

Democratic Socialist Republic of Sri Lanka



Civil Aviation Authority of Sri Lanka

Implementing Standards

(Issued under Section 120, Civil Aviation Act No. 14 of 2010)

**Title: Compliance to Annex-6-Part 1 – Chapter 6- Aeroplane
Instruments, Equipment and Flight Documents**

IS Reference Code: CA-IS-6-(i)-6

Date of Issue: 17.02.2023

Pursuant to Section 120 of the Civil Aviation Act No.14 of 2010 (hereinafter referred to as the CA Act), Director General of Civil Aviation (hereinafter referred to as the DGCA) shall have the power to issue, whenever he considers it necessary or appropriate to do so, such Implementing Standards for the Purpose of giving effect to any provision in the CA Act, Regulations or Rules made thereunder including the Articles of the Convention on International Civil Aviation specified in the Schedule to the CA Act.

Accordingly, I, being the DGCA do hereby issue the Implementing Standards on Compliance to **Annex 6 - Part (I) - Chapter 6– Aeroplane Instruments, Equipment and Flight Documents** as mentioned in the Attachment hereto (**Ref: Attachment No IS-6-(i)-6**) elaborating the requirements to be satisfied for the effective implementation of the International Standards and Recommended Practices contained in ICAO Annex 6.

This implementing Standard shall be applicable to holders of Air Operator Certificate, Foreign Air Operator Certificate issued by DGCA and any applicant seeking an Air Operator Certificate or Foreign Air Operator Certificate and shall come in to force with effect from 17th of February 2023 and remain in force unless revised/revoked.

This Implementing Standard will supersede 01st Edition, Rev 01 of Implementing Standard 015 dated 14th March 2018 issued by the DGCA.

Attention is also drawn to Section 103 of the CA Act, which states inter alia that failure to comply with any Implementing Standard is an offence. Further, if any standard stipulated in this Implementing Standard is not complied with or violated, an appropriate enforcement action will be taken as per the Aviation Enforcement Policy and Procedures Manual, SLCAP 0005 by the DGCA under Section 102 of the CA Act.

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Enclosure: Attachment No. IS-6-(i)-6-Att-01

PREAMBLE

1. Notice to the Recipient

- 1.1 The requirements in this Implementing Standard are based on the Standards and Recommended Practices (SARPs) adopted by the International Civil Aviation Organization (ICAO) and incorporated in the 12th Edition to Annex 06 Part I - Aeroplane Instruments, Equipment and Flight Documents.
- 1.2. In pursuance of the obligation cast under Article 38 of the Convention which requires the Contracting States to notify the ICAO of any differences between the national regulations of the States and practices and the International Standards contained in the respective Annex and any amendments thereto, the CAASL will be taking steps to notify ICAO of such differences relating to either a Standard or a Recommended Practice, if any. The CAASL will also keep the ICAO currently informed of any differences which may subsequently occur, or of the withdrawal of any differences previously notified. Furthermore, the CAASL will take steps for the publication of differences between the national regulations and practices and the related ICAO Standards and Recommended Practices through the Aeronautical Information Service, which is published in accordance with the provisions in the Annex-15 to the Convention.
- 1.3. Taking into account of the ICAO council resolution dated 13 April 1948 which invited the attention of Contracting States of the desirability of using in the State's national regulations, as far as is practicable, the precise language of those ICAO Standards that are of a regulatory character, to the greatest extent possible the CAASL has attempted to retain the ICAO texts in the Annex in drafting this Implementing Standard.
- 1.4. Status of ICAO Annex components in the Implementing Standard
Some of the components in an ICAO Annex are as follows and they have the status as indicated:
- 1.4.1. **Standard:** Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38. The ICAO Standards are reflected in the Implementing Standards if they are locally implemented using the normal fonts and recipients are required to conform to such requirements.
- 1.4.2. **Recommended Practice:** Any specification for physical characteristics, configuration, material, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interest of safety, regularity, efficiency or environmentally responsiveness of international air navigation, and to which Contracting States will endeavor to conform in accordance with the Convention. The ICAO Recommended Practices are reflected in the Implementing Standards in italic fonts and the Recipients are encouraged to implement them to the greatest extent possible.
- 1.4.3. **Appendices:** Comprising material grouped separately for convenience but forming part of the Standards and Recommended Practices adopted by the Council. Enforcement action on such matters will be as in the case of Standards or Recommended Practices.
- 1.4.4. **Definitions:** A definition does not have independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.
- 1.4.5. **Tables and Figures:** add to or illustrate a Standard or Recommended Practice, and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

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Implementing Standards

REQUIREMENTS FOR AEROPLANE INSTRUMENTS, EQUIPMENTS AND FLIGHT DOCUMENTS

1. General

1.1. In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in the following paragraphs shall be installed or carried, as appropriate, in aeroplanes according to the aeroplane used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by DGCA in respect of aircraft registered in Sri Lanka.

1.2. An aeroplane shall carry a certified true copy of the Air Operator Certificate and a copy of the Operations Specifications relevant to the aeroplane specified in paragraph 2.1 of Implementing Standards 013, issued in conjunction with the certificate. The DGCA will issue Air Operator Certificate and the associated Operations Specifications in English language. When the Air Operator Certificate and the associated operations specifications are issued by a State other than Sri Lanka and in a language other than English, an English translation shall be included.

1.3. The operator shall include in the Operations Manual a Minimum Equipment List (MEL), approved by the DGCA 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. The operator shall follow the procedures contained in SLCAP 4215 "MMEL/MEL Procedures Manual" published by the Civil Aviation Authority of Sri Lanka when preparing the operators Minimum Equipment List (MEL) for the approval of DGCA. In respect of aeroplanes that are not registered in Sri Lanka but operated in Sri Lanka, DGCA shall ensure that the MEL does not affect the aeroplane's compliance with the airworthiness requirements applicable to DGCA.

1.4. 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. The manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe Human Factors principles.

1.5. Aeroplane operated under an Article 83 *bis* agreement

Guidance concerning the transfer of responsibilities by the State of Registry to the State of the Operator in accordance with Article 83 *bis* is contained in the Manual on the Implementation of Article 83 *bis* of the Convention on International Civil Aviation (Ref. IS 091).

1.5.1 An aeroplane, when operating under an Article 83 *bis* agreement entered into between the State of Registry and the State of the Operator, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format. When the summary is issued in a language other than English, an English translation shall be included.

1.5.2 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 under the

agreement by the State of Registry to the State of the Operator, when conducting surveillance activities such as ramp checks.

- 1.5.3** 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.

The agreement summary transmitted with the Article 83 *bis* agreement registered with the ICAO Council contains the list of all aircraft affected by the agreement. However, the certified true copy to be carried on board as per 1.5.1 of this IS will need to list only the specific aircraft carrying the copy.

2. All aeroplanes on all flights

- 2.1.** An aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural maneuvers and observe the operating limitations of the aeroplane in the expected operating conditions.

- 2.2.** An aeroplane shall be equipped with:

- a. Accessible and adequate medical supplies;

Medical supplies should comprise:

1. One or more first-aid kits for the use of cabin crew in managing incidents of ill health; and
 2. 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
 3. For aeroplanes authorized to carry more than 100 passengers, on a sector length of more than two hours, a medical kit, for the use of medical doctors or other qualified persons in treating in-flight medical emergencies. Guidance on the types, number, location and contents of the medical supplies is given in Appendix 1.
- b. Portable fire extinguisher of a type which, when discharge, will not cause dangerous contamination of the air within the aeroplane. At least one shall be located in;
1. The pilots compartment and
 2. Each passenger compartment that is separate from the pilot compartment and not readily accessible to the flight crew. Any portable fire extinguisher so fitted In accordance with the C of A may count as one prescribed. Refer paragraph 2.2.1 for fire extinguishing agents. The number of fire extinguishers required shall be as follows;

Maximum approved passenger seating configuration	Number of Extinguishers required
7-30	1
31-60	2
61-200	3
201-300	4
301-400	5
401-500	6
501-600	7
601 or more	8

3. At least one of the fire extinguishers located in the flight deck and in the passenger compartment shall contain Helon 1211 (Bromochloro difluoro methane, CBrClF₂) or equivalent as the extinguishing agent.
 4. At least one readily accessible fire extinguisher must be available for use in each class A or class B cargo or baggage compartment and in each class E cargo compartment that is accessible to crew members inflight.
- c.
1. A seat or berth for each person who is aged two years or more;
 2. A seat belt for each seat and restraining belts for each berth; and
 3. A safety supplementary loop belt (kangaroo belt), or other restrain device for each infant.
 4. A safety harness for each flight crew seat. The safety harness for each pilot seat shall incorporate device, which will automatically restrain the occupant's torso in the event of rapid deceleration; the safety harness for each pilot seat shall incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight controls. The safety harness includes shoulder straps and a seat belt, which may be used independently.
 5. A seat belt with shoulder harness for each cabin crew seat and observer seat.
 6. All seat belts with shoulder harness shall have a single point release.
- d. Means of ensuring that the following information and instructions are conveyed to passengers through a safety briefing card in each passenger seat pocket and a oral safety briefing announcement prior to each take-off;
1. When and how seat belt are to be fastened including child restrain devices;
 2. When and how oxygen equipment is to be used if the carriage of oxygen is required;
 3. Restrictions on smoking;
 4. Location and use of life jackets or equivalent individual floatation devices where their carriage is required;
 5. Location and method of operating emergency exits;
 6. Emergency exit path lighting system;
 7. When and where carry-on baggage must be stowed; and
 8. Correct positioning of seat backs and chair tables for take-off and landing
- e. Spare electrical fuses of appropriate ratings for the replacement of those accessible in flight.

- f. One crash axe or crowbar shall be located in the flight deck. If the maximum approved passenger seats are more than 200 an additional crash axe or crowbar shall be carried and located in or near the most rearward galley area. Crash axes and crowbar located in the passenger compartment shall not be visible to passengers.
- g. Mega phones to be carried as follows;

Passenger seating configuration	No. of mega phones required
61-99	1
100 or more	2

- h. i. An operator shall not operate an aeroplane unless it has equipment to protect the eyes nose and mouth of each flight crew member while on flight deck duty and to provide oxygen for a period of not less than 15 minutes. In addition when the flight crew is more than one and a cabin crew member is not carried Portable Breathing Equipment (PBE) must be carried to protect the eyes, nose and mouth of one member of the flight crew and to provide breathing gas for a period of not less than 15 minutes.
- ii. It has sufficient portable PBE to protect the eyes, nose and mouth of all required cabin crew member and to provide breathing gas for a period of not less than 15 minutes.
- iii. PBE intended of flight crew used must be conveniently located on the flight deck and be easily accessible for immediate use by each required flight crew member at their assigned duty station.
- iv. PBE intended for cabin crew used must be installed adjacent to each required cabin crew member duty station.
- v. PBE while in use must not prevent communication where required.
- i. Any instructions / placard used for passenger information shall be in Sinhala, Tamil and English languages.

2.2.1. 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 31 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 31 December 2018 shall;

- a. The type and quantity of extinguishing agent must be suitable for the kinds of fire likely to occur in the compartment where the extinguisher to be intended to be used for personnel compartments must minimize the hazard of toxic gas concentration; and
- b. Not be of a type listed in the 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.

Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.

2.3. An aeroplane shall carry

- a. The Operations Manual prescribed in paragraph 2.3 of Implementing Standards 013, 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 Implementing Standards 014 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.

2.4. Marking of break-in points

- 2.4.1. If 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 **Appendix-2**. The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.
- 2.4.2. If the corner markings are more than 2m apart, intermediate lines 9cm x 3cm shall be inserted so that there is no more than 2m between adjacent markings. This standard does not require any aeroplane to have break-in areas.

3. Flight recorders

Crash protected flight recorders comprise one or more of the following:

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

As per Appendix 3 of this IS, image and data link information may be recorded on either the CVR or the FDR.

Lightweight flight recorders comprise one or more systems,

- An aircraft data recording system (ADRS),
- A cockpit audio recording system (CARS),
- An airborne image recording system (AIRS)
- A data link recording system (DLRS).

As per Appendix 3 of this IS, image and data link information may be recorded on either the CARS or the ADRS.

Detailed requirements on flight recorders are contained in IS 063.

For aeroplanes for which the application for type certification is submitted to a DGCA before 1 January 2016, specifications applicable to crash-protected flight recorders may be found in EUROCAE ED-112, ED-56A, ED-55, Minimum Operational Performance Specifications (MOPS), or earlier equivalent documents.

For aeroplanes for which the application for type certification is submitted to a DGCA on or after 1 January 2016, specifications applicable to crash-protected flight recorders may be found in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.

Specifications applicable to lightweight flight recorders may be found in EUROCAE ED-155, Minimum Operational Performance Specification (MOPS), or equivalent documents.

3.1. Flight data recorders – and aircraft data recording systems

3.1.1. Applicability

3.1.1.1. All turbine- engined aeroplanes of a maximum certificated take-off mass of 5700 kg or less for which the application for type certification is submitted to the DGCA on or after 1 January 2016 shall be equipped with;

- a. An FDR which shall record at least the first 16 parameters listed in Table A8-1 of Appendix 3; 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 2.2 of Appendix 3; or
- c. An ADRS which shall record at least the first 7 parameters listed in Table A8-3 of Appendix 3.

“The application for type certification is submitted to the DGCA “refers to the date of application of the original “Type certificate” for the aeroplane type, not the date of certification of particular aeroplane variants or derivate models.

AIR or AIRS classification is defined in 6.2 of Appendix 3 of this IS.

3.1.1.2. 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 1 January 2016 should be equipped with;

- a. An FDR which should record at least the first 16 parameters listed in Table A8-1 of Appendix 3; or
- b. A Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot(s), as defined in 2.2 of Appendix 3; or
- c. An ADRS which should record at least the first 7 parameters listed in Table A8-3 of Appendix 3.

3.1.1.3. 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 an FDR which shall record at least the first 32 parameters listed in Table A8-1 of Appendix 3.

3.1.1.4. 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 Appendix 3.

3.1.1.5.All multi-engined turbine- engine 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 should be equipped with an FDR which should record at least the first 16 parameters listed in Table A8-1 of Appendix 3.

3.1.1.6.All turbine-engine 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 3.1.1.8 of this IS, shall be equipped with an FDR which shall record at least the first 5 parameters listed in Table A8-1 of Appendix 3.

3.1.1.7.All turbine engine 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 5700kg, except those in paragraph 3.1.1.8 of this IS, should be equipped with an FDR which should record at least the first 9 parameters listed in Table A8-1 of Appendix 3.

3.1.1.8.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 DGCA after 30 September 1969 shall be equipped with an FDR which shall record at least the first 16 parameters listed in Table A8-1 of Appendix 3.

3.1.1.9. All turbine-engined aeroplanes for which the individual certificate of airworthiness was first issued before 1 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 DGCA after 30 September 1969 should be equipped with a FDR which should record, in addition to the first 5 parameters listed in Table A8-1 of Appendix 3, 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.

3.1.1.10. All aeroplanes of a maximum certificated take-off mass of over 5 700kg for which the individual certificate of airworthiness is first issued after 1 January 2005 shall be equipped with an FDR which shall record at least the first 78 parameters listed in Table A8-1 of Appendix 3.

3.1.1.11. 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 1 January 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table A8-1 of Appendix 3.

3.1.1.12. 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 1 January 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table A8-1 of Appendix 3.

3.1.2. Recording technology

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

3.1.3. Duration

All FDRs shall retain the information recorded during at least the last 25 hours of their operation, with the exception of those installed on aeroplanes referenced in 3.1.1.5 for which the FDR shall retain the information recorded during at least the last 30 minutes of its operation, and in addition sufficient information from the preceding take-off for calibration purposes.

3.2. Cockpit voice recorders and cockpit audio recording systems

3.2.1. Applicability

3.2.1.1.All turbine-engine 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 the DGCA on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.

3.2.1.2.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 1 January 2016 and required to be operated by more than one pilot should be equipped with either a CVR or a CARS.

3.2.1.3.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 1 January 1987 shall be equipped with a CVR.

3.2.1.4.All turbine-engined aeroplanes for which the individual certificate of airworthiness is first issued before 1 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 DGCA after 30 September 1969 shall be equipped with a CVR.

3.2.1.5.All turbine-engined aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 5 700 kg up to and including 27000 kg that are of types of which the prototype was certificated by the DGCA after 30 September 1969 should be equipped with a CVR.

3.2.2. Recording technology

CVRs and CARS shall not use magnetic tape or wire.

3.2.3. Duration

3.2.3.1.All CVRs shall retain the information recorded during at least the last 2 hours of their operation.

3.2.3.2.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 1 January 2022 shall be equipped with a CVR which shall retain the information recorded during at least the last 25 hours of its operation.

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

3.2.4. Cockpit Voice Recorder alternate power source

3.2.4.1.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. The alternate power source shall power the CVR and its associated cockpit area microphone components. The CVR shall be located as close as practicable to the alternate power source. “Alternate” means separate from the power source that normally provides power to the CVR. The use of aeroplane batteries or other power sources is acceptable provided that the requirements above are met and electrical power to essential and critical loads is not compromised. When the CVR function is combined with other recording functions within the same unit, powering the other functions is allowed.

3.2.4.2.All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the application for type certification is submitted to the DGCA on or after 1 January 2018 shall be provided with an alternate power source, as defined in 3.2.4.1 of this IS that powers the forward CVR in the case of combination recorders.

3.2.4.3.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 2018 should be provided with an alternate power source, as defined in 3.2.4.1 of this IS that powers at least one CVR.

3.3. Data link recorders

3.3.1. Applicability

3.3.1.1.All aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which use any of the data link communications applications referred to in 5.1.2 of Appendix 3 and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder.

3.3.1.2.All aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred in 5.1.2 of Appendix 3, shall record the data link communications messages on a crash-protected flight recorder unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1 January 2016

A Class B AIR could be 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.

The “aircraft modifications” refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring).

- a. Data link initiation capability
- b. Controller-pilot data link communications
- c. Data link-flight information services
- d. Automatic dependent surveillance – contract

- e. Automatic dependent surveillance – broadcast*
- f. Aeronautical operational control*

Messages applying to the applications listed above 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.

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

3.3.2. Duration

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

3.3.3. Correlation

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

3.4. Flight crew-machine interface recordings

3.4.1. Applicability

3.4.1.1. All aeroplanes of a maximum take-off mass of over 27 000 kg for which the application for type certification is submitted to a DGCA on or after 1 January 2023 shall be equipped with a crash-protected flight recorder which shall record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew as defined in Appendix 3.

3.4.1.2. All aeroplanes of a maximum take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the application for type certification is submitted to a DGCA on or after 1 January 2023 should be equipped with a crash-protected flight recorder which should 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 Appendix 3.

3.4.2. Duration

The minimum flight crew-machine interface recording duration shall be at least for the last two hours.

3.4.3. Correlation

Flight crew-machine interface recordings shall be able to be correlated to the recorded cockpit audio.

3.5. Flight recorders – general

3.5.1. Construction and installation

Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

3.5.2. Operation

3.5.2.1. Flight recorders shall be serviceable at the commencement of the flight and not be switched off during flight time.

3.5.2.2. To preserve flight recorder records, flight recorders shall be de-activated upon completion of flight time following an accident or incident. The flight recorders shall not be re-activated before their disposition as determined by the DGCA. The need for removal of the flight recorder records from the aircraft will 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. The operator's responsibilities regarding the retention of flight recorder records are contained in paragraph 6 of Implementing Standards 020.

3.5.3. Continued serviceability

Operational checks and evaluations of recordings from the flight recorder systems shall be conducted as per the requirements stipulated in IS 063, to ensure the continued serviceability of the recorders.

Procedures for the inspections of the flight recorder systems are given in Appendix 3.

3.5.4. Flight recorder electronic documentation

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

Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.

3.5.5. Combination recorders

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

3.5.5.2. All aeroplanes of a maximum certificated take-off mass of over 15 000kg for which the application for type certification is submitted to the DGCA on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

3.5.5.3. All aeroplanes of a maximum certificated take-off mass over 5 700kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR). This requirement of 3.5.5 may be satisfied by equipping the aeroplanes with two combination recorders (one forward and one aft) or separate devices.

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

3.6. Flight recorder data recovery

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

3.6.2. In approving the means to make flight recorder data available in a timely manner, the DGCA 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.

4. All aeroplanes operated as VFR flights

4.1. All aeroplanes when operated as VFR flights shall be equipped with:

- a. Magnetic compass;
- b. Accurate timepiece indicating the time in hours, minutes and seconds;
- c. Sensitive pressure altimeter;
- d. Airspeed indicator; and
- e. Such additional instruments or equipment as may be prescribed by the DGCA.

4.2. VFR flights, which are operated as controlled flights, shall be equipped in accordance with paragraph 9.

5. All aeroplanes on flights over water

5.1. Seaplanes : All seaplanes for all flights shall be equipped with:

- a. One life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided;
- b. Equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable; and
- c. One sea anchor (drogue) and other equipment necessary to facilitate mooring, anchoring or maneuvering on water, appropriate with size, weight and handling characteristics.

“Seaplanes” includes amphibians operated as seaplanes.

5.2. Landplanes

5.2.1. Landplanes shall carry the equipment prescribed in paragraph 5.2.2 of this IS:

- a. When flying over water and at a distance of more than 93 km (50 NM) away from the shore, in the case of landplanes operated in accordance with paragraphs 2.9 or 2.10 of Implementing Standards 014;
- 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 DGCA, 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.

5.2.2. The equipment referred to in paragraph 5.2.1 shall comprise one life jacket equipped with a survivor locator light 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.

Life Jackets for infants may be substituted by other approved flotation devices equipped with a survivor locator light. "Landplanes" includes amphibians operated as landplanes.

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

Information regarding the acceptable means of compliance with this Standard, particularly in the case of infants, can be found, in the Guidance on the preparation of an Operations Manual (SLCAP 4500).

5.3. All aeroplanes on long-range over-water flights

5.3.1. In addition to the equipment prescribed in paragraphs 5.1 or 5.2 whichever is applicable, the following equipment shall be installed in all aeroplanes when used over routes on which the aeroplane may be over water and at more than a distance corresponding to 120 minutes at cruising speed or 740 km (400 NM), whichever is the lesser, away from land suitable for making an emergency landing in the case of aircraft operated in accordance with Implementing Standard 014, paragraphs 2.9 or 2.10, and 30 minutes or 185 km (100 NM), whichever is the lesser, for all other aeroplanes:

- a. life-saving rafts with locator lights 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 specified in ASN 086.
- c. At the earliest practicable date but not later than 1 January 2018, on all aeroplanes of a maximum certificated take-off mass of over 27 000 kg, a securely attached underwater locating device operating at a frequency of 8.8 kHz. This automatically activated underwater locating device shall operate for a minimum of 30 days and shall not be installed in wings or empennage. Underwater Locator Beacon (ULB) performance requirements are as contained in the SAE

AS6254, Minimum Performance Standard for Underwater Locating Devices (Acoustic) (Self- Powered), or equivalent documents

- 5.3.2.** Each life jacket and equivalent individual flotation device, when carried in accordance with paragraphs 5.1 a), 5.2.1 and 5.2.2 of this IS, shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of paragraph 5.2.1 c) of this IS is met by the provision of individual flotation devices other than life jackets.

6. All aeroplanes on flights over designated land areas:

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

7. All aeroplanes on high altitude flights

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

Approximate altitude in the Standard Atmosphere corresponding to the value of absolute pressure used in this text is as follows:

- 7.1.** An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa in personnel compartments shall be equipped with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the Requirements published under paragraph 3.9.1 of Implementing Standard 013.
- 7.2.** An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 700 hPa but which is provided with means of maintaining pressures greater than 700hpa in personnel compartments shall be provided with oxygen storage and dispensing apparatus capable of storing and dispensing the oxygen supplies required in the Requirements published under paragraph 3.9.2 of Implementing Standard 013.
- 7.3.** Pressurized aeroplanes newly introduced in to service on or after 1st July 1962 and intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.
- 7.4.** Pressurized aeroplanes introduced into service before 1 July 1962 and intended to be operated at flight altitudes at which the atmospheric pressure is less than 376hpa should be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.
- 7.5.** An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 376hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376hPa, cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620hPa and for which the individual certificate of airworthiness is first issued on or after 9 November 1998, shall be provided with automatically deployable oxygen equipment to satisfy the Requirements Published under

paragraph 3.9.2 of Implementing Standard 013. The total number of oxygen dispensing units shall exceed the number of passenger and cabin crew seats by at least 10 per cent.

- 7.6.** An aeroplane intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, and for which the individual certificate of airworthiness was first issued before 9 November 1998, should be provided with automatically deployable oxygen equipment to satisfy the Requirements Published under paragraph 3.9.2 of Implementing Standard 013. The total number of oxygen dispensing units should exceed the number of passenger and cabin crew seats by at least 10 per cent.

8. All aeroplanes in icing conditions:

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

9. All aeroplanes operated in accordance with instrument flight rules

- 9.1.** 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 equipped with:

- a. A magnetic compass;
- b. An accurate timepiece indicating the time in hours, minutes and seconds;
- c. Two sensitive pressure altimeters with counter drum-pointer or equivalent presentation; (Neither three-pointer nor drum-pointer altimeters satisfy this requirement in 9.1 c.)
- d. An airspeed indicating system with means of preventing malfunctioning due to either condensation or icing;
- e. A turn and slip indicator;
- f. An attitude indicator (artificial horizon);
- g. A Heading indicator (directional gyroscope); (The requirements of paragraphs 9.1 e), f) and g) of this IS 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.)
- 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 DGCA.

9.2. All aeroplanes over 5 700 kg- Emergency power supply for electrically operated attitude indicating instruments.

- 9.2.1.** All aeroplanes of a maximum certificated take-off mass of over 5 700 kg newly introduced into service after 1 January 1975 shall be fitted with an emergency power supply, independent of the main electrical generating system, for the purpose of operating and illuminating, for a minimum period of 30 minutes, an attitude indicating instrument (artificial horizon), clearly visible to the pilot-in-command. The emergency power supply shall be

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

- 9.2.2.** Those 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.

10. All aeroplanes when operated at night:

All aeroplanes, when operated at night shall be equipped with:

- a. All equipment specified in paragraph 9
- b. The lights required by the IS 026 for aircraft in flight or operating on the movement area of an aerodrome;
- c. Two landing lights; (Aeroplanes not certificated in accordance with the requirements specified by the DGCA which are equipped with a single landing light having two separately energized filaments will be considered to have complied with this requirement).
- 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.

11. Pressurized aeroplanes when carrying passengers – weather radar:

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

12. All aeroplanes operated above 15 000 m (49 000 ft) – radiation indicator:

All aeroplanes intended to be operated above 15 000 m (49 000 ft) shall carry equipment to measure and indicate continuously the dose rate of total cosmic radiation being received (i.e. the total of ionizing and neutron radiation of galactic and solar origin) and the cumulative dose on each flight. The display unit of the equipment shall be readily visible to a flight crewmember.

13. All aeroplanes complying with the noise certification Standards in IS 030.

An aeroplanes shall carry a document attesting noise certification issued by the DGCA and that document shall include an English translation if it's not issued in the English language.

14. Mach number indicator:

All aeroplanes with speed limitations expressed in terms of Mach number, shall be equipped with a Mach number indicator. This does not preclude the use of the airspeed indicator to derive Mach number for ATS purposes.

15. Aeroplanes required to be equipped with Ground Proximity Warning Systems (GPWS)

- 15.1.** All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, shall be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.
- 15.2.** 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.
- 15.3.** All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers should be equipped with a ground proximity warning system which provides the warnings of paragraph 15.7 a) and c) of this IS, warning of unsafe terrain clearance and a forward looking terrain avoidance function.
- 15.4.** All turbine-engined aeroplanes of a maximum certificated take-off mass of 5 700 kg or less and authorized to carry more than five but not more than nine passengers for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a ground proximity warning system which provides the warnings of 15.7 a) and c), warning of unsafe terrain clearance and a forward looking terrain avoidance function
- 15.5.** All piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings in 15.7 a) and c) of this IS, warning of unsafe terrain clearance and a forward looking terrain avoidance function.
- 15.6.** A ground proximity warning system shall provide automatically a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface. Operators shall be guided by ASN 103 for maintaining the effectiveness of ground proximity warning system equipment.
- 15.7.** A ground proximity warning system shall provide, unless otherwise specified herein, warnings of the following circumstances:
- a. Excessive descent rate;
 - b. Excessive terrain closure rate;
 - c. Excessive altitude loss after take-off or go-around;
 - d. Unsafe terrain clearance while not in landing configuration;
 - I) gear not locked down;
 - II) flaps not in a landing position; and
 - e. Excessive descent below the instrument glide path.

16. Aeroplanes carrying passengers –cabin crew seats**16.1. Aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 1981:**

All aeroplanes shall be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the aeroplane) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of Implementing Standards No. 021 in respect of emergency evacuation.

16.2. Aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 1981:

All aeroplanes should be equipped with a forward or rearward facing (within 15 degrees of the longitudinal axis of the aeroplane) seat, fitted with a safety harness for the use of each cabin crew member required to satisfy the intent of Implementing Standards No. 021 in respect of emergency evacuation.

Safety harness includes shoulder straps and a seat belt which may be used independently.

16.3. Cabin crew seats provided in accordance with paragraph 16.1 and 16.2 of this IS shall be located near floor level and other emergency exits as required by the DGCA for emergency evacuation.

17. Emergency Locator Transmitter (ELT)

17.1. All aeroplanes should carry an automatic ELT.

17.2. Except as provided for in paragraph 17.3 of this IS, all aeroplanes authorized to carry more than 19 passengers shall be equipped with at least one automatic ELT or two ELTs of any type.

17.3. All aeroplanes authorized 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 paragraph 18 of this IS.

In the case where the requirements for paragraph 18 are met by another system no automatic ELT is required.

17.4. Excepted as provided in paragraph 17.5 of this IS, all aeroplanes authorized to carry 19 passengers or less shall be equipped with at least one ELT of any type.

17.5. All aeroplanes authorized 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.

17.6. ELT equipment carried to satisfy the requirements of paragraphs 17.1, 17.2, 17.3, 17.4 and 17.5 of this IS shall operate in accordance with the relevant provisions of IS 040.

The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

18. LOCATION OF AN AEROPLANE IN DISTRESS

- 18.1.** 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 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 Appendix 4.
- 18.2.** All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023, should autonomously transmit information from which a position can be determined at least once every minute, when in distress, in accordance with Appendix 4.
- 18.3.** The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the DGCA.

Refer to IS 013 for operator responsibilities when using third parties.

Operational procedures for monitoring and making position information of a flight in distress available to the appropriate organizations in a timely manner are contained in PANS-OPS, Volume III, Section 10.

19. Aeroplanes required to be equipped with an airborne collision avoidance system (ACAS II)

- 19.1.** All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than 19 passengers shall be equipped with an airborne collision avoidance system (ACAS II).
- 19.2.** All aeroplanes should be equipped with an airborne collision avoidance system (ACAS II).
- 19.3.** An airborne collision avoidance system shall operate in accordance with the relevant provisions of IS 047. Operational procedures and training requirements of airborne collision avoidance system (ACAS) equipment are contained in ASN 104.

20. Requirements for pressure-altitude reporting transponders:

- 20.1.** All aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of IS 047.
- 20.2.** All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25ft), or better
- 20.3.** All aeroplanes shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25ft), or better.
- 20.4.** The Mode S transponder should be provided with the airborne/on-the-ground status if the aeroplane is equipped with an automatic means of detecting such status.

These provisions will improve the effectiveness of airborne collision avoidance systems as well as air traffic services that employ Mode S radar. In particular, tracking processes are significantly enhanced with a resolution of 7.62m (25ft), or better.

Mode C replies of transponders always report pressure altitude in 30.50m (100ft) increments irrespective of the resolution of the data source.

21. Microphones:

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

22. Turbo-jet aeroplanes forward-looking wind shear warning system

22.1. All turbo-jet aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers should be equipped with a forward-looking wind shear warning system.

22.2. A forward-looking wind shear warning system should 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 maneuver if necessary. The system should 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.

23. All Aeroplanes operated by a single pilot under the Instrument Flight Rules (IFR) or at night

For approval in accordance with paragraph 9.1 of the Implementing Standard 013, 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 or equivalent; and
- c. Means of displaying charts that enables them to be readable in all ambient light conditions.

24. Aeroplanes equipped with Automatic Landing Systems, a Head Up Display (HUD) or equivalent displays, Enhanced Vision Systems (EVS), Synthetic Vision Systems (SVS) and/or Combined Vision Systems (CVS)

Notwithstanding IS 013, 2.8.1.1 to 2.8.1.3, where aeroplanes are equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, criteria for the use of such systems for the safe operation of an aeroplane shall be established by the DGCA.

Information regarding, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, is contained in the IS 013 and SLCAP 4510 Manual of All-Weather Operations.

25. Electronic flight bags (EFBs)

Guidance on EFB equipment, functions and specific approval is contained in the Manual on Electronic Flight Bags. Refer IS 027 and SLCAP 4535.

25.1. EFB 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.

25.2. EFB functions

25.2.1. Where EFBs are used on board an aeroplane the operator shall:

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

Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859 and Gazette Notification number 2065/38, 2018).

25.2.2. DGCA shall issue a specific approval for the operational use of EFB functions to be used for the safe operation of aeroplanes.

25.3. EFB specific approval

When issuing a specific approval for the use of EFBs, the DGCA shall ensure that:

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

Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859 and Gazette Notification number 2065/38, 2018).

26. TURBINE AEROPLANE - RUNWAY OVERRUN AWARENESS AND ALERTING SYSTEM (ROAAS)

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

Guidance material for ROAAS design is contained in EUROCAE ED-250, Minimum Operation Performance Specification (MOPS) for Runway Overrun Awareness and Alerting System (ROAAS), or equivalent documents.

APPENDIX 1

TYPES, NUMBER, LOCATION AND CONTENTS OF MEDICAL SUPPLIES

1. Types

- 1.1.** The different types of medical supplies should be provided as follows: first-aid kit(s) for carriage on all aeroplanes, universal precaution kit(s) for carriage on all aeroplanes that require a cabin crew member, and a medical kit for carriage where the aeroplane is authorized to carry more than 100 passengers on a sector length of more than two hours. Where national regulations allow it, operators may elect to carry the recommended medication in the first-aid kit.
- 1.2.** Based on the limited available evidence, only a very small number of passengers are likely to benefit from the carriage of Automated External Defibrillators (AED) on aeroplanes. However, many operators carry them because they offer the only effective treatment for cardiac fibrillation. The likelihood of use, and therefore of potential benefit to a passenger, is greatest in aircraft carrying a large number of passengers, over long duration sector lengths. The carriage of AEDs should be determined by operators on the basis of a risk assessment taking into account the particular needs of the operation.

2. Number of first-aid and universal precaution kits

2.1. First-aid kits

The number of first-aid kits should be appropriate to the number of passengers which the aeroplane is authorized to carry:

Passenger	First-aid kits
0-100	1
101-200	2
201-300	3
301-400	4
401-500	5
More than 500	6

2.2. Universal precaution kits

For routine operations, one or two universal precaution kits should be carried on aircraft that are required to operate with at least one cabin crew member. Additional kit(s) should be made available at times of increased public health risk, such as during an outbreak of a serious communicable disease having pandemic potential. Such kits may be used to clean up any potentially infectious body contents such as blood, urine, vomit and faeces and to protect the cabin crew members who are assisting potentially infectious cases of suspected communicable disease.

3. Location

- 3.1.** First-aid and universal precaution kits should be distributed as evenly as practicable throughout the passenger cabins. They should be readily accessible to cabin crew members.
- 3.2.** The medical kit, when carried, should be stored in an appropriate secure location.

4. Contents

4.1. The following provides guidance on typical contents of first-aid, universal precaution and medical kits.

4.1.1. First-aid kit:

- List of contents
- Antiseptic swabs (10/pack)
- Bandage: adhesive strips
- Bandage: gauze 7.5 cm × 4.5 m
- Bandage: triangular; safety pins
- Dressing: burn 10 cm × 10 cm
- Dressing: compress, sterile 7.5 cm × 12 cm
- Dressing: gauze, sterile 10.4 cm × 10.4 cm
- Tape: adhesive 2.5 cm (roll)
- Steri-strips (or equivalent adhesive strip)
- Hand cleanser or cleansing towelettes
- Pad with shield, or tape, for eye
- Pair of Scissors: 10 cm (if allowed by national regulations)
- Tape: Adhesive, surgical 1.2 cm × 4.6 m
- Pair of Tweezers: splinter
- Disposable gloves (multiple pairs)
- Thermometers (non-mercury)
- Mouth-to-mouth resuscitation mask with one-way valve
- First-aid manual, current edition
- Incident record form

The following medications may be included in the first-aid kits:

- Mild to moderate analgesic
- Antiemetic
- Nasal decongestant
- Antacid
- Antihistamine

4.1.2. Universal precaution kit:

- Dry powder that can convert small liquid spill into a sterile granulated gel
- Germicidal disinfectant for surface cleaning
- Skin wipes
- Face/eye mask (separate or combined)
- Gloves (disposable)
- Protective apron
- Large absorbent towel
- Pick-up scoop with scraper
- Bio-hazard disposal waste bag
- Instructions

4.1.3. Medical kit:

- Equipment
- List of contents
- Stethoscope
- Sphygmomanometer (electronic preferred)
- Airways, oropharyngeal (three sizes)
- Syringes (appropriate range of sizes)
- Needles (appropriate range of sizes)
- Intravenous catheters (appropriate range of sizes)
- Antiseptic wipes
- Gloves (disposable)
- Needle disposal box
- Urinary catheter
- System for delivering intravenous fluids
- Venous tourniquet
- Sponge gauze
- Tape – adhesive
- Surgical mask
- Emergency tracheal catheter (or large gauge intravenous cannula)
- Umbilical cord clamp
- Thermometers (non-mercury)
- Basic life support cards
- Bag-valve mask
- Flashlight and batteries

Medication

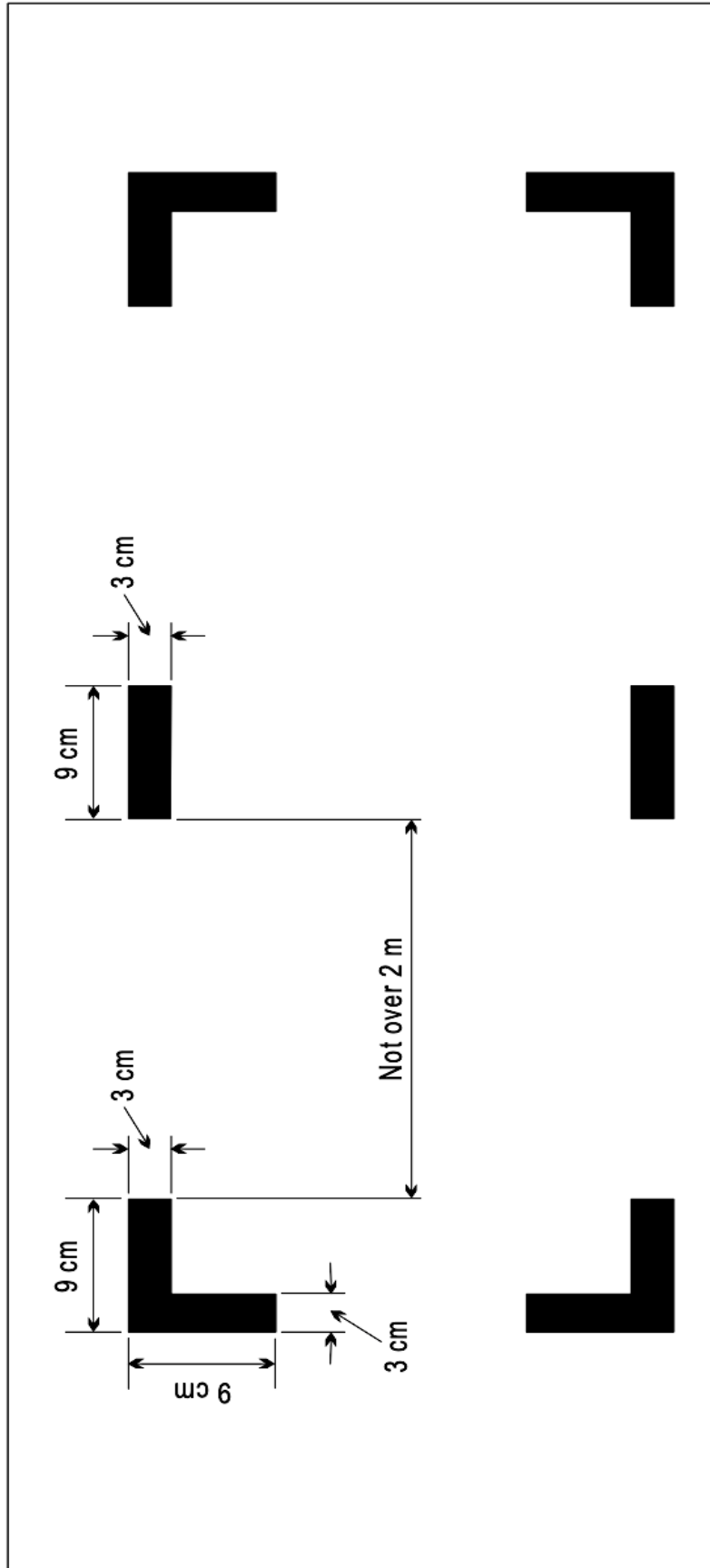
- Epinephrine 1:1 000
- Antihistamine – injectable
- Dextrose 50% (or equivalent) – injectable: 50 ml
- Nitroglycerin tablets, or spray
- Major analgesic
- Sedative anticonvulsant – injectable
- Antiemetic – injectable
- Bronchial dilator – inhaler
- Atropine – injectable
- Adrenocortical steroid – injectable
- Diuretic – injectable
- Medication for postpartum bleeding
- Sodium chloride 0.9% (minimum 250 ml)
- Acetyl salicylic acid (aspirin) for oral use
- Oral beta blocker

If a cardiac monitor is available (with or without an AED) add to the above list:

- Epinephrine 1:10 000 (can be a dilution of epinephrine)

The United Nations Conference for Adoption of a Single Convention on Narcotic Drugs in March 1961 adopted such a Convention, Article 32 of which contains special provisions concerning the carriage of drugs in medical kits of aircraft engaged in international flight.

APPENDIX - 2



APPENDIX - 3

FLIGHT RECORDERS

The material in this Appendix concerns flight recorders intended for installation in aeroplanes engaged in international air navigation. Crash protected flight recorders comprise one or more of the following:

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

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

- Lightweight flight recorders comprise one or more of the following:
- An aircraft data recording system (ADRS),
- A cockpit audio recording system (CARS),
- An airborne image recording system (AIRS),
- A data link recording system (DLRS).

1. General requirements

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

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

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

1.3 Automatic deployable flight recorder containers shall:

- a) Be painted a distinctive orange colour, however the surface visible from outside the aircraft may be of another colour;
- b) Carry reflective material to facilitate their location; and
- c) Have an integrated automatically activated ELT.

1.4 The flight recorder systems shall be installed so that:

- a) The probability of damage to the recordings is minimized;
- b) There is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and

- c) If the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.
- 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.

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

- 1.5** The crash-protected flight recorders shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardizing service to essential or emergency loads.
- 1.6** The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.
- 1.7** The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.
- 1.8** Means shall be provided for an accurate time correlation between the flight recorder systems recordings.
- 1.9** The flight recorder system manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recording systems:
 - a) Manufacturer's operating instructions, equipment limitations and installation procedures;
 - b) Parameter origin or source and equations which relate counts to units of measurement;
 - c) Manufacturer's test reports. and
 - d) Detailed information to ensure the continued serviceability of the flight recorder system.
- 1.10** The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the aeroplane to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

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

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

2. Flight Data Recorder (FDR) and Aircraft Data Recording Systems (ADRS)

2.1 Start and stop logic

The FDR or ADRS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power.

2.2 Parameters to be recorded

2.2.1 The parameters that satisfy the requirements for FDRs are listed in Table A8-1. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by aeroplane systems or the flight crew to operate the aeroplane. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

2.2.2 If further FDR recording capacity is available, recording of the following additional information shall be considered:

- a) Operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:
 - 1) Parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;
 - 2) Display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;
 - 3) Warnings and alerts; and
 - 4) The identity of displayed pages for emergency procedures and checklists; and
- b) Retardation information including brake application for use in the investigation of landing overruns and rejected takeoffs.

2.2.3 The parameters that satisfy the requirements for flight path and speed as displayed to the pilot(s) are listed below. The parameters without an (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an (*) shall be recorded if an information source for the parameter is displayed to the pilot and is practicable to record:

- Pressure altitude
- Indicated airspeed or calibrated airspeed
- Heading (primary flight crew reference)
- Pitch attitude
- Roll attitude Engine thrust/power Landing-gear status*
- Total or outside air temperature*
- Time*
- Navigation data*: drift angle, wind speed, wind direction, latitude/longitude
- Radio altitude*

2.2.4 The parameters that satisfy the requirements for ADRS are the first 7 parameters in Table A8-3.

2.2.5 If further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table A8-3 shall be considered.

2.3 Additional information

2.3.1 The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.

2.3.2 Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

3. Cockpit Voice Recorder (CVR) and Cockpit Audio Recording System (CARS)

3.1 Start and stop logic

The CVR and CARS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR and CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

3.2 Signals to be recorded

3.2.1 The CVR shall record simultaneously on four separate channels, or more, at least the following:

- a) Voice communication transmitted from or received in the aeroplane by radio;
- b) Aural environment on the flight deck;
- c) Voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed;
- d) Voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and
- e) Voice communication of flight crew members using the passenger address system, if installed

3.2.2 The preferred 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.

3.2.3 The CARS shall record simultaneously on two separate channels, or more, at least the following:

- a) Voice communication transmitted from or received in the aeroplane by radio;
- b) Aural environment on the flight deck; and
- c) Voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed.

3.2.4 The preferred CARS audio allocation should be as follows:

- a) Voice communication; and
- b) Aural environment on the flight deck.

4. Automatic Deployable Flight Recorder (ADFR)

4.1 Operation

The following requirements shall apply to an ADFR:

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

5. Data Link Recorder (DLR)

5.1 Applications to be recorded

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

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

5.1.2 Messages applying to the applications listed in Table A8-2 shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

6. Flight Crew-Machine Interface Recordings

6.1 Start and stop logic

The AIR or AIRS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

6.2 Classes

6.2.1 A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

There are no provisions for Class A AIR or AIRS in this document.

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

A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS, or where an FDR is not required.

6.3 Applications to be recorded

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

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

- Any switch or selector that will affect the operation and the navigation of the aircraft; and
- Selection of normal and alternate systems.

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

- Primary flight and navigation displays;
- Aircraft system monitoring displays;
- Engine indication displays;
- Traffic, terrain, and weather displays;
- Crew alerting systems displays;
- Stand-by instruments; and
- Installed EFB to the extent it is practical.

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

7. Inspections of flight recorder systems

7.1 Prior to the first flight of the day, the built-in test features for the flight recorders and Flight Data Acquisition Unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

7.2 FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording system inspection intervals of one year; subject to the approval from the appropriate regulatory authority, this period may be extended to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring. DLR systems or DLRS shall have recording system inspection intervals of two years; subject to the approval from the appropriate regulatory authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.

7.3 Recording system inspections shall be carried out as follows:

- a) An analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
- b) The FDR or ADRS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;
- c) The readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
- d) An examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
- e) Where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and
- f) An examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.
- g) An examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

7.4 A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

7.5 A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.

7.6 Calibration of the FDR system:

- a) For those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and
- b) When the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two years

Table A8-1. Parameter characteristics for flight data recorders

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
1	Time (UTC when 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_{S0} (Note 1) V_{S0} 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		

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
9	Power on each engine (Note 3)		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretises	1		
16	Longitudinal acceleration (Note 8)	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration (Note 8)	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
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)
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	

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
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
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, discretised or full range)	1	±5%	2% of full range

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
35*	Additional engine parameters (EPR, N ₁ , indicated vibration level, N ₂ , EGT, fuel flow, fuel cut-off lever position, N ₃ , 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/alerts display format		Discrete(s)	4	As installed	
48*	AC electrical bus status		Discrete(s)	4	As installed	

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
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

<i>Serial number</i>	<i>Parameter</i>	<i>Applicability</i>	<i>Measurement range</i>	<i>Maximum sampling and recording interval (seconds)</i>	<i>Accuracy limits (sensor input compared to FDR readout)</i>	<i>Recording resolution</i>
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_{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 controlsystems 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 Appendix.

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

<i>Item No.</i>	<i>Application type</i>	<i>Application description</i>	<i>Recording content</i>
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. 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 to be recorded only as far as is practicable given the architecture of the system.

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

<i>No.</i>	<i>Parameter name</i>	<i>Minimum recording range</i>	<i>Maximum recording interval in seconds</i>	<i>Minimum recording accuracy</i>	<i>Minimum recording resolution</i>	<i>Remarks</i>
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 altitude of aeroplane +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
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	

<i>No.</i>	<i>Parameter name</i>	<i>Minimum recording range</i>	<i>Maximum recording interval in seconds</i>	<i>Minimum recording accuracy</i>	<i>Minimum recording resolution</i>	<i>Remarks</i>
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°	

<i>No.</i>	<i>Parameter name</i>	<i>Minimum recording range</i>	<i>Maximum recording interval in seconds</i>	<i>Minimum recording accuracy</i>	<i>Minimum recording resolution</i>	<i>Remarks</i>
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	

APPENDIX 4.

LOCATION OF AN AEROPLANE IN DISTRESS

1. PURPOSE AND SCOPE

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

2. OPERATION

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

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

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

Aircraft behavior events can include, but are not limited to, unusual attitudes, unusual speed conditions, collision with terrain and total loss of thrust/propulsion on all engines and ground proximity warnings. A distress alert can be triggered using criteria that may vary as a result of aircraft position and phase of flight.

Aviation System Performance Specification (MASPS) for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information.

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

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

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

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

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