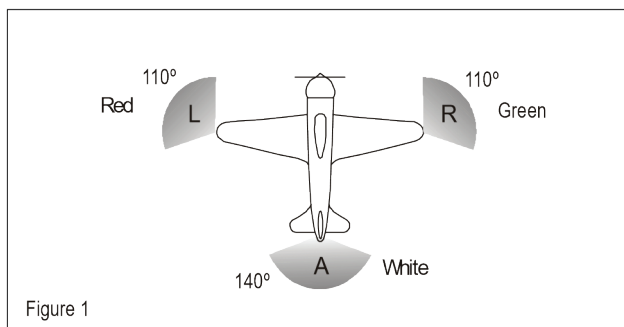
“visible” means visible on a dark night with a clear atmosphere.

## **2. NAVIGATION LIGHTS TO BE DISPLAYED IN THE AIR**

*Note.* — *The lights specified in this paragraph are intended to meet the requirements of the Civil Aviation (Rules of the Air) Regulations, 2020 for navigation lights.*

As illustrated in Figure 1 below, 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

#### (1) General

*Note.* — The lights specified in this paragraph are intended to meet the requirements of the Civil Aviation (Rules of the Air) Regulations, 2020 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.

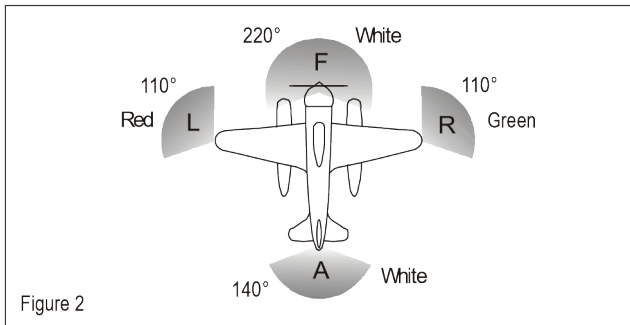
#### (2) When under way

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

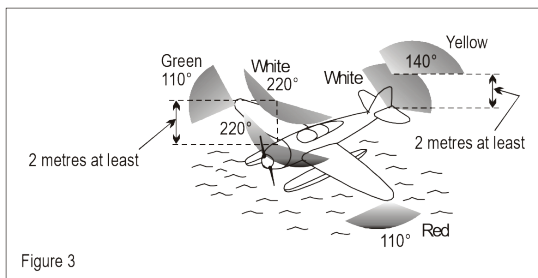


### (3) When towing another vessel or aeroplane

As illustrated in Figure 3 below, the following appearing as steady, unobstructed lights—

- (a) the lights described in paragraph 3(2);
- (b) a second light having the same characteristics as the light described in paragraph 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 paragraph 3 (2) (c) and mounted in a vertical line at least 2 m above it.



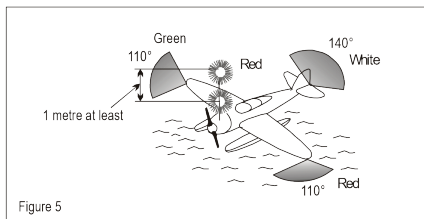
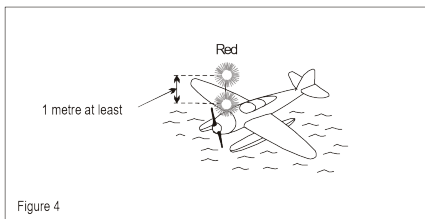


**(4) When being towed**

The lights described in paragraph 3 (2) (a), (b) and (c) appearing as steady, unobstructed lights.

**(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).



**(6) When making way but not under command**

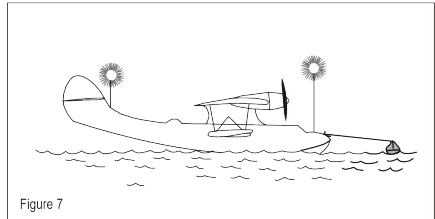
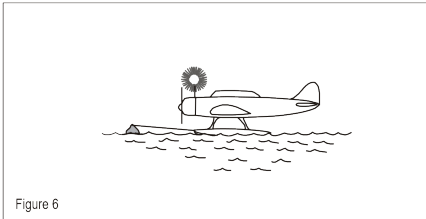
As illustrated in Figure 5, the lights described in paragraph 3(5) plus the lights described in paragraph 3(2) (a), (b) and (c).

*Note. — The display of lights prescribed in paragraphs 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.*

**(7) When at anchor**

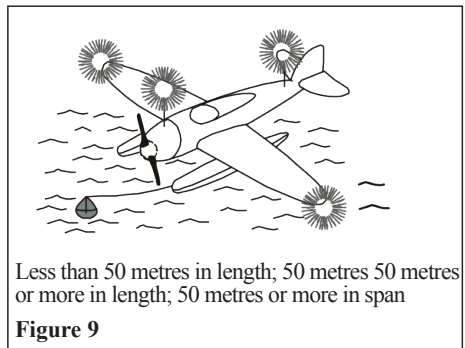
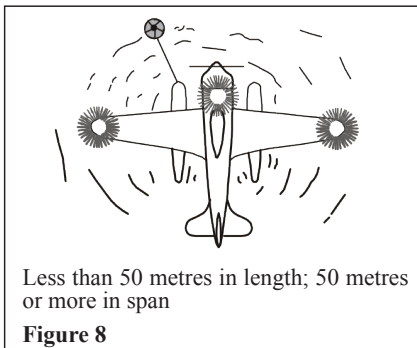
- (a) If less than 50 m in length, where it can best be seen, a steady white light as shown in Figure 6, visible all around the horizon at a distance of at least 3.7 km (2 NM).

- (b) If 50m or more in length, where they can best be seen, a steady white forward light and a steady white rear light as shown in Figure 7 both visible all around the horizon at a distance of at least 5.6 km (3 NM).
- (c) If 50 m or more in span a steady white light on each side as shown in 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).



### (8) When aground

The lights prescribed in paragraph 3(7) and in addition two steady red lights in vertical line, at least 1m apart so placed as to be visible all around the horizon.



## SCHEDULE 4

*Regulation 79*

### **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.

## SCHEDULE 5

*Regulation 94*

### **LIGHTS TO BE DISPLAYED BY AEROPLANE (GENERAL AVIATION — AEROPLANES)**

#### **1. TERMINOLOGY**

In this Schedule, unless the context otherwise requires—

“angles of coverage” includes—

- (a) angle of coverage A that 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 that 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 that 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 that is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

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

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

“making way” in relation to an aeroplane on the surface of the water, means, when the aeroplane is under way and has a velocity relative to the water;

“under command” in relation to an aeroplane on the surface of the water means when the aeroplane 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” in relation to an aeroplane on the surface of the water, means, when the aeroplane is not aground or moored to the ground or to any fixed object on the land or in the water;

“vertical planes” means planes perpendicular to the horizontal plane;

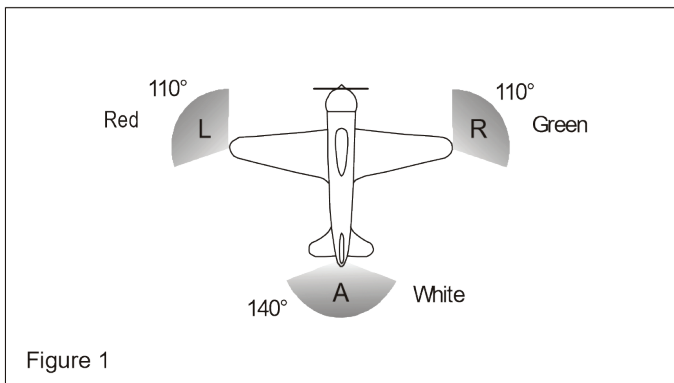
“visible” means visible on a dark night with a clear atmosphere.

## 2. NAVIGATION LIGHTS TO BE DISPLAYED IN THE AIR

*Note.— The lights specified herein are intended to meet the requirements of the Civil Aviation (Rules of the Air) Regulations, 2020 for navigation lights.*

As illustrated in Figure 1, the following unobstructed navigation lights shall be displayed—

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



### **3. LIGHTS TO BE DISPLAYED ON THE WATER**

#### **3.1 GENERAL**

*Note.— The lights specified herein are intended to meet the requirements of the Civil Aviation (Rules of the Air) Regulations, 2020 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.

#### (1) 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.

(2) When towing another vessel or aeroplane

As illustrated in Figure 3, the following appearing as steady, unobstructed lights—

- (a) the lights described in paragraph (1);
- (b) a second light having the same characteristics as the light described in paragraph (1);
- (c) mounted in a vertical line at least 2 m above or below it; and
- (d) a yellow light having otherwise the same characteristics as the light described in subparagraph (c) and mounted in a vertical line at least 2 m above it.

(3) When being towed

The lights described in paragraph (2) (a), (b) and (c) appearing as steady, unobstructed lights.

(4) 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).

(5) When making way but not under command

As illustrated in Figure 5, the lights described in subparagraph (4) plus the lights described in subparagraph (2) (a), (b) and (c).

*Note. — The display of lights prescribed in subparagraph (4) and (5) 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.*

(6) When at anchor

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



- (c) If 50 m or more in span a steady white light on each side (Figures 8 and 9) to indicate the maximum span and visible, so far as practicable, all around the horizon at a distance of at least 1.9 km (1 NM).

(7) When aground

The lights prescribed in subparagraph (6) 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.

## SCHEDULE 6

*Regulations 102, 103, 109, 114 and 130*

### **FLIGHT RECORDERS (GENERAL AVIATION — AEROPLANES)**

The material in this Schedule applies to flight recorders intended for installation in aeroplanes engaged in international air navigation. Crash-protected flight recorders comprise one or more of the following—

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

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

Lightweight flight recorders comprise one or more of the following—

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

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

### **1.2 GENERAL REQUIREMENTS**

- (1) Non-deployable flight recorder containers shall be painted a distinctive orange colour.
- (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.

- (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.
- (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 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be 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.*

- (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.
- (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.

- (7) The flight recorder systems, when tested by methods approved by the Authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.
- (8) Means shall be provided for an accurate time correlation between the recorder systems recordings.
- (9) The manufacturer shall provide the 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**

- (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) Where further FDR recording capacity is available, recording of the following additional information shall be considered-
- (a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority—
    - (i) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;
    - (ii) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;
    - (iii) warnings and alerts; and
    - (iv) the identity of displayed pages for emergency procedures and checklists;
  - (b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.
- (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—
- (a) pressure altitude;
  - (b) indicated airspeed or calibrated airspeed;
  - (c) heading (primary flight crew reference);
  - (d) pitch attitude;
  - (e) roll attitude;
  - (f) engine thrust/power;
  - (g) landing gear status\*;

- (h) total or outside air temperature\*;
  - (i) time\*;
  - (j) navigation data\*: Drift angle, wind speed, wind direction, latitude/longitude;
  - (k) radio altitude\*.
- (4) The parameters that satisfy the requirements for ADRS are listed in Table A2.3-3.
- (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**

- (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) 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

- (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.
- (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) 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.
- (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**

- (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.*

- (2) A Class B AIR or AIRS captures data link message displays.
- (3) A Class C AIR or AIRS captures instruments and control panels.

*Note.— A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS, or where an FDR is not required.*

## **5. DATA LINK RECORDER (DLR)**

### **5.1 Applications to be recorded**

- (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.*

- (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**

- (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.
- (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 authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.
- (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.
- (4) A flight recorder system shall be considered unserviceable where there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.
  - (5) A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.
  - (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 and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±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)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max $V_{S_0}$ (Note 1) $V_{S_0}$ to 1.2 $V_D$ (Note 2)	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration		-3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
9	Power on each engine (Note 3)		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discrettes	1		
16	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration (Note 3)		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) (Notes 4 and 8)	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position		Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude		-6 m to 750 m (-20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)

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 (0–200 NM)	4	As installed	1 852 m (1 NM)
27	Air/ground status		Discrete	1		
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)		Discrete	1		
29*	Angle of attack		Full range	0.5	As installed	0.3% of full range
30*	Hydraulics, each system (low pressure)		Discrete	2		0.5% of full range

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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 should be obtained from the most accurate system	1 kt
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretises or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N <sub>1</sub> , indicated vibration level, N <sub>2</sub> , EGT, fuel flow, fuel cut-off lever position, N <sub>3</sub> engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discrete(s)	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot 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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
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 position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust command		As installed	2	As installed	2% of full range
54*	Engine thrust target		As installed	4	As installed	2% of full range
55*	Computed centre of gravity		As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank		As installed	64	As installed	1% of full range
57*	Head-up display in use		As installed	4	As installed	
58*	Para-visual display on/off		As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation		As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glide slope)		As installed	4	As installed	
61*	Ice detection		As installed	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
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	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle		Full range	1	±5%	0.5°
69*	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75	All cockpit flight control input forces (control wheel, control column, rudder pedal)		Full range (±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*	Actual navigation performance or estimated position error or estimated position uncertainty		As installed	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
79*	Cabin pressure altitude	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
81*	Flight director command (left flight director pitch command, left flight director roll command, right flight director pitch command, right flight director roll command)	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	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.  $V_s$  *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 A2.3-1 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 available, otherwise relative time count or GNSS time sync)		24 hours	4	±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)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max $V_{S_0}$ (Note 1) $V_{S_0}$ to 1.2 $V_D$ (Note 2)	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration		-3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
9	Power on each engine (Note 3)		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretely	1		
16	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration (Note 3)		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) (Notes 4 and 8)	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed

19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required as installed	0.3% of full range or
20*	Radio altitude	-6 m to 750 m (-20 ft to 2500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)

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)		0-370 km (0-200 NM)	4	As installed	1 852 m (1 NM)

	(IRNAV/IAN) (Notes 5 and 6)					
27	Air/ground status	Discrete	1			
28*	GPWS/TAWS/ GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)	Discrete	1			
29*	Angle of attack	Full range	0.5	As installed	0.3% of full range	
30*	Hydraulics, each system (low pres- sure)	Discrete	2		0.5% 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
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 should be 1 kt obtained from the most accurate	
34	Brakes (left and right)		(Maximum metered	1	system ±5%	2% of full

	brake pressure, left and right brake pedal position)		brake range, (discretes or full range)			range
35*	Additional engine parameters (EPR, N <sub>1</sub> , indicated vibration level, N <sub>2</sub> , EGT, fuel flow, fuel cut-off lever position, N <sub>3</sub> engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discrete(s)	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot 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		As installed	1	As installed	Sufficient to

	(all pilot selectable modes of operation)				determine crew selection
43*	Selected heading	As installed	1	As installed	Sufficient to
	(all pilot selectable modes of operation)				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
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IR-NAV/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 position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust command		As installed	2	As installed	2% of full range
54*	Engine thrust target		As installed	4	As installed	2% of full range

55*	Computed centre of gravity	As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank	As installed	64	As installed	1% of full range
57*	Head-up display in use	As installed	4	As installed	
58*	Para-visual display on/off	As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation	As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glide slope)	As installed	4	As installed	
61*	Ice detection	As installed	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
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	±3% unless higher accuracy uniquely	0.3% of full range



67*	Roll trim surface position	Full range	2	required ±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle	Full range	1	±5%	0.5°
69*	De-icing and/or anti-icing systems selection	Discrete(s)	4		
70*	Hydraulic pressure (each system)	Full range	2	±5%	100 psi
71*	Loss of cabin pressure	Discrete	1		
72*	Cockpit trim control input position, Pitch	Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll	Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw	Full range	1	±5%	0.2% of full range or as installed
75	All cockpit flight control input forces (control wheel, control column, rudder pedal)	Full range	1	±5%	0.2% of full range or as installed
				(±311 N (±70 lbf), ±378 N (±85 lbf), ±734 N (±165 lbf))	
76*	Event marker	Discrete	1		
77*	Date	365 days	64		
78*	Actual navigation performance or estimated position error or estimated position uncertainty	As installed	4	As installed	

79*	Cabin pressure altitude	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
81*	Flight director command (left flight director pitch command, left flight director roll command, right flight director pitch command, right flight director roll command)	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	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. 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

**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 broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the aeroplane are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

Key:

C: Complete contents recorded.

M: Information that enables correlation to any associated records stored separately from the aeroplane.

\*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

**TABLE A2.3-3. PARAMETER CHARACTERISTICS FOR AIRCRAFT DATA RECORDING SYSTEMS**

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading:					
	a) Heading (Magnetic or True)	±180°	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 altitude 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°	* 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 s	0.1 s	UTC time preferred where available
	b) Latitude/longitude	Latitude: ±90° Longitude: ±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1 000 ft) to maximum certificated altitude of aircraft + 1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0-1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
e)	Track	0-360°	2 (1 if available)	As installed (±2° recommended)	0.5°	
f)	Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5	Normal acceleration	-3 g to +6 g (*)	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.45 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine each second	As installed (5% of full)	2% of full range	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N <sub>1</sub> or torque/N <sub>p</sub> as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
17	Engine gas generator speed (N <sub>g</sub> )	0–150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (N <sub>f</sub> )	0–150%	Each engine each second	As installed	0.2% of full range	
19	Coolant temperature	Full range	1	As installed (±5°C recommended)	1°C	
20	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22	Flaps position	Full range or each discrete position	2	As installed	0.5°	
23	Primary flight control surface position	Full range	0.25	As installed	0.2% of full range	
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and-locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	



**Table A2.3-3. Parameter characteristics for aircraft data recording systems**

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading:					
1	a) Heading (Magnetic or True)	±180°	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°	* 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 s	0.1 s	UTC time preferred where available
	b) Latitude/longitude	Latitude: ±90° Longitude: ±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1 000 ft) to maximum certified altitude of aircraft + 1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0-1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
e)	Track	0-360°	2 (1 if available)	As installed (±2° recommended)	0.5°	
f)	Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5	Normal acceleration	-3 g to +6 g (*)	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.45 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a	0.004 g	

				datum error of	
				±0.05 g	
				recommended)	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb  (31.02 in-Hg) or  available sensor range	1	As installed  (±1 mb  (0.1 in-Hg) or  ±30 m (±100 ft)  to ±210 m (±700 ft)  recommended)	0.1 mb  (0.01 in-Hg) or 1.5 m (5 ft)
9	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed  (±2°C  recommended)	1°C
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed  (±3%  recommended)	1 kt (0.5 kt recommended)
11	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range
12	Engine oil pressure	Full range	Each engine each second	As installed  (5% of full range  recommended)	2% of full range

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. $EPR/N_1$ 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 should be provided.
17	Engine gas generator speed ( $N_g$ )	0–150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed ( $N_f$ )	0–150%	Each engine each second	As installed	0.2% of full range	
19	Coolant temperature	Full range	1	As installed	1°C	

(±5°C  
recommended)

20	Main voltage	Full range	Each engine each second	As installed	1 Volt
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range
22	Flaps position	Full range or each discrete position	2	As installed	0.5°
23	Primary flight control surface position	Full range	0.25	As installed	0.2% of full range
24	Fuel quantity	Full range	4	As installed	1% of full range
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording reso- lution	Remarks
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record  up-and-locked  and down-and-  locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	

## SCHEDULE 7

*Regulation 119*

### ARTICLE 83 bis AGREEMENT SUMMARY General Aviation Operations- Aeroplanes

*Note.— A certified true copy of the agreement summary to be carried on board*

1. Purpose and scope

*The Article 83 bis agreement summary shall contain the information in the template in paragraph 2, in a standardized format.*

Title of the Agreement:		
State of Registry:		Focal point:
State of the principal location of a general aviation operator:		Focal point:
Date of signature:	By State of Registry <sup>1</sup> :	
	By State of the principal location of a general aviation operator <sup>1</sup> :	
Duration:	Start Date <sup>1</sup> :	End Date (if applicable) <sup>2</sup> :
Languages of the Agreement		
ICAO Registration No.:		
Umbrella Agreement (if any) with		

ICAO Registration number:			
<b>Chicago Convention</b>	<b>ICAO Annexes affected by the transfer to the State of the principal location of a general aviation operator of responsibility in respect of certain functions and duties</b>		
Article 12:	Annex 2, all chapters	Yes	
Rules of the Air		No	
Article 30 a): Aircraft	Radio Station Licence	Yes	
radio equipment		No	
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6 and Annex 6 Part I, Radio Operator or Part III, section II, Composition of the flight crew (radio operator) and/or Part II, Qualifications and/or Flight crew member licensing or Part III, Section III, Qualifications	Yes	Annex 6: [Specify Part and paragraph] <sup>3</sup>
		No	
Article 31:	Annex 6	Yes	[Specify Part and chapters] <sup>3</sup>
Certificates of Airworthiness	Part I or Part III, Section II	No	
	Annex 6 Part II or Part III, Section III	Yes	[Specify Part and chapters] <sup>3</sup>
		No	
	Annex 8	Yes	[Specify chapters] <sup>3</sup>
	Part II, Chapters 3 and 4	No	

**Aircraft affected by the transfer of responsibilities to the  
State of the principal location of a general aviation operator**

Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From <sup>1</sup>	To (if applicable) <sup>2</sup>

*Notes.—*

1. *dd/mm/yyyy.*
2. *dd/mm/yyyy or N/A if not applicable.*
3. *Square brackets indicate information that needs to be provided.*



## SCHEDULE 8

*Regulation 124(2)*

### **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.

## SCHEDULE 9

### PART A

*Regulation 152*

#### **ARTICLE 83 bis AGREEMENT SUMMARY Commercial Air Transport - Helicopters )**

*Note.— A certified true copy of the agreement summary to be carried on board.*

**1. Purpose and scope**

*The Article 83 bis agreement summary shall contain the information in the template at paragraph 2 as applicable, in a standardized format.*

**2. Article 83 bis agreement summary for commercial air transport-helicopters**

#### **ARTICLE 83 bis AGREEMENT SUMMARY**

Title of the Agreement:		
State of Registry:		Focal point:
State of the Operator:		Focal point:
Date of signature:	By State of Registry <sup>1</sup> :	
	By State of the Operator <sup>1</sup> :	
Duration:	Start Date <sup>1</sup> :	End Date (if applicable) <sup>2</sup> :
Languages of the Agreement		

ICAO Registration No.:			
Umbrella Agreement (if any) with			
ICAO Registration number:			
<b>Chicago Convention</b>	<b>ICAO Annexes affected by the transfer of responsibility in respect of certain functions and duties to the State of the Operator</b>		
Article 12: Rules of the Air	Annex 2, all chapters	Yes	
		No	
Article 30 a): Aircraft	Annex 2 (radio station licence)	Yes	
radio equipment		No	
		Yes	Annex 6: [Specify Part and paragraph] <sup>3</sup>
		No	
Articles 30 b) and 32 a): Licenses of Personnel	Annex 1, Chapters 1, 2, 3 and 6; and Annex 6 Part III, section II, (composition of the flight crew (radio operator); and/or Annex 6, Part III, Section II, (qualifications)		

Article 31: Certificates of Airworthiness	Annex 6	Yes	[Specify Part and chapters] <sup>3</sup>
	Part III, Section II	No	
	Annex 6 Part III, Section II	Yes	[Specify Part and chapters] <sup>3</sup>
		No	
	Annex 8	Yes	[Specify chap- ters] <sup>3</sup>
	Part II, Chapters 3 and 4	No	

Aircraft affected by the transfer of responsibilities to the State of the Operator

Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From <sup>1</sup>	To (if applica- ble) <sup>2</sup>

Notes.—

1. dd/mm/yyyy.

2. dd/mm/yyyy or N/A if not applicable.

3. Square brackets indicate information that needs to be provided.

## PART B

Regulation 245(5)

### ARTICLE 83 bis AGREEMENT SUMMARY General Aviation- Helicopters

*Note.— A certified true copy of the agreement summary to be carried on board.*

#### 1. Purpose and scope

*The Article 83 bis agreement summary shall contain the information in the template at paragraph 3 as applicable, in a standardized format.*

#### 2. Article 83 bis agreement summary for general aviation-helicopters

### ARTICLE 83 bis AGREEMENT SUMMARY

Title of the Agreement:		
State of Registry:		Focal point:
State of the Principal location of general aviation Operator:		Focal point:
Date of signature:	By State of Registry <sup>1</sup> :	
	By State of the principal location of a general aviation operator <sup>1</sup> :	
Duration:	Start Date <sup>1</sup> :	End Date (if applicable) <sup>2</sup> :
Languages of the Agreement		
ICAO Registration No.:		

Umbrella Agreement (if any) with			
ICAO Registration number:			
<b>Chicago Convention</b>	<b>ICAO Annexes affected by the transfer of responsibility in respect of certain functions and duties to the State of the principal location of a general aviation Operator</b>		
Article 12:	Annex 2, all chapters	Yes	
Rules of the Air		No	
Article 30 a): Aircraft radio equipment	Annex 2 (radio station licence)	Yes	
		No	
Articles 30 b) and 32 a): Licenses of Personnel	Annex 1, Chapters 1, 2, 3 and 6; and Annex 6 Part III, section III, (composition of the flight crew (radio operator); and/or Annex 6, Part III, Section III, (qualifications))	Yes	Annex 6: [Specify Part and paragraph] <sup>3</sup>
		No	
Article 31:	Annex 6	Yes	[Specify Part and chapters] <sup>3</sup>
	Part III, Section III	No	

Certificates of Airworthiness	Annex 6 Part III, Section III	Yes	[Specify Part and chapters] <sup>3</sup>
		No	
	Annex 8	Yes	[Specify chapters] <sup>3</sup>
		No	
	Part II, Chapters 3 and 4	Yes	
		No	

Aircraft affected by the transfer of responsibilities to the State of principal location of a general aviation operator

Aircraft make, model, series	Nationality and Registration marks	Serial No	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From <sup>1</sup>	To (if applicable) <sup>2</sup>
			mn		

- Notes.—
1. dd/mm/yyyy.
  2. dd/mm/yyyy or N/A if not applicable.
  3. Square brackets indicate information that needs to be provided.

- Notes.—
1. dd/mm/yyyy.
  2. dd/mm/yyyy or N/A if not applicable.
  3. Square brackets indicate information that needs to be provided.

## SCHEDULE 10

*Regulations 162, 163, 164, 170, 223, 224, 225 and 231*

### **FLIGHT RECORDERS- HELICOPTER OPERATIONS)**

The material in this Schedule concerns flight recorders intended for installation in helicopters engaged in international air navigation. Crash-protected flight recorders comprise one or more of the following—

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

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

Lightweight flight recorders comprise one or more of the following-

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

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

#### **1. GENERAL REQUIREMENTS**

- (1) Non-deployable flight recorder containers shall be painted a distinctive orange colour.
- (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 1st January 2018, this device shall operate for a minimum of 90 days.



- (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.
- (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 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be 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.*

- (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.
- (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.
- (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.

- (8) Means shall be provided for an accurate time correlation between the flight recorder systems functions.
- (9) The manufacturer usually provides 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.

## **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**

- (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) The following parameters shall satisfy the requirements for flight path and speed—
  - (a) pressure altitude;
  - (b) indicated airspeed;
  - (c) outside air temperature;
  - (d) heading;

- (e) normal acceleration;
  - (f) lateral acceleration;
  - (g) longitudinal acceleration (body axis);
  - (h) time or relative time count;
  - (i) navigation data\*: drift angle, wind speed, wind direction, latitude/longitude;
  - (j) radio altitude\*.
- (3) Where 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.).
- (4) The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in Table A4-3.
- (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**

- (1) The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the authority.
- (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**

- (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.
- (2) The CVR audio allocation should 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) 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.
- (4) The CARS audio allocation should 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**

- (1) A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

*Note 1.— To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.*

*Note 2.— There are no provisions for Class A AIRs or AIRS in these regulations.*

- (2) A Class B AIR or AIRS captures data link message displays.
- (3) A Class C AIR or AIRS captures instruments and control panels.

*Note.— A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR, or where an FDR is not required.*

## **5. DATA LINK RECORDER (DLR)**

### **5.1 APPLICATIONS TO BE RECORDED**

- (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.*

- (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**

- (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.
- (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 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 authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.
- (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.
- (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.

- (5) A report of the recording inspection shall be made available on request to the authority for monitoring purposes.
- (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 number	Parameter sampling and recording	Applicability	Measurement range	Maximum interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
Serial number						
1 Time (UTC 24 hours $4 \pm 0.125\%$ /h 1 s when available, otherwise relative time count or GNSS time sync)						
2	Pressure altitude m (5 ft) maximum certificated		-300 m (-1 000 ft) to 1	1	$\pm 30$ m to $\pm 200$ m	1.5 ( $\pm 100$ ft to $\pm 700$ ft) altitude of aircraft +1 500 m (+5 000 ft)
3	Indicated airspeed measuring system		As the installed pilot	1	$\pm 3\%$	1 kt display
4	Heading	$360^\circ$	1	$\pm 2^\circ$	$0.5^\circ$	
5	Normal acceleration 0.004 g datum error of $\pm 0.045$ g		-3 g to +6 g		0.125	$\pm 0.09$ g excluding a
6	Pitch attitude range whichever is greater		$\pm 75^\circ$ or 100% of	0.5	$\pm 2^\circ$	$0.5^\circ$ useable
7	Roll attitude	$\pm 180^\circ$	0.5	$\pm 2^\circ$	$0.5^\circ$	
8	Radio	On-off (one discrete)	1	—	—	transmission keying
9	Power on each range engine		Full range 1 (per engine)		$\pm 2\%$	0.1% of full
10	Main rotor: Main rotor speed	50-130	0.51	$\pm 2\%$	0.3% of full range	
	Rotor brake	Discrete	—			
11	Pilot input and/or position (0.25 accuracy uniquely recommended)	Full range	$0.5 \pm 2\%$ unless higher 0.5% of operating range 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	$\pm 2^\circ\text{C}$	$0.3^\circ\text{C}$ temperature	
14*	Autopilot/ autothrottle/AFCS mode and engagement status	A suitable combination of	discretes	1	—	—
15*	Stability augmentation system engagement	Discrete		1	—	—
16*	Main gearbox oil pressure	As installed		1	As installed	$6.895$ kN/m <sup>2</sup> (1 psi)
17*	Main gearbox oil temperature	As installed		2	As installed	$1^\circ\text{C}$
18	Yaw rate	$\pm 400^\circ/\text{second}$			$0.25 \pm 1.5\%$ maximum range excluding datum error of $\pm 5\%$	

19*	Sling load force	0 to 200% of certified load	0.5	$\pm 3\%$ of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration	$\pm 1$ g	0.25	$\pm 0.015$ g	0.004 g
21	Lateral acceleration	$\pm 1$ g	0.25	$\pm 0.015$ g	0.004 g
22*	Radio altitude	-6 m to 750 m (-20 ft to 2 500 ft)	1	$\pm 0.05$ g $\pm 0.6$ m ( $\pm 2$ ft) or $\pm 3\%$ whichever is greater below 150 m (500 ft) and $\pm 5\%$ above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation	Signal range	1	$\pm 3\%$	0.3% of full range
24*	Horizontal beam deviation	Signal range	1	$\pm 3\%$	0.3% of full range
25	Marker beacon passage	Discrete	1	—	—
26	Warnings	Discrete(s)	1	—	—
27	Each navigation receiver frequency selection	Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and 2 distances	0–370 km (0–200 NM)	4	As installed	1 852 m (1 NM)
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)	As installed	2	As installed	As installed
30*	Landing gear and gear selector position	Discrete	4	—	—
31*	Engine exhaust gas temperature ( $T_4$ )	As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)	As installed	1	As installed	

33*	Fuel contents	As installed	4	As installed	
34*	Altitude rate	As installed	1	As installed	
35*	Ice detection	As installed	4	As installed	
36*	Helicopter health and usage monitor system	As installed	—	As installed	—
37	Engine control modes	Discrete	1	—	—
38*	Selected barometric setting (pilot and co-pilot)	As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44	Selected flight path (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
45	Selected decision height	As installed	4	As installed	Sufficient to determine crew selection
46	EFIS display format (pilot and co-pilot)	Discrete(s)	4	—	—

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 Contracting (terrain alerts, both State on or cautions and warnings, after 1 January and advisories) and 2023 (on/off switch position and (operational status)	Discrete(s)	1	As installed	
50*	TCAS/ACAS (traffic Application for alert and collision type avoidance system) and certification is (operational status) submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
51*	Primary flight controls Application for – pilot input forces type certification is submitted to a Contracting State on or after 1 January 2023	Full range	0.125 ± 3% unless higher (0.0625 accuracy is uniquely recommended)	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 of gravity	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
53*	Helicopter computed weight	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range

**Table A4-1. Parameter Characteristics for Flight Data Recorders**

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

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
14*	Autopilot/ autothrottle/AFCS mode and engagement status		A suitable combination of discretes	1	—	—
15*	Stability augmentation system engagement		Discrete	1	—	—
16*	Main gearbox oil pressure		As installed	1	As installed	6.895 kN/m <sup>2</sup> (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% for maximum certified load
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)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation		Signal range	1	±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)

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)		As installed	2	As installed	As installed
30*	Landing gear and gear selector position		Discrete	4	—	—
31*	Engine exhaust gas temperature (T <sub>e</sub> )		As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)		As installed	1	As installed	
33*	Fuel contents		As installed	4	As installed	
34*	Altitude rate		As installed	1	As installed	
35*	Ice detection		As installed	4	As installed	
36*	Helicopter health and usage monitor system		As installed	—	As installed	—
37	Engine control modes		Discrete	1	—	—
38*	Selected barometric setting (pilot and co-pilot)		As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
44*	Selected flight path (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height		As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)		Discrete(s)	4	—	—
47*	Multi-function/engine/alerts display format		Discrete(s)	4	—	—
48*	Event marker		Discrete	1	—	—
49*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
50*	TCAS/ACAS (traffic alert and collision avoidance system) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
51*	Primary flight controls – pilot input forces	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Full range	0.125 (0.0625 recommended)	± 3% unless higher accuracy is uniquely required	0.5% of operating range
52*	Computed centre of gravity	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
53*	Helicopter computed weight	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range



**Table A4-2. Description of Applications for Data Link Recorders**

Item No.	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes 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**

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading:					
	a) Heading (Magnetic or True)	±180°	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 (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1 000 ft) to maximum certificated altitude of aircraft +1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0-1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
	e) Track	0-360°	2 (1 if available)	As installed (± 2° recommended)	0.5°	
	f) Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available

No	Parameter Name	Minimum Recording Range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording Resolution	Remarks
5	Normal acceleration	-3 g to + 6 g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.05 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 hPa (1.02 in-Hg) to 310.2 hPa (9.16 in-Hg) or available sensor range	1	As installed (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft) to ±210 m (±700	0.1 hPa (0.03 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Main rotor speed (Nr)	50% to 130% or available sensor range	0.5	As installed	0.3% of full range	
12	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For piston- engined helicopters
13	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Engine oil temperature	Full range	Each engine each second	As Installed (5% of full range recommended)	2% of full range	
15	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
16	Manifold pressure (*)	Full range	Each engine each	As installed	0.2% of full	*For piston-

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
17	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbine-engined helicopters.
18	Engine gas generator speed (Ng) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19	Free power turbine speed (Nf) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
20	Collective pitch	Full range	0.5	As installed	0.1% of full range	
21	Coolant temperature (*)	Full range	1	As installed (±5°C recommended)	1° C	*Only for piston-engined helicopters
22	Main voltage	Full range	Each engine each second	As installed	1 Volt	
23	Cylinder head temperature (*)	Full range	Each cylinder each second	As installed	2% of full range	*Only for piston-engined helicopters
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	

**Table A4-3. Parameter Characteristics for Aircraft Data Recording Systems**

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading:					
	a) Heading (Magnetic or True)	±180°	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 (0.00015° recommended)	0.00005°	
	c) Altitude	-300 m (-1000 ft) to maximum certificated altitude	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	

			of aircraft +1 500 m (5 000 ft)			
d) Ground speed	0–1 000 kt	2	(1 if available)	As installed (±5 kt recommend- ed)	1 kt	
e) Track	0–360°	2	(1 if available)	As installed (± 2° recommend- ed)	0.5°	
f) Estimated error	Available range	2	(1 if available)	As installed	As in- stalled	Shall be recorded if readily available

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
5	Normal acceleration	-3 g to + 6 g	0.25  (0.125 if available)	As installed  (±0.09 g excluding a datum error of ±0.05 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g	0.25  (0.125 if available)	As installed  (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g	0.25  (0.125 if available)	As installed  (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 hPa (1.02 in-Hg) to 310.2 hPa (9.16 in-Hg) or available sensor range	1	As installed  (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft)	0.1 hPa  (0.03 in-Hg) or 1.5 m (5 ft)	

				recommended)		
9	Outside air temperature (or total air temperature)	-50° to +90°C or available sensor range	2	As installed (±2°C	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Main rotor speed (Nr)	50% to 130% or available sensor range	0.5	As installed	0.3% of full range	
12	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters
13	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
15	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
16	Manifold pressure (*)	Full range	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
17	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine

						shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbine-engined helicopters.
18	Engine gas generator speed (Ng) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19	Free power turbine speed (Nf) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
20	Collective pitch	Full range	0.5	As installed	0.1% of full range	
21	Coolant temperature (*)	Full range	1	As installed (±5°C recommended)	1° C	*Only for piston-engined helicopters
22	Main voltage	Full range	Each engine each second	As installed	1 Volt	
23	Cylinder head temperature (*)	Full range	Each cylinder each second	As installed	2% of full range	*Only for piston-engined helicopters
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or 1 each discrete position		As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	



## SCHEDULE 11

*Regulation 258*

### **OFFENCES AND PENALTIES**

REG. NO.	TITLE	PART
5	General instruments, equipment and flight documents requirements	B
76, 121,200, 247	Navigation Equipment	A
49,87,177,178,179,214,215,216	VFR operations.	A
55,93,136,177,180,214,217	IFR Operations	A
6	Standby attitude indicator.	A
78,123	Navigation equipment for operations in minimal navigation performance specification airspace (MNPS)	B
79,124	Equipment for operations in reduced vertical separation minimum airspace (RVSM).	B
75,79,120, 125, 144,199,246	Radio equipment	A
66,141,	Airborne collision avoidance system.	A
67,99,142,192,239	Altitude Reporting transponder.	A
8,14,24	Aircraft lights and instrument illumination.	A
9	Engine instruments.	A
24,61,96	Machmeter and speed warning devices.	B
10	Landing gear: aural warning device.	B
62,97,181	Ground proximity warning system.	A
58,189	Weather radar.	A
37,38,39, 40,106,107,108,167,168,169,228,229,230	Cockpit voice recorders: aircraft.	A
34,35,36,103,104,105,163,164,165,166,224,225,226,227	Flight data recorders.	A
41,42,43,109,110,111,170,171,172,231,232,233	Recording of data link communication.	A
12,28,43,56,64,98,137,183,186, 219,238	Emergency equipment: all aircraft.	A
28,46	Exits.	A
52,91,185,220	Flights over designated land areas: all aircraft.	A

11,17	Survival equipment.	A
26,155,208	Portable fire extinguishers.	A
30,159,212	Lavatory fire extinguisher.	A
53	Smoke detector	A
13	Crash axe.	A
32,86,161,213	Marking of break-in points.	A
207	First-aid and emergency medical kit.	A
53,92,129,134,187,221	Oxygen equipment and supply requirements.	A
63,64	Megaphones: aircraft.	A
88,89,90	Individual flotation devices.	A
66,183,219	Life rafts.	A
28	Life jackets: helicopters.	A
27,156,209	Seats, safety belts and shoulder harnesses.	A
28,157,209	Passenger information signs.	A
	Power supply, distribution and indication system.	A
29,158,211	Protective circuit fuses.	A
14,54,135,188	Aircrafts in icing conditions.	A
15	Pitot indication systems.	A
16	Static pressure system.	A
31,160,210	Chart	A
59,139	Cosmic radiation detection equipment.	A
50,88	Seaplanes and amphibians – miscellaneous equipment.	A
113,252	Use and retention of records.	B
253,255	Reports of violation.	B
254	Enforcement of directions	A

## **Cross References**

Civil Aviation (Aeronautical Communication Systems) Regulations, 2022 S.I. No. 70 of 2022

Civil Aviation (Aircraft Accident and Incident Investigations) Regulations, 2022 S.I. No. 66 of 2022

Civil Aviation (Air Operator Certification and Administration) Regulations, 2022 S.I. No. 73 of 2022

Civil Aviation (Air Traffic Services) Regulations, 2022 S.I. No. 74 of 2022

Civil Aviation (Airworthiness of Aircraft) Regulations, 2022 S.I. No. 77 of 2022

Civil Aviation (Operation of Aircraft) (Commercial Air Transport Aeroplanes) Regulations, 2022 S.I. No. 84 of 2022

Civil Aviation (Operation of Aircraft) (Commercial Air Transport and General Aviation Helicopters) Regulations, 2022 S.I. No. 85 of 2022

Civil Aviation (Operation of Aircraft) (General Aviation) (Aeroplanes) Regulations, 2022 S.I. No. 86 of 2022

Civil Aviation (Rules of the Air) Regulations, 2020 S.I. No. 15 of 2020

Civil Aviation (Surveillance and Collision Avoidance Systems) Regulations, 2022 S.I. No. 93 of 2022

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GEN. EDWARD KATUMBA WAMALA  
*Minister of Works and Transport.*