Republic of the Philippines
Department of Transportation and Communications
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES
Office of the Director General

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MEMORANDUM CIRCULAR NO.: 50-13

TO : **ALL CONCERNED**

FROM : **THE DIRECTOR GENERAL**

SUBJECT : **AMENDMENTS TO THE PHILIPPINE CIVIL AVIATION REGULATIONS**

REFERENCE:

1. Philippine Civil Aviation Regulations
2. ICAO Annex 1, 6, 8
3. ICAO Annex 6 Part 1; Amendment 33, 34, 35 and 36
4. Regulations Amendment Procedures
5. Board Resolution No.: 2012-054 dated 28 September 2013

CAAP-FLIGHT STANDARDS
INSPECTORATE SERVICE
(VERIFIED TRUE AND CORRECT
FROM THE DOCUMENTS ON FILE)
CAPT. EFREN C. ROCAMORA
NAME AND SIGNATURE

Pursuant to the powers vested in me under Republic Act 9497, otherwise known as the Civil Aviation Aurhority Act of 2008 and in accordance with the Board Resolution No.: 2012-054 dated 28 September 2013, I hereby approve the incorporation of ICAO Annex 6, Part 1, Amendment 33, 34, 35 and 36 to the Philippine Civil Aviation Regulations.

PCAR PART 1

1.5 SAFETY MANAGEMENT SYSTEM

The AOC, ATO, and AMO shall implement a safety management system acceptable to the Authority that as a minimum:

(1) Identifies safety hazards;

(2) Ensures the implementation of remedial action necessary to maintain agreed safety performance;

(3) Provides for continuous monitoring and regular assessment of the safety performance; and

(4) Aims at a continuous improvement of the overall performance of the safety management system.

The safety management system shall clearly define lines of safety accountability throughout the approved training organization, including a direct accountability for safety on the part of senior management

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The safety management system shall contain the components and elements listed in IS 1.5.

Note 1: Guidance on defining safety performance is contained in ICAO Doc 9859 Safety Management Manual.

Note 2: The framework for the implementation and maintenance of a safety management system is contained in ICAO Doc 9859 Safety Management Manual, Appendix 4.

Note 3: The framework for a STATE Safety Program (SSP) is contained in ICAO Annex 1: Attachment C and ICAO Annex 6, Part I: Attachment I. (31 October 2013)

IS: 1.5 SAFETY MANAGEMENT SYSTEM

The following specifies the framework for the implementation and maintenance of a safety management system (SMS) by an AOC, ATO or AMO.

(1)Safety policy and objectives:

(i)Management commitment and responsibility.

(A)The AOC, ATO or AMO shall define the organization's safety policy which shall be:

(aa) inaccordance with international and national requirements, and

(bb) signed by the accountable executive of the organization.

(B)The safety policy shall:

(aa) reflectorganizational commitments regarding safety;

(bb)include a clear statement about the provision of the necessary resources for the implementation of the safety policy;

(cc)be communicated with visible endorsement throughout the organization;

(dd)include the safety reporting procedures;

(ee)clearly indicate which types of operational behaviors are unacceptable;

(ff)include the conditions under which disciplinary action would not apply; and

(gg)Be periodically reviewed to ensure it remains relevant and appropriate to the organization.

(ii)Safety accountabilities

(A)The AOC, ATO or AMO shall identify, with respect to the safety performance of the SMS:

(aa)the accountable executive who, irrespective of other functions, shall have ultimate responsibility and accountability, on behalf of the AOC, ATO or AMO, for the implementation and maintenance of the SMS;

(bb)the accountabilities of all members of the management, irrespective of other functions, and

(cc)the employees.

(B)The AOC, ATO or AMO shall

(aa)document safety responsibilities, accountabilities and authorities;

(bb)communicate these throughout the organization, and

(cc)include a definition of the levels of management authority to make decisions regarding safety risk tolerability.

(iii)Appointment of key safety personnel

(A)The AOC, ATO or AMO shall identify a safety manager to be the responsible individual and focal point or the implementation and maintenance of an effective SMS.

(iv)Coordination of emergency response planning

(A)The AOC, ATO or AMO shall ensure that an emergency response plan that provides for the orderly and efficient transition from normal to emergency operations and the return to normal operations is properly coordinated with the emergency response plans of those organizations it must interface with during the provision of its services.

(v)SMS documentation

(A)The AOC, ATO or AMO shall develop and maintain:

(aa)an SMS implementation plan:

(aaa)endorsed by senior management of the organization, and

(bbb)that defines the organization's approach to the management of safety in a manner that meets the organization's safety objectives.

(bb)SMS documentation describing:

(aaa)the safety policy and objectives,

(bbb)the SMS requirements,

(ccc)the SMS processes and procedures,

(ddd)the accountabilities, responsibilities and authorities for processes and procedures and the SMS outputs.

(cc)a safety management systems manual (SMSM) to communicate its approach to the management of safety throughout the organization.

(2)Safety risk management:

(i)Hazard identification.

(A)The AOC, ATO or AMO shall develop and maintain a formal process that ensures that hazards in operations are identified.

(B)The AOC, ATO or AMO shall base its hazard identification on a combination of reactive, proactive and predictive methods of safety data collection.

(ii)Safety risk assessment and mitigation.

(A)The AOC, ATO or AMO shall develop and maintain a formal process that ensures analysis, assessment and control of the safety risks in training operations.

(3)Safety assurance:

(i)Safety performance monitoring and measurement.

(A)The AOC, ATO or AMO shall develop and maintain the means to:

(aa)verify the safety performance of the organization, and

(bb)validate the effectiveness of safety risk controls.

(B)The AOC, ATO or AMO shall verify the safety performance of the organization in reference to the safety performance indicators and safety performance targets of the SMS.

(ii)The management of change

(A)The AOC, ATO or AMO shall develop and maintain a formal process to:

(aa)identify changes within the organization which may affect established processes and services;

(bb)describe the arrangements to ensure safety performance before implementing changes, and

(cc)eliminate or modify safety risk controls that are no longer needed or effective due to changes in the operational environment.

(iii)Continuous improvement of the SMS

(A)The AOC, ATO or AMO shall develop and maintain a formal process to

(aa)identify the causes of substandard performance of the SMS.

(bb)determine the implications of substandard performance of the SMS in operations; and

(cc)eliminate or mitigate such causes.

(4)Safety promotion:

(i)Training and education

(A)The AOC, ATO or AMO shall develop and maintain a safety training program that:

(aa)ensures that all personnel are trained and competent to perform the SMS duties, and

(bb)is appropriate to each individual's involvement in the SMS.

(ii)Safety communication.

(A)The AOC, ATO or AMO shall develop and maintain formal means for safety communication that:

(aa)ensures all personnel are fully aware of the SMS;

(bb)conveys safety-critical information;

(cc)explains why particular safety actions are taken; and

(dd)explains why safety procedures are introduced or changed. (31 October 2013)

APPENDIX A DEFINITIONS

Accelerate-stop distance available (ASDA). The length of the take-off run available plus the length of stopway, if provided. (31 October 2013)

Airworthy. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation. (31 October 2013)

Alternate airport/aerodrome/heliport. An airport/heliport to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the airport/heliport of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate airports/heliports include the following:

(a) **Take-off alternate**. An alternate airport/heliport at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the airport/heliport of departure.

(b) **En-route alternate**. An alternate airport/heliport at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

(c) **Destination alternate**. An alternate airport/heliport at which an aircraft would be able to land should it become either impossible or inadvisable to land at the airport/heliport of intended landing. (31 October 2013)

Approach and landing operations using instrument approach procedures. Instrument approach and landing operations are classified as follows:

(A) Category I (CAT I) operation. A precision instrument approach and landing with:

(aa) a decision height not lower than 60 m (200 ft); and

(bb) with either a visibility not less than 800 m or a runway visual range (RVR) not less than 550 m.

(B) Category II (CAT II) operation. A precision instrument approach and landing with:

(aa) a decision height lower than 60 m (200 ft), but not lower than 30 m (100 ft);

(bb) and a RVR not less than 300 m.

(C) Category IIIA (CAT IIIA) operation. A precision instrument approach and landing with:

(aa) a decision height lower than 30 m (100 ft) or no decision height; and

(bb) a runway visual range not less than 175 m

(D) Category IIIB (CAT IIIB) operation A precision instrument approach and landing with:

(aa) a decision height lower than 15 m (50 ft) or no decision height; and

(bb) a runway visual range less than 175 m but not less than 50 m. (31 October 2013)

Continuing Airworthiness. The set of processes by which an aircraft, engine, propeller or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life (31 October 2013)

Duty. Any task that flight or cabin crew members are required by the operator to perform, including for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue. (31 October 2013)

Duty period. A period which starts when flight or cabin crew personnel are required by an operator to report for or to commence a duty and ends when that person is free from all duties. (31 October 2013)

Enhanced Vision System (EVS). A system to display electronic real-time images of the external scene achieved through the use of image sensors. (31 October 2013)

Extended diversion time operations (EDTO). Any operation by an airplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the Authority. (31 October 2013)

EDTO critical fuel. The fuel quantity necessary to fly to an en-route alternate aerodrome considering, at the most critical point on the route, the most limiting system failure. (31 October 2013)

EDTO-significant system. An airplane system whose failure or degradation could adversely affect the safety particular to an EDTO flight, or whose continued functioning is specifically important to the safe flight and landing of an airplane during an EDTO diversion. (31 October 2013)

Engine. A unit used or intended to be used for aircraft propulsion. It consists of at least those components and equipment necessary for the functioning and control, but excludes the propeller (if applicable).(31 October 2013)

Fatigue. A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety-related duties (31 October 2013)

Fatigue Risk Management System (FRMS). A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness (31 October 2013)

Flight duty period. A period which commences when a flight or cabin crew member is required to report for duty that includes a flight or a series of flights and which finishes when the airplane finally comes to rest and the engines are shut down at the end of the last flight on which he/she is a crew member. (31 October 2013)

Head-up display *(HUD).* A display system that presents flight information into the pilot's forward external field of view. (31 October 2013)

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Isolated aerodrome. A destination aerodrome for which there is no destination alternate aerodrome suitable for a given airplane type. (31 October 2013)

Land distance available (LDA). The lengthy of runway which is declared available and suitable for the ground run of an airplane landing. (31 October 2013)

Maximum diversion time. Maximum allowable range, expressed in time, from a point on a route to an en-route alternate aerodrome. (31 October 2013)

Navigation specification. A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specification:

> Required navigation performance (RNP) specification. A navigation specification based on an area navigation that includes that requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.
>
> Area navigation (RNAV) specification.A navigation specification based on area navigation that does not include the requirements for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.
>
> *Note 1: The Performance based Navigation Manual (ICAO Doc 9613) Volume 2 contains detailed guidance on navigation specifications.*
>
> *Note 2: The term RNP as previously defined as "a statement of the navigation performance, necessary for operation within a defined airspace", has been removed from ICAO Annex 6 PART 1 as the concept of RNP has been overtaken by the concept of PBN. The term RNP in of Annex 6 is now solely used in context of navigation specifications that require performance monitoring and alerting. E.g. RNP 4 refers to the aircraft andoperating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in ICAO Doc 9613.*(31 October 2013)

Point of no return. The last possible geographic point at which an airplane can proceed to the destination aerodrome as well as to an available en route alternate aerodrome for a given flight. (31 October 2013)

Rest period. A continuous and defined period of time, subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties. (31 October 2013)

State safety program. An integrated set of regulations and activities aimed at improving safety. (31 October 2013)

Threshold time. The range, expressed in time, established by the Authority, to an en-route alternate aerodrome, whereby any time beyond requires an EDTO approval from the Authority. (31 October 2013)

PCAR PART 7

7.2.8 NAVIGATION EQUIPMENT FOR OPERATIONS IN RVSM AIRSPACE

(a) [AAC] For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1,000 ft) is applied between FL 290 and FL 410 inclusive, ~~an aircraft~~

(1) . . .

(iv) Automatically reporting pressure-altitude;

(2) shall be authorized by the Authority for operation in the airspace concerned; and

(b)

(1) The vertical navigation performance capability of the aircraft satisfies the requirements specified in ICAO Annex 6, Part I, Appendix 4 (AOC) and ICAO Annex 6, Part II, Appendix 2 (General Aviation) (31 October 2013)

(c) . . .

(d) The Authority will take appropriate action in respect of aircraft and operators found to be operating in RVSM airspace in the Philippines without a valid RVSM approval.

Note 1: These provisions and procedures need to address both the situation where the aircraft in question is operating without approval in the airspace of the State, and the situation where an operator for which the State has regulatory oversight responsibility is found to be operating without the required approval in the airspace of another State.

Note 2: See ICAO Doc 9574, Manual on Implementation of a 300 m (1,000 ft) Vertical Separation Minimum between FL 290 and FL 410 Inclusive, for guidance relating to the approval for operations in RVSM airspace.

(e) An operator with RVSM approval shall ensure that a minimum of two airplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per airplane, whichever period is longer. If an operator aircraft type grouping consists of a single airplane, monitoring of that airplane shall be accomplished within the specified period.

Note: *Monitoring data from any regional monitoring program established in accordance with ICAO Annex 11.3.3.5.2, may be used to satisfy the requirement.*

(f) An operator shall ensure that each airplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the airplane to navigate in accordance with paragraphs (a), (b) and (c) of 7.2.8.

Note.- *Guidance material relating to aircraft equipment necessary for flight I airspace where RVSM is applied is contained in the* Manual on Implementation of a 300 m (1 000ft) Vertical Separation minimum Between FL 290 and FL 410 Inclusive *(ICAO Doc 9574).*

(g) On flights in which it is intended to land in instrument meteorological conditions, an airplane shall be provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in instrument meteorological conditions and for any designated alternate aerodromes. (31 October 2013)

7.2.11 AIRPLANES EQUIPPED WITH HEAD-UP DISPLAYS (HUD) AND/OR ENHANCED VISION SYSTEMS (EVS)

(a) Where aircraft are equipped with HUD and/or EVS, the use of such systems to gain operational benefit shall be approved by the Authority.

Note 1: Guidance on HUD and EVS is contained in ICAO Annex 6, Part I, Attachment J. (31 October 2013)

7.7 FLIGHT RECORDERS

7.7.1 GENERAL REQUIREMENTS

Note 1: Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.

Note 2: Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.

Note 3: Combination recorders (FDR/CVR) may be used to meet the equipage requirements for helicopters.

7.7.1.1 CONSTRUCTION AND INSTALLATION

(a) Flight recorders systems 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.

(1) The flight recorder systems containers shall:

(i) Be painted a distinctive orange or yellow color;
(ii) Carry reflective material to facilitate their location; and
(iii) Have securely attached an automatically activated underwater locating device.

(b) Flight recorder systems shall be installed so that:

(1) The probability of damage to the recordings is minimized;

(2) They receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads;

(3) There is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and

(4) If the flight recorder systems have a bulk erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact.

(5) They meet the prescribed crashworthiness and fire protection specifications.

(c) The flight recorder systems, when tested by methods approved by its State of Design, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

(d) Means shall be provided for an accurate time correlation between the flight recorder systems recordings.

Note 1: Industry crashworthiness and fire protection specifications for FDR, CVR, AIR and DLR are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems or equivalent documents.

Note 2: Industry crashworthiness and fire protection specifications for ADRS and CARS are as contained in the EUROCAE ED-155, Minimum Operational Performance Specifications (MOPS) for Lightweight Flight Recording Systems, or equivalent documents.

7.7.1.2 OPERATION

(a) Flight recorder systems shall not be switched off during flight time.

(b) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with the accident/incident regulations of the Authority.

Note 1: The need for removal of the flight recorder records from the aircraft will be determined by the investigation authority in the State of Occurrence conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

Note 2: The operator's responsibilities regarding the retention of flight recorder records are contained in PCAR Volume 1 Part 13,

7.7.1.3 CONTINUED SERVICEABILITY AND INSPECTION OF FLIGHT RECORDER SYSTEMS

(a) The operator shall conduct operational checks and evaluations of recordings from the flight recorder systems to ensure the continued serviceability of the recorders.

(b) The procedures for the inspections of the flight recorder systems are given in IS 7.7.1.3.

7.7.1.4 FLIGHT RECORDER ELECTRONIC DOCUMENTATION

(a) Operators shall provide to accident investigation authorities the documentation of flight recording systems parameters in electronic format and in accordance with ARINC 647A, Flight Recorder Electronic Documentation or equivalent Document..

7.7.1.5 COMBINATION RECORDERS

[AAC] No person may operate an airplane of a maximum certificated take-off mass over 5 700 kg required to be equipped with an FDR and a CVR unless it is equipped with–

(1) An FDR and a CVR: or

(2) Two combination recorders (FDR/DVR).

[AOC] No person may operate an airplane of a maximum certificated take-off mass of over 5 700 kg and which is required to be equipped with both a FDR and CVR unless—

(1) The airplane is equipped with an FDR and a CVR or alternatively equipped with two combination recorders (FDR/CVR).

(2) The airplane is equipped with two combination recorders (FDR/CVR) for airplanes type certificated on or after 1 January 2016.

Note: The requirement may be satisfied by equipping the airplanes with two combination recorders (one forward and one aft) or separate devices.

[AOC] No person may operate an airplane of a maximum certificated take-off mass of over 15 000 kg which is required to be equipped with both a CVR and an FDR and type certificated on or after 1 January 2016, unless—

(1) The airplane is equipped with two combination recorders (FDR/CVR), and

(2) one recorder is located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

[AOC] No person may operate a multi-engined turbine-powered airplane of a maximum certificated take-off mass of 5 700 kg or less, unless –

(1) The airplane is equipped with an FDR and/or a CVR, or

(2) The airplane is equipped with one combination recorder (FDR/CVR).

7.7.2 FLIGHT DATA RECORDERS (FDR) AND AIRCRAFT DATA RECORDING SYSTEMS (ADRS)

Note 1:FDR and AIR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Note 2: ADRS performance requirements are as contained in the EUROCAE ED-155, Minimum Operational Performance Specification (MOPS) for Lightweight Flight Recording Systems, or equivalent documents.

7.7.2.1 TYPES AND PARAMETERS

(a) Airplane. Airplane FDR shall record the parameters as listed in IS 7.7.2.1(A) for the following FDR types:

(1) Types I and IA FDR shall record the parameters required to determine accurately the airplane flight path, speed, attitude, engine power, configuration and operation.

(2) Types II and IIA FDRs shall record the parameters required to determine accurately the airplane flight path, speed, attitude, engine power and configuration of lift and drag devices.

(b) Helicopter. Helicopter FDR shall record the parameters as listed in IS 7.7.2.1 (B) for the following FDR types:

(1) Type IV FDRs shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power and operation.

(2) Type IVA FDRs shall record the parameters required to determine accurately the helicopter flight path, speed, attitude, engine power, operations and configuration.

(3) Type V FDRs shall record the parameters required to determine accurately the helicopter flight path, speed, attitude and engine power.

7.7.2.2 AIRCRAFT EQUIPPAGE FOR OPERATION

(a) No person may operate the following airplane unless it is equipped with a flight data recorder capable of recording the aural environment of the flight deck during flight time.

(1) [AAC] All turbine-engined airplanes of a maximum certificated take-off mass of 5,700 kg or less for which the application is for a type certificate is first made to the State of Design on or after 1 January 2016; shall be equipped with:

(i) a Type II FDR; or

(ii) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or

(iii) an ADRS capable of recording the essential parameters defined in the Table in IS 7.7.2.2.

Note: Type certificate first issued refers to the date of issuance of the original "Type Certificate" for the airplane type, not the date of certification of particular airplane variants or derivative models.

(2) [AOC] All turbine-engined airplanes 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 shall be equipped with:

(i) a Type II FDR; or

(ii) a Class C AIR capable of recording flight path and speed parameters displayed to the pilot(s); or

(iii) an ADRS capable of recording the essential parameters defined in the Table in IS: 7.7.2.2.

(3) [AAC] All airplanes 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 a Type I FDR.

(4) [AAC] All airplanes 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 a Type II FDR.

(5) [AOC] Effective 1 January 2016, all multi-engined turbine-engined airplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 1990 shall be equipped with a Type IIA FDR.

(6) [AOC] All turbine-engined airplanes, 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 5 700 kg, except those in paragraph 7.7.2.2(8) and 7.7.2.2(10), shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.

(7) [AOC] Effective 1 January 2016, all turbine-engined airplanes, 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 5 700 kg, except those in paragraph 7.7.2.2(8) and 7.7.2.2.(10), shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration, heading and such additional parameters as are necessary to determine pitch attitude, roll attitude, radio transmission keying and power on each engine.

(8) [AOC] All turbine-engined airplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a Type II FDR.

(9) [AOC] All turbine-engined airplanes, 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 shall be equipped with an FDR which shall record time, altitude, airspeed, normal acceleration and heading.

(10) [AOC] Effective 1 January 2016, all turbine-engined airplanes, 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 appropriate national authority after 30 September 1969 shall be equipped with an FDR which shall record, in addition to time, altitude, airspeed, normal acceleration and heading, such additional parameters as are necessary to meet the objectives of determining:

(i) the attitude of the airplane in achieving its flight path; and
(ii) the basic forces acting upon the airplane resulting in the achieved flight path and the origin of such basic forces.

(11) [AAC] All airplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued after 1 January 2005 shall be equipped with a Type IA FDR.

(12) [AOC] All airplanes which are required to record normal acceleration, lateral acceleration and longitudinal acceleration for which the application is for a type certificate is first made to its State of Design on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of 0.0625 seconds.

(13) [AAC] All airplanes which are required to record pilot input and/or control surface position of primary controls (pitch, roll, yaw) for which the application for a type certificate is first made to its State of Design on or after 1 January 2016 and which are required to be fitted with an FDR shall record those parameters at a maximum sampling and recording interval of 0.125 seconds.

Note: For airplanes with control systems in which movement of a control surface will back drive the pilot's control, "or" applies. For airplanes with control systems in which movement of a control surface will not back drive the pilot's control, "and" applies. In airplanes with independent moveable surfaces, each surface needs to be recorded separately. In airplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.

(b) No person may operate the following helicopter unless it is equipped with a flight data recorder capable of recording the aural environment of the flight deck during flight time.

(1) [AAC] All helicopters with a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with a Type IVA FDR.

(2) [AAC] All helicopter with a certificated takeoff mass of over 7 000 kg, or having a passenger seating configuration of more than nineteen, for which the individual certificate of airworthiness is first issued on or after 1, January 1989 shall be equipped with a Type IV FDR.

(3) [AAC] All helicopters with a maximum certificated take-off mass of over 3 180 kg, up to and including 7 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with a Type V FDR.

(4) [AOC] All turbine-engined helicopter of a maximum certificated take-off mass of over 2 250 kg, up to and including 3 180 kg the application for a type certificate is first made to its State of Design on or after 1 January 2018, unless is it equipped with:

(i) A Type IVA FDR; or

(ii) A Class C AIR capable of recording fight path and speed parameters displayed to the pilot(s); or

(iii) An ADRS capable of recording the essential parameters in the Table in IS: 7.7.2.2.

(5) [AOC] All turbine-engined helicopter of a maximum certificated take-off mass of over 3 180 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2018, unless is it equipped with:

(i) A Type IVA FDR; or

(ii) A Class C AIR capable of recording fight path and speed parameters displayed to the pilot(s); or

(iii) An ADRS capable of recording the essential parameters in the Table in IS: 7.7.2.2.

7.7.2.3 DISCONTINUATION

(a) Flight data recorder media not acceptable for use in aircraft registered in the Philippines, or operated in commercial air transport operations in the Philippines, are –

(1) Engraving metal foil;

(2) Photographic film;

(3) Analogue data using frequency modulation (FM);

(4) Magnetic tape.

7.7.2.4 DURATION

(a) FDRs shall be capable of retaining the information recorded during the last—

(1) Type I and II -- 25 hours of operation.

(2) Type IIA – 30 minutes of operation.

(3) Type IV, IVA and V – 10 hours of operation.

7.7.3 COCKPIT VOICE RECORDERS (CVR) AND COCKPIT AUDIO RECORDING SYSTEMS (CARS)

Note 1: CVR performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Note 2: CARS performance requirements are as contained in the EUROCAE ED-155, Minimum Operational Performance Specification (MOPS) for Lightweight Flight Recording Systems, or equivalent documents.

7.7.3.1 SIGNALS TO BE RECORDED – CVR AND CARS

(a) The CVR, and CARS as applicable to airplanes, shall start to record prior to the aircraft moving under its own power and record continuously until the termination of the flight when the aircraft is no longer capable of moving under its own power.

(b) In addition to (a) above, 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.

(c) The CVR shall record on four separate channels, or more, at least the following:

(1) Voice communication transmitted from or received in the aircraft by radio;

(2) Aural environment on the flight deck;

(3) Voice communication of flight crew members on the flight deck using the aircraft's interphone system, if installed;

(4) Digital communications with ATS, unless recorded by the FDR.

(d) The CARS shall record on two separate channels, or more, at least the following:

(1) Voice communication transmitted from or received in the airplane by radio;

(2) Aural environment on the flight deck; and

(3) Voice communication of flight crewmembers on the flight deck using the airplane's interphone, if installed.

(e) The recorder shall be capable of recording on at least four channels simultaneously, except for the recorder in paragraph 7.7.2.2(a)(4) in the preferred channel allocation as follows:

(1) Channel 1 – co-pilot headphones and live boom microphone;

(2) Channel 2 – pilot headphones and live boom microphone;

(3) Channel 3 – area microphone;

(4) Channel 4 – time reference plus the third and fourth crewmembers.

Note 1: Channel 1 is located closest to the base of the recording head

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Note 2: The preferred channel allocation presumes the use of current conventional magnetic tape transport mechanisms and is specified because the outer edges of the tape have a higher risk of damage than the middle. It is not intended to preclude use of alternative recording media where such constraints may not apply.

(f) On a tape-based CVR, to ensure accurate time correlation between channels, the recorder shall record in an in-line format. If a bi-directional configuration is used, the in-line format and channel allocation shall be retained in both directions.

7.7.3.2 AIRCRAFT EQUIPPAGE FOR OPERATIONS

(a) No person may operate an airplane unless it is equipped with a cockpit voice recorder as listed below:

(1) [AAC] All turbine-engined airplanes for which the application for a type certificate is first submitted to the appropriate CAA 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.

(2) [AAC] All airplanes 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 1987 shall be equipped with a CVR.

(3) [AAC] Effective 1 January 2016, all airplanes of a maximum certificated take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1987, shall be equipped with a CVR.

(4) [AOC] All airplanes 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 2003, shall be equipped with a CVR capable of retaining the information recorded during at least the last two hours of its operation.

(5) [AOC] All airplanes 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.

(6) [AOC] All turbine-engined airplanes, 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 appropriate national authority after 30 September 1969 shall be equipped with a CVR.

(7) [AOC] Effective 1 January 2016, all turbine-engined airplanes, 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 27 000 kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a CVR.

(b) No person may operate a helicopter unless it is equipped with a cockpit voice recorder as listed below:

(1) [AAC] All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness is first issued on

or after 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

(2) [AAC] Effective 1 January 2016, all helicopters of a maximum certificated take-off mass of over 3 180 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

(3) [AAC] All helicopters of a maximum certificated take-off mass of over 7 000 kg for which the individual certificate of airworthiness was first issued before 1 January 1987 shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

7.7.3.3 DISCONTINUATION

(a) CVS media not acceptable for use in aircraft registered in the Philippines, or operated in commercial air transport operations in Philippines, are—
(1) Magnetic tape and wire.

7.7.3.4 DURATION

(a) A CVR shall be capable of retaining the information recorded during at least the last—

(1) 30 minutes of its operation; or

(2) 2 hours, beginning no later than 1 January 2016.

7.7.3.5 COCKPIT VOICE RECORDER ALTERNATE POWER

(a) [AOC] No person may operate an airplane required to be equipped with a CVR unless it is equipped with CVR alternate power that:

(1) automatically engages and provides ten minutes, plus or minus one minute, of operation whenever airplane power to the recorder ceases, either by normal shutdown or by any other loss of power;

(2) powers the CVR and its associated cockpit area microphone components, and

(3) is located as close as practicable to the alternate power source.

(b) [AOC] No person may operate an airplane 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 unless is it equipped with an alternate power source, as described in (a) above, that powers–

(1) the forward CVR in the case of combination recorders, or

(2) at least one CVR.

Note 1 – "Alternate" means separate from the power source that normally provides power to the CVR. The use of airplane batteries or other power sources is acceptable provided that the requirements are above are met and electrical power to essential and critical loads is not compromised.

Note 2 – When the CVR function is combined with other recording functions within the same unit, powering the other functions is allowed.

7.7.4 DATA LINK RECORDERS (DLR) AND DATA LINK RECORDING SYSTEMS (DLRS)

Note: Data link recorders performance requirements are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

7.7.4.1 APPLICABILITY

(a) No person may operate an airplane or helicopter for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which utilize any of the data link communications applications listed in IS 7.7.4.1 and are required to carry a CVR, unless the aircraft records on a flight recorder the data link communications messages.

(b) No person may operate an airplane or helicopter modified on or after 1 January 2016, which utilize any of the data link communications applications listed in IS 7.7.4.1 and are required to carry a CVR, unless the aircraft records on a flight recorder the data link communications messages.

(c) No person may operate an airplane or helicopter where the aircraft flight path is authorized or controlled through the use of data link messages, unless all data link messages, both uplinks to the aircraft and downlinks from the aircraft are recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note 1: Data link communications are currently conducted by either ATN-based or FANS 1/A-equipped aircraft.

Note 2: A Class B AIR could be a means for recording data link communications applications messages to and from the aircraft where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

7.7.4.2 DURATION

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

7.7.4.3 CORRELATION

(a) Data link recording shall be correlated to the recorded cockpit audio.

7.7.5 AIRBORNE IMAGE RECORDER (AIR) AND AIRBORNE IMAGE RECORDING SYSTEM (AIRS)

(a) Airborne image recorders are classified as follows.

(1) A Class A AIR captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

(2) A Class B AIR captures data link message displays.

(3) A Class C AIR captures instruments and control panels.

Note 1: To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crewmembers whilst seated in their normal operating position.

Note 2: A Class C AIR may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR, or where an FDR is not required.

(b) When AIRs are used, the AIR must start to record prior to the aircraft moving under its own power and record continuously until the termination of the flight when the aircraft is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR must start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

7.8.6 PORTABLE FIRE EXTINGUISHERS

(a) [AAC] No person may operate an aircraft unless it is equipped with portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the aircraft. At least one shall be located in —

(1) The pilot's compartment; and

(2) Each passenger compartment that is separate from the pilot's compartment and not readily accessible to the flight crew.

Note: Any portable fire extinguisher so fitted in accordance with the certificate of airworthiness of the airplane may count as one prescribed.

(b) [AOC] No person may operate an aircraft unless it is equipped with portable fire extinguishers accessible for use in crew, passenger, and cargo compartments as follows:

(1) The type and quantity of extinguishing agent shall be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used.

(2) At least one portable fire extinguisher shall be provided and conveniently located for use in each Class E cargo compartment which is accessible to crew members during flight, and at least one shall be located in each upper and lower lobe galley.

(3) At least one portable fire extinguisher shall be conveniently located on the flight deck for use by the flight crew.

(4) At least one portable fire extinguisher shall be conveniently located in the passenger compartment if the passenger compartment is separate from the flight deck and not readily accessible to the flight crew.

(5) For each airplane having a passenger seating capacity of more than 30, there shall be at least the following number of portable fire extinguishers conveniently located and uniformly distributed throughout the compartment.

Minimum Number of Hand Fire Extinguishers Passenger Seating Capacity	
7 through 29	1
30 through 60	2
61 through 200	3
201 through 300	4
301 through 400	5
401 through 500	6
501 through 600	7
601 or more	8

(c) [AAC] Any agent used in a portable fire extinguisher in an aircraft 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 aircraft for which the individual certificate of airworthiness is first issued on or after 31 December 2016, shall:

(1) Meet the applicable minimum performance requirements of the Authority; and

(2) Not contain Halon 1211, Halon 1301, or Halon 2402.

Note 1: The substances listed in (a) (2) above of Halon 1211, Halon 1301, and Halon 2402 are listed Annex A, Group II of the Montreal Protocol on Substances that Deplete the Ozone Layer, 8th Edition, 2009, which is listed in ICAO Annex 6, Part I: 6.2.2.1; ICAO Annex 6, Part II, Section II: 2.4.2.3, and ICAO Annex 6, Part III, Section III: 4.1.3.2.

Note 2: Information concerning extinguishing agents is contained in the UNEP Halons Options Committee Technical Note Number 1 – New Technology Halon Alternatives and FAA Report Number DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems. (31 October 2013)

7.8.11 FIRST-AID KIT, UNIVERSAL PRECAUTION KIT AND EMERGENCY MEDICAL KIT

(a)First Aid Kits.

(1)No person may operate the following aircraft unless it is it is equipped with an accessible, approved first-aid kit(s):

(i) [AAC - Airplane] Airplanes with a maximum certificated take-off weight of over 5 700 kg;

(ii) [AOC] - All AOC holders.

(2)The contents of first-aid kits to be carried shall comply withIS: 7. 8.11.

(3)Each aircraft shall carry first-aid kits in accordance with at least the following schedule:

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Number of Passenger Seats	Number of First-Aid Kits
0-100	1
101-200	2
201-300	3
301-400	4
401-500	5
More than 500	6

(4)The location of first aid kits should be:

(i)Distributed evenly throughout the aircraft

(ii)Readily accessible to cabin crew members, if cabin crew members are required for flight, and

(iii)Located near the aircraft exits should their use be required outside the aircraft in an emergency situation.

(b)Universal Precaution Kit.

(1)No person shall operate an aircraft that requires a cabin crew member unless it is equipped with at least one universal precaution kit.

(2)The contents of universal precaution kits to be carried shall comply with IS: 7. 8.11.

(3)Each aircraft shall carry universal precaution kits in accordance with the following:

(i)Two kits; and

(ii)Additional kits, as determined by the Authority, at times of increased public health risk, such as during an outbreak of a serious communicable disease having pandemic potential.

(c)Emergency Medical Kit.

(1)[AOC] No person may operate a passenger flight in an aeroplane with 30 seats or more unless the aeroplane is equipped with an approved emergency medical kit for treatment of injuries or medical emergencies that might occur during flight time or in minor accidents.

(2)[AOC] The contents of emergency medical kits to be carried shall comply with IS: 7. 8.11.

(3)[AOC] The medical kit shall be stored in a secure location. (31 October 2013)

7.8.17 LIFE RAFT

(a) [AAC] In addition to the equipment prescribed in 7.8.16 and 7.8.18 of this Part, life saving rafts in sufficient numbers to carry all persons on board shall be installed in:

(b) . . .

(c) . . .

(d) . . .

(1) . . .

(2) . . .

(3) A pyrotechnical signaling device. (31 October 2013)

(e)

(f) at the earliest practicable date but not later than 1 January 2018, on all airplanes 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.

Note: 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.*(31 October 2013)

IS: 7.7.1.3 CONTINUED SERVICEABILITY AND INSPECTION OF FLIGHT RECORDER SYSTEMS

(a) The operator shall, prior to the first flight of the day, monitor the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, by monitored by manual and/or automatic checks.

(b) The operator shall carry out annual inspections as follows:

(1) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;

(2) the analysis of the FDR shall evaluate the quality of the recorded data to determine if the bit error rate (including those errors introduced by recorder, the acquisition unit, the source of the data on the airplane and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;

(3) a complete flight from the FDR 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. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;

(4) 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;

(5) an annual examination of the recorded signal on the CVR shall be carried out by replay of the CVR recording. While installed in the aircraft, the CVR shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;

(6) where practicable, during the annual examination, a sample of in-flight recordings of the CVR shall be examined for evidence that the intelligibility of the signal is acceptable; and

(7) an annual examination of the recorded images on the AIR shall be carried out by replay of the AIR recording. While installed in the aircraft, the AIR shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

(c) Flight recorder systems 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.

(d) The operator shall make available a report of the annual inspection on request to CAAP for monitoring purposes.

(1) Calibration of the FDR system: for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and

(2) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

IS: 7.7.2.1(A) FLIGHT DATA RECORDERS—TYPE AND PARAMETERS - AIRPLANE

(a) Flight data recorders shall be classified as Type I, Type IA, Type II and Type IIA depending upon the number of parameters to be recorded and the duration required for retention of the recorded information.

(1) Type IA FDR. This FDR shall be capable of recording, as appropriate to the airplane, at least the 78 parameters in Table A.

(2) Type I FDR. This FDR shall be capable of recording, as appropriate to the airplane, at least the first 32 parameters in Table A.

(3) Types II and IIA FDRs. These FDRs shall be capable of recording, as appropriate to the airplane, at least the first 15 parameters in Table A.

(b) Parameters – General.

(1) The parameters that satisfy the requirements for FDRs are listed in the paragraphs below.

(2) The number of parameters to be recorded shall depend on airplane complexity.

(3) The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of airplane complexity.

(4) In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by airplane systems or the flight crew to operate the airplane.

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(5) However, other parameters may be substituted with due regard to the airplane type and the characteristics of the recording equipment.

(c) *Parameter – Flight Path and Speed.* The following parameters satisfy the requirements for flight path and speed:

(1) Pressure altitude

(2) Indicated or calibrated airspeed.

(3) Air-ground status and each landing gear air-ground sensor when practicable.

(4) Total or outside air temperature.

(5) Heading (primary flight crew reference)

(6) Normal acceleration

(7) Lateral acceleration.

(8) Longitudinal acceleration (body axis)

(9) Time or relative time count

(10) Navigation data*: drift angle, wind speed, wind direction, latitude/longitude.

(11) Groundspeed*

(12) Radio altitude*

(d) *Parameters – Altitude.* The following parameters satisfy the requirements for altitude:

(1) Pitch attitude

(2) Roll attitude

(3) Yaw or sideslip angle*

(4) Angle of attack*

(e) *Parameters – Engine Power.* The following parameters satisfy the requirements for engine power:

(1) Engine thrust power: propulsive thrust/power on each engine, cockpit thrust/power lever position.

(2) Thrust reverse status*

(3) Engine thrust command*

(4) Engine thrust target*

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(5) Engine bleed valve position*

(6) Additional engine parameters*: EPR, N1, indicated vibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3.

(f) *Parameters – Configuration*. The following parameters satisfy the requirements for configuration:

(1) Pitch trim surface position

(2) Flaps*: trailing edge flap position, cockpit control selection

(3) Slats*: leading edge flap (slat) position, cockpit control selection

(4) Landing Gear*: landing gear, gear selector position.

(5) Yaw trim surface position*

(5) Roll trim surface position*

(6) Cockpit trim control input position pitch*

(7) Cockpit trim control input position roll*

(8) Cockpit trim control input position yaw*

(9) Ground spoiler and speed brake*: Ground spoiler position, ground spoiler selection, speed brake position, speed brake selection.

(10) De-icing and/or anti-icing systems selection*

(11) Hydraulic pressure (each system)*

(12) Fuel quantity*

(13) AC electrical bus status*

(14) DC electrical bus status*

(15) APU bleed valve position*

(16) Computed centre of gravity*

(g) *Parameters – Operation*. The following parameters satisfy the requirements for operation:

(1) Warnings

(2) Primary flight control surface and primary flight control pilot input: pitch axis, roll axis, yaw axis.

(3) Marker beacon passage

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(4) Each navigation receiver frequency selection

(5) Manual radio transmission keying and CVR/FDR synchronization reference

(6) Autopilot/autothrottle/AFCS mode and engagement status*

(7) Selected barometric setting*: pilot first officer (co-pilot)

(8) Selected altitude (all pilot selectable modes of operation)*

(9) Selected speed (all pilot selectable modes of operation)*

(10) Selected MACH (all pilot selectable modes of operation)*

(11) Selected vertical speed (all pilot selectable modes of operation)*

(12) Selected heading (all pilot selectable modes of operation)*

(13) Selected flight path (all pilot selectable modes of operation)*; course/DSTRK, path angle

(14) Selected decision height*

(15) EFIS display format*: pilot, first officer (co-pilot)

(16) Multi function/engine/alerts display format *

(17) GPWS/TAWS/GCAS status*: selection of terrain display mode including pop-up display status, terrain alerts, both cautions and warning, and advisories, on/off switch position

(18) Low pressure warning*: hydraulic pressure, pneumatic pressure

(19) Computer failure*

(20) Loss of cabin pressure*

(21) TCAS/ACAS (traffic alert and collision avoidance system/airborne collision avoidance system)*

(22) Ice detection*

(23) Engine warning each engine vibration*

(24) Engine warning each engine over temperature*

(25) Engine warning each engine oil pressure low*

(26) Engine warning each engine over speed*

(27) Wind shear warning*

(28) Operational stall protection, stick shaker and pusher activation*

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(h) All cockpit flight control forces* control wheel, control column, rudder pedal cockpit input forces

(i) Vertical deviation*: ILS glide path, MLS elevation, GNSS approach path

(j) Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path

(k) DME 1 and 2 distances*

(l) Primary navigation system reference*: GNSS, INS, VOR/DME, MLS, Loran C, ILS

(m) Brakes*: left and right brake pressure, left and right brake pedal position

(n) Date*

(o) Event marker*

(p) Head up display in use*

(q) Para visual display on*

Note 1: Parameter guidance for range, sampling, accuracy and resolution are as contained in the EUROCAE ED-112, Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Note 2: It is not intended that airplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the range, sampling, accuracy or resolution guidance detailed in this Appendix.

(r) Parameters – Flight Path and Speed as Displayed to the Pilot. 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 designed by an (*) shall be recorded if an information source for the parameter is displayed to the pilot and is practicable to record:

(1) Pressure altitude

(2) Indicated airspeed or calibrated airspeed

(3) Heading (primary flight crew reference)

(4) Pitch attitude

(5) Roll attitude

(6) Engine thrust/power

(7) Landing-gear status*

(8) Total or outside air temperature

(9) Time*

(10) Navigation data*: drift angle, wind speed, wind direction, latitude/longitude

(11) Radio altitude*

Table — Parameter Guidance for Crash Protected Flight Data Recorders – Airplanes

Notes:

1) The first 15 parameters satisfy the requirements for a Type II and Type IIA FDR.

2) The first 32 parameters satisfy the requirements for a Type I FDR.

3) The total 78 parameters satisfy the requirements for a Type IA FDR.

Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval *(seconds)*	Accuracy limits *(sensor input compared to FDR read-out)*	Recording resolution
1	Time (UTC when available, otherwise relative time count or GPS sync)	24 hours	4	±0.125% per hour	1 second
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 VSo (Note 1) VSo to 1.2 VD (Note 2)	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)	360 degrees	1	±2°	0.5°
5	Normal acceleration (Note 3)–	-3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g
6	Pitch attitude	±75 ° or usable range whichever is greater	±0.25	±2 °	0.5°
7	Roll attitude	±180°	±0.25	±2°	0.5°
8	Radio transmission keying	On-off one discrete	1		

Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval *(seconds)*	Accuracy limits *(sensor input compared to FDR read-out)*	Recording resolution
9	Power on each engine (Note 4)	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 discretes	1		
16	Longitudinal acceleration (Note 3)	+/-1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration (Note 3)	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) (Note 5) (Note 6)	Full range	±0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed

Serial number	Parameter	Measurement range	Maximum Sampling and Recording Interval *(seconds)*	Accuracy limits *(sensor input compared to FDR read-out)*	Recording resolution
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/GPS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)	Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GPS/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	NAV receiver frequency selection (Note 7)	Full range	4	As installed	
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN) (Notes 7 and 8	0 – 370 km (0-200 NM)	4	As installed	1852 m (1 NM)
27	Air/ground status	Discrete	1		

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Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval *(seconds)*	Accuracy limits *(sensor input compared to FDR read-out)*	Recording resolution
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (Terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)	Discrete	1		
29*	Angle of attack	Full range	0.5	As installed	0.3% of full range
30*	Hydraulics, each system (low pressure)	Discrete	2		0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) (Note 9)	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, discretes or full range)	1	1±5%	2% of full range
35*	Additional engine parameters (EPR, N1, indicated vibration level, N2; EGT, fuel flow, fuel cut-off lever position, N3)	As installed	Each engine each second	As installed	2% of full range
36*	TCAQS/ACAS (traffic alert and collision avoidance system)	Discretes	1	As installed	
37*	Windshear 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	As installed		As installed	Sufficient to determine crew

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Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval *(seconds)*	Accuracy limits *(sensor input compared to FDR read-out)*	Recording resolution
	modes of operation)				selection
40*	Selected speed (all pilot selectable modes of operations)	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle; final approach path (IRNAV/IAN))		1	As installed	
45*	Selected Decision Height	As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)	Discrete(s)	4	As installed	
47*	Multi-function/engine/ alerts display format	Discrete(s)	4	As installed	
48*	AC electrical bus status	Discrete(s)	4	As installed	
49*	DC electrical bus status	Discrete(s)	4	As installed	
50*	Engine bleed valve position	Discrete(s)	4	As installed	
51*	APU bleed valve position	Discrete(s)	4	As installed	
52*	Computer failure	Discrete(s)	4	As installed	
53*	Engine thrust command	As installed	2	As installed	

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Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval *(seconds)*	Accuracy limits *(sensor input compared to FDR read-out)*	Recording resolution
54*	Engine thrust target	As installed	4	As installed	2% of full range
55*	Computed centre of gravity	As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank	As installed	64	As installed	1% of full range
57*	Head up display in use	As installed	4	As installed	
58*	Para visual display on/off	As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation	As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)	As installed	4	As installed	
61*	Ice detection	As installed	4	As installed	
62*	Engine warning each engine vibration	As installed	1	As installed	
63*	Engine warning each engine over temperature	As installed	1	As installed	
64*	Engine warning each engine oil pressure low	As installed	1	As installed	
65*	Engine warning each engine over speed	As installed	1	As installed	
66*	Yaw Trim Surface Position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll Trim Surface Position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle	Full range	1	±5%	0.5%
69*	De-icing and/or anti-icing systems selection	Descrete(s)			

Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval *(seconds)*	Accuracy limits *(sensor input compared to FDR read-out)*	Recording resolution
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	

Note 1: V_{So} stalling speed or minimum steady flight speed in the landing configuration.

Note 2: VD design diving speed.

Note 3: Refer to §7.7.2.2(a)(12) for increased recording requirements.

Note 4: Record sufficient inputs to determine power.

Note 5: For airplanes with control systems in which movement of a control surface will back drive the pilot's control, "or" applies. For airplanes with control systems in which movement of a control surface will not back drive the pilot's control, "and" applies. In airplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.

Note 6: Refer to §7.8.2.2(a)(13) for increased recording requirements.

Note 7: If signal available in digital form.

Note 8: Recording of latitude and longitude from INS or other navigation system is a preferred alternative.

Note 9: If signals readily available.

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If further recording capacity is available, recording of the following additional information should 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 flightcrew 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;

(4) the identity of displayed pages for emergency procedures and checklists;

(b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.

IS: 7.7.2.1(B) FLIGHT DATA RECORDERS—TYPE AND PARAMETERS – HELICOPTERS

(a) Flight data records shall be classified as Type IV, Type IVA, and Type V depending upon the number of parameters to be recorded.

(1) Type IV FDRs shall be capable of recording, as appropriate to the helicopter, at least the first 30 parameters in Table B below.

(2) Type IVA FDRs shall be capable or recording, as appropriate to the helicopter, at least the first 48 parameters in Table B below.

(3) Type V FDRs shall be capable of recording, as appropriate to the helicopter, at least the first 15 parameters in Table B below.

(4) For all FDR types, if further recording capability is available, recording of the following additional information shall be considered:

(5) Additional operational information from electronic displays, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS); and

(6) Additional engine parameters (EPR, N1, fuel flow, etc.).

(b) The parameters that satisfy the requirements for a Type IV; Type IVA, and Type V FDRs are listed below. The number of parameters to be recorded shall depend on helicopter complexity. The parameters without an asterisk (*) are mandatory parameters that shall be recorded. The parameters designated by an asterisk (*) shall also be recorded if an information data source for an asterisked parameter is used by helicopter systems or the flight crew to operate the helicopter. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

(c) The following parameters satisfy the requirements for flight path and speed:

(1) Pressure altitude

(2) Indicated airspeed

(3) Total or outside air temperature.

(4) Heading (primary flight crew reference)

(5) Normal acceleration

(6) Lateral acceleration

(7) Longitudinal acceleration (body axis)

(8) Time or relative time count

(9) Navigation data*: drift angle, wind speed, wind direction, latitude/longitude

(10) Radio altitude*

(d) The following parameters satisfy the requirements for attitude:

(1) Pitch attitude.

(2) Roll attitude.

(3) Yaw rate.

(e) The following parameters satisfy the requirements for engine power:

(1) Power on each engine: free power turbine speed (Nf), engine torque, engine gas generator speed (Ng), cockpit power control position.

(2) Rotor: main rotor speed, rotor brake.

(3) Main gearbox oil pressure*

(4) Gearbox oil temperature*, main gearbox oil temperature, tail rotor gearbox oil temperature

(5) Engine exhaust gas temperature (T4)*

(6) Turbine inlet temperature (TIT)*

(f) The following parameters satisfy the requirements for configuration:

(1) Landing gear or gear selector position*.

(2) Fuel quality*

(3) Ice detector liquid water content*

(g) The following parameters satisfy the requirements for operation:

(1) Hydraulics low pressure

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(2) Warnings

(3) Primary flight controls —pilot input and/or control output position: collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor petal, controllable stabilator, hydraulic selection

(4) Marker beacon passage

(5) Each navigation receiver frequency selection

(6) AFCS mode and engagement status*

(7) Stability augmentation system engagement*

(8) Indicated sling load force*

(9) Vertical deviation*: ILS glide path, GNSS approach path

(10) Horizontal deviation*: ILS localizer, GNSS approach path

(11) DME 1 and 2 distances*

(12) Altitude rate*

(13) Ice detector liquid water content*

(14) Helicopter health and usage monitor system (HUMS)* engine data, chip detectors, track timing, exceedance discretes, broadband average engine vibration.

Note: Parameter requirements, including range, sampling, accuracy and resolution are as contained in the Minimum Operational Performance Specification (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Table— Parameters for Flight Data Recorders – Helicopters

Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GPS time sync)	24 hours	4	±0.125% per hour	1s
2	Pressure-altitude–	-300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed	As the installed	1	±3%	1 kt

Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)	Recording resolution
		measuring system			
4	Heading	360 degrees	1	± 2˚	0.5˚
5	Normal acceleration–	-3 g to +6 g	0.125	±0-.9 g excluding a datum error of ±g	0.004 g
6	Pitch attitude	±75 ˚ or 100% of usable range whichever is greater	0.5	± 2˚	0.5˚
7	Roll attitude	±180˚	0.5	±2˚	0.5˚
8	Radio transmission keying	On-off (one discrete)	1	---	---
9	Power on each engine	Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor :				
	Main rotor speed	50-130%	0.51	±2%	0.3% of full range
	Rotor brake	Discrete		---	---
11	Pilot input and/or control surface position-primary controls (Collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)	Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required.	0.5% of operating range
12	Hydraulics, each system (low pressure and selection)	Discrete	1	---	---
13	Outside air temperature	Sensor range	2	±2˚C	0.3˚C
14*	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	---	---
15*	Stability augmentation system engagement	Discrete	1	---	---
16*	Main gearbox oil pressure	As installed	1	As installed	6.895 kN/m2 (1 psi)
17*	Main gearbox oil temperature	As installed	2	As installed	1˚C

Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)	Recording resolution
18	Yaw acceleration (or yaw rate)	±400°/second	0.25	±1.5% max range excluding datum error of ±5%	±2°s
19*	Sling load force	0-200% of certified load	0.5	±3% of max range	0.5% for maximum certified load
20	Longitudinal acceleration	±1 g	0.25	±0.015 g excluding datum error of ± 0.05 g	0.0004 g
21	Lateral acceleration	±1 g	0.25	±0.015 g excluding datum error of ± 0.05 g	0.0004 g
22*	Radio altitude–	-6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1ft) below 150 m (500 ft), 0.3 m (1 ft) = 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation	Signal range	1	±3%	0.3% of full range
24*	Horizontal beam deviation	Signal range	1	±3%	0.3% of full range
25	Marker beacon passage	Discrete	1	---	---
26	Warnings	Discrete(s)	1	---	---
27	Each navigation receiver frequency selection	Sufficient to determine selected frequency	4	As installed	----
28*	DME 1 and 2 distance	0-370 km (0-200 NM)	4	As installed	1.852 m (1 NM)
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)	As installed	2	As installed	As installed
30*	Landing gear or gear selector position	Discrete	4	---	---
31*	Engine exhaust gas temperature (T4)	As installed	1	As installed	
32*	Turbine inlet temperature (ITI/ITT)	As installed	1	As installed	
33*	Fuel contents	As installed	4	As installed	

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Serial number	Parameter	Measurement range	Maximum Sampling and Recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)	Recording resolution
34*	Altitude rate	As installed	1	As installed	
35*	Ice detection	As installed	4	As installed	
36*	Helicopter health and usage monitor system	As installed	1	As installed	
37	Engine control modes	Discrete	1	----	----
38*	Selected barometric setting (pilot and co-pilot)	As installed	64	As installed	0.1 mb (0.01 in Hg)39*
39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height	As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)	Discrete(s)	4	---	---
47*	Multi-function/engine/ alerts display format	Discrete(s)	4	---	---
48*	Event marker	Discrete	1	---	---

IS 7.7.2.2 AIRCRAFT EQUIPPAGE FOR OPERATIONS – AIRCRAFT DATA RECORDING SYSTEM (ADRS)

(a) ADRS shall be capable of recording, as appropriate to the aircraft, at least the essential (E) parameters in the Table below.

(b) The measurement range, recording interval and accuracy of parameters on installed equipment is usually verified by methods approved by the State of Design.

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

Table—Parameter Guidance for Aircraft Data Recording Systems

No.	Parameter Name	Parameter Category	Minimum Recording Range	Maximum Recording Interval in Seconds	Minimum Recording Accuracy	Minimum Recording Resolution	Remarks
1	Heading (Magnetic or True)	R*	±180°	1	±2°	0.5°	*If not available, record rates
2	Pitch attitude	E*	±90°	0.25	±2°	0.5°	*If not available, record rates
3	Roll attitude	E*	±180°	0.25	±2°	0.5°	*If not available, record rates
4	Yaw rate	E*	±300°	0.25	±1% + drift of 360°/hr	2°	*Essential if no heading available
5	Pitch rate	E*	±300°	0.25	±1% + drift of 360°/hr	2°	*Essential if no pitch attitude available
6	Roll rate	E*	±300°	0.25	±1% + drift of 360°/hr	2°	*Essential if no roll rate available
7	Positioning system: latitude/ longitude	E	Latitude: ±90°; Longitude: ±180°	2 (1 if available)	As installed (0.00015° recommended	0.00005°	--
8	Positioning system: estimated error	E*	Available range	2 (1 if available)	As installed	As installed	*If available
9	Positioning system: altitude	E	-300 m (-1 000 ft) to maximum certificated altitude of airplane +1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	--
10	Positioning system: time	E	24 hours	1	±0.5 second	0.1 second	*UTC time preferred where available

No.	Parameter Name	Parameter Category	Minimum Recording Range	Maximum Recording Interval in Seconds	Minimum Recording Accuracy	Minimum Recording Resolution	Remarks
11	Positioning system: ground speed	E	0-1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	--
12	Positioning system: channel	E	0-360°	2 (1 if available)	As installed (±2° recommended)	0.5°	--
13	Normal acceleration	E	-3 g to + 6 g(*)	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±45 g recommended)	0.004 g	--
14	Longitudinal acceleration	E	±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	--
15	Lateral acceleration	E	±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	--
16	External static pressure (or pressure altitude)	R	34.4 mb (3.44 in-Hg) to 310.2 mb (31.03 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	--
17	Outside air temperature (or total air temperature)	R	-50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	--
18	Indicated air speed	R	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	--

No.	Parameter Name	Parameter Category	Minimum Recording Range	Maximum Recording Interval in Seconds	Minimum Recording Accuracy	Minimum Recording Resolution	Remarks
19	Engine RPM	R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	--
20	Engine oil pressure	R	Full range	Each engine each second	As installed (5% of full range)	2% of full range	--
21	Engine oil temperature	R	Full range	Each engine each second	As installed (5% of full range)	2% of full range	--
22	Fuel flow or pressure	R	Full range	Each engine each second	As installed	2% of full range	--
23	Manifold pressure	R	Full range	Each engine each second	As installed	0.2% of full range	--
24	Engine thrust/ power/ torque parameters required to determine propulsive thrust/ power*	R	Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPRN/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
25	Engine gas generator speed (Ng)	R	0-150%	Each engine each second	As installed	0.2% of full range	--
26	Free power turbine speed (Nf)	R	0-150%	Each engine each second	As installed	0.2% of full range	--
27	Coolant temperature	R	Full range		As installed (±5°C recommended)	1°C	--
28	Main voltage	R	Full range	Each engine	As installed	1 Volt	

No.	Parameter Name	Parameter Category	Minimum Recording Range	Maximum Recording Interval in Seconds	Minimum Recording Accuracy	Minimum Recording Resolution	Remarks
				each second			
29	Cylinder head temperature	R	Full range	Each cylinder each second	As installed	2% of full range	--
30	Flaps position	R	Full range or each discrete position	2	As installed	0.5°	--
31	Primary flight control surface position	R	Full range	0.25	As installed	0.2% of full range	--
32	Fuel quantity	R	Full range	4	As installed	1% of full range	--
33	Exhaust gas temperature	R	Full range	Each engine each second	As installed	2% of full range	--
34	Emergency voltage	R	Full range	Each engine each second	As installed	1 Volt	--
35	Trim surface position	R	Full range or each discrete position	1	As installed	0.3% of full range	--
36	Landing gear position	R	Each discrete position*	Each gear every 2 seconds	As installed	--	*Where available, record up-and-locked and down-and-locked position
37	Novel/ unique aircraft features	R	As required	As required	As required	As required	--

Key:

E ***Essential parameters***

R ***Recorded parameters***

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IS 7.7.4.1 DATA LINK RECORDER APPLICABILITY

(a) Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be

recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

(1) Data link initiation capability;

(2) Controller-pilot data link communications;

(3) Data link –flight information services;

(4) Automatic dependent surveillance- contract;

(5) Automatic dependent surveillance- broadcast*;

(6) Aeronautical operational control*.

(b) Descriptions of the applications for data link recorders are contained in the table below.

Table—Description of Applications for Data Link Recorders

Item No.	Application Type	Application Description	Recording Content
1	Data link Initiation	This includes any applications used to logon 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 (ADS-C) application. Where parametric data are reported within the message they shall be recorded 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, D-METAR, D-ATIS, D-NOTAM and other textual data link services.	C
5	Aircraft Broadcast Surveillance	This includes Elementary and Enhanced Surveillance Systems, as well as ADS-B output data. Where parametric data sent by the aircraft are reported within the message they shall be recorded unless data from the same sources are recorded on the FDR.	M*
6	Aeronautical Operational Control Data	This includes any application transmitting or receiving data used for AOC purposes.	M*

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Key:

C Complete contents recorded.

M Information that enables correlation to any associated records stored separately from the aircraft.

** Applications to be recorded only as far as is practicable given the architecture of the system.*

(31 October 2013)

IS: 7.8.11 FIRST-AID KIT, UNIVERSAL PRECAUTION KIT AND EMERGENCY MEDICAL KIT

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

(a)The required first-aid kits shall include at least the following:

- 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
- Scissors. 10 cm (if allowed by national regulations)
- Tape: adhesive, surgical 1.2 cm × 4.6 m
- 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
- Mild to moderate analgesic [as allowed by national regulation]
- Antiemetic [as allowed by national regulation]
- Nasal decongestant [as allowed by national regulation]
- Antacid [as allowed by national regulation]
- Antihistamine [as allowed by national regulation]

(b)The required universal precaution kits shall include at least the following:

- 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

- Instruction

(c)The required medical kits shall include at least the following:

- Stethoscope
- Sphygmomanometer (electronic preferred)
- Airways, oropharyngeal (3 sizes)
- Syringes (appropriate range sizes)
- Needles (appropriate range 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

(d)[AOC] The required medical kits shall include the following medication:

- Epinephrine 1 : 1000
- Antihistamine – injectable
- Dextrose 50% (or equivalent) – injectable: 50ml
- 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 259ml)
- Acetyl salicylic acid (aspirin) for oral use
- Oral beta blocker
- Epinephrine 1 : 10000 (can be a dilution of epinephrine 1 : 1000)

Note: If a cardiac monitor is available (with or without an AED) add to the above list.(31 October 2013)

PCAR PART 8

8.1.1.2 DEFINITIONS

Accelerate-stop distance available (ASDA). The length of the take-off run available plus the length of stopway, if provided. (31 October 2013)

Airworthy. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation. (31 October 2013)

Alternate airport/aerodrome/heliport. An airport/heliport to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the airport/heliport of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate airports/heliports include the following:

(a) **Take-off alternate**. An alternate airport/heliport at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the airport/heliport of departure.

(b) **En-route alternate**. An alternate airport/heliport at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

(c) **Destination alternate**. An alternate airport/heliport at which an aircraft would be able to land should it become either impossible or inadvisable to land at the airport/heliport of intended landing. (31 October 2013)

Approach and landing operations using instrument approach procedures. Instrument approach and landing operations are classified as follows:

(A) Category I (CAT I) operation. A precision instrument approach and landing with:

(aa) a decision height not lower than 60 m (200 ft); and

(bb) with either a visibility not less than 800 m or a runway visual range (RVR) not less than 550 m.

(B) Category ii (CAT II) operation. A precision instrument approach and landing with:

(aa) a decision height lower than 60 m (200 ft), but not lower than 30 m (100 ft);

(bb) and a RVR not less than 300 m.

(C) Category IIIA (CAT IIIA) operation. A precision instrument approach and landing with:

(aa) a decision height lower than 30 m (100 ft) or no decision height; and

(bb) a runway visual range not less than 175 m.

(D) Category IIIB (CAT IIIB) operation. A precision instrument approach and landing with:

(aa) a decision height lower than 15 m (50 ft) or no decision height; and

(bb) a runway visual range less than 175 m but not less than 50 m. (31 October 2013)

Continuing Airworthiness. The set of processes by which an aircraft, engine, propeller or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life.(31 October 2013)

Duty. Any task that flight or cabin crew members are required by the operator to perform, including for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue. (31 October 2013)

Duty period. A period which starts when flight or cabin crew personnel are required by an operator to report for or to commence a duty and ends when that person is free from all duties. (31 October 2013)

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NAME AND SIGNATURE

Extended diversion time operations (EDTO). Any operation by an airplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the Authority. (31 October 2013)

EDTO critical fuel. The fuel quantity necessary to fly to an en-route alternate aerodrome considering, at the most critical point on the route, the most limiting system failure. (31 October 2013)

EDTO-significant system. An airplane system whose failure or degradation could adversely affect the safety particular to an EDTO flight, or whose continued functioning is specifically important to the safe flight and landing of an airplane during an EDTO diversion. (31 October 2013)

Engine. A unit used or intended to be used for aircraft propulsion. It consists of at least those components and equipment necessary for the functioning and control, but excludes the propeller (if applicable).(31 October 2013)

Fatigue. A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety-related duties (31 October 2013)

Fatigue Risk Management System (FRMS). A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness. (31 October 2013)

Flight duty period. A period which commences when a flight or cabin crew member is required to report for duty that includes a flight or a series of flights and which finishes when the airplane finally comes to rest and the engines are shut down at the end of the last flight on which he/she is a crew member. (31 October 2013)

Isolated aerodrome. A destination aerodrome for which there is no destination alternate aerodrome suitable for a given airplane type. (31 October 2013)

Land distance available (LDA). The lengthy of runway which is declared available and suitable for the ground run of an airplane landing. (31 October 2013)

Maximum diversion time. Maximum allowable range, expressed in time, from a point on a route to an en-route alternate aerodrome. (31 October 2013)

Navigation specification.A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specification:

Required navigation performance (RNP) specification. A navigation specification based on a area navigation that includes that requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

Area navigation (RNAV) specification.A navigation specification based on area navigation that does not include the requirements for performance monitoring and alerting, designated by the prefix RNAV. e.g. RNAV 5, RNAV 1.

Note 1: The performance-base Navigation Manual (ICAO Doc 9613) Volume 2 contains detailed guidance on navigation specifications.

Note 2: The term RNP as previously defined as "a statement of the navigation performance, necessary for operation within a defined airspace", has been removed from ICAO Annex 6 PART 1 as the concept of RNP has been overtaken by the concept of PBN. The term RNP in of Annex 6 is now solely used in context of navigation specifications that require performance monitoring and alerting. E.g. RNP 4 refers to the aircraft andoperating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in ICAO Doc 9613.(31 October 2013)

Point of no return. The last possible geographic point at which an airplane can proceed to the destination aerodrome as well as to an available en route alternate aerodrome for a given flight. (31 October 2013)

Rest period. A continuous and defined period of time, subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties. (31 October 2013)

State safety program. An integrated set of regulations and activities aimed at improving safety. (31 October 2013)

Threshold time. The range, expressed in time, established by the Authority, to an en-route alternate aerodrome, whereby any time beyond requires an EDTO approval from the Authority. (31 October 2013)

8.6.2.2 ADEQUACY OF OPERATING FACILITIES

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NAME AND SIGNATURE

(a) . . .

(b) . .

(c) . . .

(d) Subject to their published conditions of use, aerodromes and their facilities shall be kept continuously available for flight operations during their published hours of operations, irrespective of meteorological conditions.

(e) An operator shall, as part of its safety management system, assess the level of rescue and fire fighting service (RFFS) protection available at any aerodrome intended to be specified in the operational flight plan in order to ensure that an acceptable level of protection is available for the airplane intended to be used.

(f) Information related to the level of RFFS protection that is deemed acceptable by the operator shall be contained in the operations manual.

Note 2: ICAO Annex 6, Part 1, Attachment K, contains guidance on assessing an acceptable level of RFFS protection at aerodromes.

Note 3: It is not intended that this guidance limit or regulate the operation of an aerodrome. The assessment performed by the operator does not in any way affect the RFFS requirements of ICAO Annex 14, Volume I, for aerodromes.(31 October 2013)

8.6.2.4 METEOROLOGICAL LIMITATIONS FOR VFR FLIGHTS

(a) No person will commence a flight to be conducted in accordance with the VFR unless available current meteorological reports, or a combination of current reports and forecasts,

indicate that the meteorological conditions along the route, or that part of the route to be flown under the VFR, will, at the appropriate time, allow VFR operations.(31 October 2013)

8.6.2.5 IFR DESTINATION AIRPORT/HELIPORT

(a) No person may conduct an IFR flight unless—

(1) At the time of take-off, the meteorological conditions at the departure aerodrome are at or above the operator's established aerodrome operating minima for that operation; and

(2) At the time of take-off or point of in-flight re-planning, current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions will be, at the estimated time of use, at or above the operator's established aerodrome operating minima for that operation. (31 October 2013)

8.6.2.6 DESTINATION ALTERNATE AIRPORT/HELIPORT

8.6.2.6.1 IFR DESTINATION ALTERNATE AIRPORT/HELIPORT

For a flight to be conducted in accordance with the IFR, at least one destination alternate airport/heliport shall be selected and specified in the operational and ATS flight plans, unless:

(a) the duration of the flight from the departure aerodrome, or from the point of in-flight re-planning to the destination aerodrome is such that, taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use, a reasonable certainty exists that:

(1) the approach and landing may be made under VMC, (for helicopters: the weather conditions in Subpart 8.6.2.6.2 prevails); and

(2) separate runways are usable at the estimated time of use of the destination aerodrome with at least one runway having an operational instrument approach procedure, in case of helicopter operations, a point of no return (PNR) shall be determined; or

(b) the aerodrome is isolated. Operations into isolated aerodromes do not require the selection of a destination alternate aerodrome(s) and shall be planned in accordance with 8.6.2.15.1(c) (4) (D);

(1) for each flight into an isolated aerodrome a point of no return shall be determined; and

(2) a flight to be conducted to an isolated aerodrome shall not be continued past the point of no return unless a current assessment of meteorological conditions, traffic, and other operational conditions indicate that a safe landing can be made at the estimated time of use.

Note 1: Separate runways are two or more runways at the same aerodrome configured such that if one runway is closed, operations to the other runway(s) can be conducted.

Note 2: Guidance on planning operations to isolated aerodromes is contained in the Flight Planning and Fuel Management Manual *(ICAO Doc 9976).*

(c) Two destination alternate aerodromes shall be selected and specified in the operational and ATS flight plans when, for the destination aerodrome:

(1) meteorological conditions at the estimated time of use will be below the operator's established aerodrome operating minima for that operation; or meteorological information is not available. (31 October 2013)

8.6.2.6.3 IFR DESTINATION ALTERNATE REQUIREMENT

(a) Commercial air transport where the Authority has approved alternate minima as an equivalent level of safety based on the results of a specific safety risk assessment demonstrated by the operator, which contains the following:

(1) Capabilities of the operator;

(2) Overall capability of the airplane and its systems;

(3) Available aerodrome technologies, capabilities and infrastructure;

(4) Quality and reliability of meteorological information;

(5) Identified hazards and safety risks associated with each alternate aerodrome variation;

(6) Specific mitigation measures.

Note: ICAO Doc 9859, Safety Management Manual, and ICAO Doc 9976, Flight Planning and Fuel Management Manual, contain guidance on performing a safety risk assessment and on determining variations, including examples of variations.

(b) To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate aerodrome, the operator shall specify appropriate incremental values, acceptable to the Authority, for height of cloud base and visibility to be added to the operator's established aerodrome operating minima.

Note: Guidance on the selection of these incremental values is contained in the Flight Planning and Fuel Management Manual *(ICAO Doc 9976).*

(c) The Authority shall approve a margin of time established by the operator for the estimated time of use of an aerodrome.

Note: Guidance on establishing an appropriate margin of time for the estimated time of use of an aerodrome is contained in the Flight Planning and Fuel Management Manual *(ICAO Doc 9976).*(31 October 2013)

8.6.2.9 TAKE-OFF ALTERNATE AIRPORTS/HELIPORTS: COMMERCIAL AIR TRANSPORT OPERATIONS

(a) No person may release or take-off an aircraft without a suitable take-off alternate specified in the flight release if either the meteorological conditions at the airport/heliport of departure are below the operator's established airport/heliport operating landing minima for that operation or if it would not be possible to return to the airport/heliport of departure for other reasons.

(b) Each operator shall ensure that each take-off alternate specified shall be located within the following flight time from the airport of departure:

(1) For aircraft with two engines, one hour of flight time at a one-engine-inoperative cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass; or

(2) For aircraft with three or four power-unit, two hours of flight time at an all-engine operating cruising speed, determined from the aircraft operating manual, calculated in ISA and still-air conditions using the actual take-off mass; or

(3) For aircraft engaged in extended diversion time operations (EDTO) where an alternate aerodrome meeting the distance criteria of a) or b) is not available, the first available alternate aerodrome located within the distance of the operator's approved maximum diversion time considering the actual take-off mass.

(4) For an aerodrome to be selected as a take-off alternate the available information shall indicate that, at the estimated time of use, the conditions will be at or above the operator's established aerodrome operating minima for that operation.

(c) Commercial air transport where the Authority has approved alternate minima as an equivalent level of safety based on the results of a specific safety risk assessment demonstrated by the operator, which contains the following:

(1)Capabilities of the operator;

(2)Overall capability of the airplane and its systems;

(3)Available aerodrome technologies, capabilities and infrastructure;

(4)Quality and reliability of meteorological information;

(5)Identified hazards and safety risks associated with each alternate aerodrome variation;

(6)Specific mitigation measures.

Note: ICAO Doc 9859, Safety Management Manual, and ICAO Doc 9976, Flight Planning and Fuel Management Manual, contain guidance on performing a safety risk assessment and on determining variations, including examples of variations.(31 October 2013)

8.6.2.11 REQUIREMENTS FOREXTENDED DIVERSION TIME OPERATIONS - AIRPLANES [AOC]

(a) An AOC holder shall not conduct operations beyond the threshold distance determined in accordance with Subpart 8.6.2.10 unless approved to do so by the Authority.

(b) In requesting EDTO approval, each AOC holder shall show to the satisfaction of the Authority that:

(1) For airplanes:

(i) For all airplanes,

(A) the most limiting EDTO significant system time limitation, if any indicated in the Airplane Flight Manual (directly or by reference) and relevant to that particular operation is not exceeded; and

(B) the additional fuel required by Subpart 8.6.2.15 shall include the fuel necessary to comply with the EDTO critical fuel scenario as established by the Authority.

(ii) For airplanes with two turbine engines, the airplanes EDTO certified and has verified the–

(A) Reliability of the propulsion system;

(B) Airworthiness certification for EDTO of the airplane type; and

(C) EDTO maintenance program.

(2) It has conducted a safety risk assessment which demonstrates how an equivalent level of safety will be maintained taking into account the following:

(i) Capabilities of the operator;

(ii) Overall reliability of the airplane;

(iii) Reliability of each time limited system;

(iv) Relevant information from the airplane manufacturer; and

(v) Specific mitigation measures.

(c) Before conducting an EDTO flight, an AOC holder shall ensure that a suitable EDTO en-route alternate is available, within either the approved diversion time or a diversion time based on MEL generated serviceability status of the airplane whichever is shorter.

(d) No AOC holder shall commence a flight unless, during the possible period of arrival, the required en-route alternate aerodrome will be available and the available information indicates that conditions at the aerodrome will be at or above the aerodrome operating minima approved for the operation.

(e) No AOC holder shall conduct operations beyond 60 minutes, from a pointon a route to an en-route alternate aerodrome unless it ensures that:

(1) For all airplanes;

(i) En-route alternate aerodromes are identified; and

(ii) The most up-to-date information is provided to the flight crew on identified en-route alternate aerodromes, including operational status and meteorological conditions;

(2) For airplanes with two turbine engines, the most up-to-date information provided to the flight crew indicates that conditions at identified en-route alternate aerodromes will be at or above the operator's established aerodrome operating minima for the operation at the estimated time of use.

(3) These requirements are incorporated into the operators:

(i) operational control and flight dispatch procedures;

(ii) operating procedures; and

(iii) trainingprograms

(f) No AOC Holder shall proceed beyond the threshold time approved by the Authority unless:

(1) the identified en-route alternate aerodromes have been re-evaluated for availability; and

(2) the most up to date information indicates that, during the estimated time of use, conditions at those aerodromes will be at or above the operator's established aerodrome operating minima for that operation; or.

(3) conditions are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use and an alternative course of action has been determined.

Note 1: ICAO Annex 6, Part I, Attachment D contains guidance on the requirements of this provision.

Note 2: FAA AC 120-42B (as amended), Extended Operations (ETOPS and Polar Operations), provides additional guidance.

(g) Commercial air transport where the Authority has approved alternate minima as an equivalent level of safety based on the results of a specific safety risk assessment demonstrated by the operator, which contains the following:

(1)Capabilities of the operator;

(2)Overall capability of the airplane and its systems;

(3)Available aerodrome technologies, capabilities and infrastructure;

(4)Quality and reliability of meteorological information;

(5)Identified hazards and safety risks associated with each alternate aerodrome variation;

(6)Specific mitigation measures.

Note: ICAO Doc 9859, Safety Management Manual, and ICAO Doc 9976, Flight Planning and Fuel Management Manual, contain guidance on performing a safety risk assessment and on determining variations, including examples of variations.(31 October 2013)

8.6.2.12 EN ROUTE ALTERNATE AIRPORTS: EDTO OPERATIONS

(a) The PIC shall ensure that the required en route alternates for EDTO are selected and specified in ATC flight plans in accordance with the EDTO diversion time approved by the Authority.

(b) No person shall select an aerodrome as an EDTO en-route alternate aerodrome unless the appropriate weather reports or forecasts, or any combination thereof, indicate that during a period commencing 1 hour before and ending 1 hour after the expected time of arrival at the aerodrome, the weather conditions will be at or above the planning minima prescribed in the table below, and in accordance with the operator's EDTO approval.

(c) The ceiling and visibility requirements for operations conducted in accordance with paragraphs (a) and (b) may be reduced upon approval of the Authority for—

(d) Commercial air transport where the Authority has approved alternate minima as an equivalent level of safety based on the results of a specific safety risk assessment demonstrated by the operator, which contains the following:

(1) Capabilities of the operator;

(2) Overall capability of the airplane and its systems;

(3) Available aerodrome technologies, capabilities and infrastructure;

(4) Quality and reliability of meteorological information;

(5) Identified hazards and safety risks associated with each alternate aerodrome variation,

(6) Specific mitigation measures.

Note 1: ICAO Doc 9859, Safety Management Manual, and ICAO Doc 9976, Flight Planning and Fuel Management Manual, provide guidance on performing a safety risk assessment and on determining variations, including examples of variations.

Note 2: The forecast weather criteria used in the selection of alternate aerodromes for IFR flight will also be used for the selection of EDTO alternates.(31 October 2013)

8.6.2.13.1 FUEL AND OIL PLANNING AND CONTINGENCY FACTORS

(f) Each operator shall maintain fuel records to enable the Authority to ascertain that, for each flight, the requirements of Subparts 8.6.2.14 and 8.6.2.15 have been complied with. Fuel records shall be retained by the operator for a period of three (3) months.

(g) Each operator shall maintain oil records to enable the Authority to ascertain that trends for oil consumption are such that an airplane has sufficient oil to complete each flight.

(h) Fuel and oil records shall be retained by the operator for a period of three months.

(i) No person may commence a flight unless he or she takes into account the fuel, oil, and oxygen needed to ensure the safe completion of the flight, including any reserves to be carried for contingencies.

(j) For airplanes in AOC operations, the amount of usable fuel to be carried shall, as a minimum, be based on:

(1) The following data –

(i) Current airplane-specific data derived from a fuel consumption monitoring system, if available; or

(ii) If current airplane-specific data are not available, data provided by the airplane manufacturer, an

(2) The operating conditions for the planned flight including:

(i) Anticipated airplane mass;

(ii) Notices to Airmen;

(iii) Current meteorological reports or a combination of current reports and forecasts;

(iv) ATS procedures, restrictions and anticipated delays; and

(v) The effects of deferred maintenance items and/or configuration deviations.

(vi) Any other conditions that may delay the landing of the airplane or increase fuel, oil and/or oxygen consumption. (31 October 2013)

8.6.2.15.1COMMERCIAL AIR TRANSPORT- PISTON-ENGINED AIRPLANES

The fuel and oil carried in order to comply with Subpart 8.6.2.13.1 shall, in the case of piston-engined airplanes, be at least the amount sufficient to allow the airplane:

(a) . . .

(b) . . .

(c)[AOC] Airplanes. No person may commence a flight under IFR, or continue past the point of in-flight re-planning, unless there is enough fuel supply, considering meteorological conditions and any delays that are expected in flight, to include the following:

(1) Taxi fuel – which shall be the amount of fuel expected to be consumed before take-off;

(2) Trip fuel – which shall be the amount of fuel required to enable the airplane to fly from take-off, or the point of in-flight re-planning, until landing at the destination aerodrome taking into account the operating conditions in the data provided by the manufacturer;

(3) Contingency fuel – which shall be the amount of fuel required to compensate for unforeseen factors. It shall be five percent of the planned trip fuel or of the fuel required from the point of in-flight re-planning based on the consumption rate used to plan the trip fuel, but in any case, shall not be lower than the amount required to fly for five minutes at holding speed at 450 m (1500 ft) above the destination aerodrome in standard conditions;

(4) Destination alternate fuel – which shall be

(i) Where a destination alternate aerodrome is required, the amount of fuel required to enable the airplane to:

(A) Perform a missed approach at the destination aerodrome;

(B) Climb to the expected cruising altitude;

(C) Fly the expecting routing;

(D) Descend to the point where the expected approach is initiated; and

(E) Conduct the approach and landing at the destination alternate aerodrome; or

(ii) Where two destination alternate aerodromes are required, the amount of fuel, as calculated in (4)(i) above, required to enable the airplane to proceed to the destination alternate aerodrome which requires the greater amount of alternate fuel; or

(iii) Where a flight is operated without a destination alternate aerodrome, the amount of fuel required to enable the airplane to fly for 15 minutes at holding speed at 450 m (1500 ft) above destination aerodrome elevation in standard conditions; or

(iv) Where the aerodrome of intended landing is an isolated aerodrome:

(A) For helicopters, the amount of fuel required to fly for 45 minutes plus 15 percent of the flight time planned to be spend at cruising level, including final reserve fuel, or two hours, whichever is less; or

(B) For a turbine-engined airplane, the amount of fuel required to fly for two hours at normal cruise consumption above the destination aerodrome, including final reserve fuel;

(5) Final reserve fuel – which shall be the amount of fuel calculated using the estimated mass on arrival at the destination alternate aerodrome, or the destination aerodrome when no destination alternate aerodrome is required, or a pre-calculated value for each airplane type and variant in the fleet rounded up to an easily recalled figure:

(i) For a helicopters, the amount of fuel required to fly for 45 minutes, under speed and altitude conditions specified by the Authority; or

(ii) For a turbine-engined airplane, the amount of fuel required to fly for 30 minutes at holding speed at 450 m (1500 ft) above aerodrome elevation in standard conditions:

(6) Additional fuel – which shall be the supplementary amount of fuel required if the minimum fuel calculated in accordance with trip fuel, contingency fuel, destination alternate fuel and final reserve fuel above is not sufficient to:

(i) Allow the airplane to descend as necessary and proceed to an alternate aerodrome in the event of engine failure or loss or pressurization, whichever requires the greater amount of fuel based on the assumption that such a failure occurs at the most critical point along the route;

(A) To fly for 15 minutes at holding speed at 450 m (1500 ft) above the aerodrome elevation in standard conditions; and

(B) Make an approach and landing;

(C) Allow an airplane engaged in EDTO to comply with the EDTO critical fuel scenario as established by the Authority;

(D) Meet additional requirements not covered above.

Note: Fuel planning for a failure that occurs at the most critical point along a route may place the airplane in a fuel emergency situation.

(7) Discretionary fuel – shall be the extra amount of fuel to be carried at the discretion of the PIC, or

(d) An airplane shall not take off or continue from the point of in-flight re-planning unless the usable fuel on board meets the requirements in 8.6.2.15.1(c) (2), (4), (5) and (6) if required.

(e) Notwithstanding the provisions in 8.6.2.15.1(c) (1)–(7) above, the Authority may approve a variation to these requirements provided the operator can demonstrate an equivalent level of safety will be maintained through a safety risk assessment that includes at least the following:

(1) Flight fuel calculations;

(2) Capabilities of the operator to include:

(i) A data-driven method that includes a fuel consumption monitoring program; and/or

(ii) The advanced use of alternate aerodromes; and

(3) Specific mitigation measures.

Note: ICAO Doc 9976, Flight Planning and Fuel Management Manual, contains guidance on the specific safety risk assessment, fuel consumption monitoring program and the advanced use of alternate aerodromes.(31 October 2013)

8.6.2.15.2COMMERCIAL AIR TRANSPORT: TURBINE-ENGINED AIRPLANES

The fuel and oil carried in order to comply with Subpart 8.6.2.13.1 shall, in the case of turbine-engined airplanes, be at least the amount sufficient to allow the airplane: (31 October 2013)

8.6.2.15.6 IN-FLIGHT FUEL MANAGEMENT

(a) An operator shall establish policies and procedures, approved by the Authority, to ensure that in-flight fuel checks and fuel management are performed.

(b) The pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

(c) The pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.

(d) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel.

Note 1: The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

Note 2: Guidance on declaring minimum fuel is contained in the Flight Planning and Fuel Management Manual *(ICAO Doc 9976)*

(e) The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAYMAYDAY*FUEL*, when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.

Note 1: The planned final reserve fuel refers to the value calculated in 8.6.2.15.1(c) (5) (i) or (ii) and is the minimum amount of fuel required upon landing at any aerodrome.

Note 2: The words "MAYDAY FUEL." describe the nature of the distress conditions as required in ICAO Annex 10, Volume II, 5.3.2.1, b) 3.

Note 3: Guidance on procedures for in-flight fuel management are contained in the Flight Planning and Fuel Management Manual *(ICAO Doc 9976).*(31 October 2013)

8.7.1.3 AIRCRAFT PERFORMANCE CALCULATIONS

(a)Each operator shall ensure that the performance data contained in the AFM/RFM, or other authorized source is used to determine compliance with the appropriate requirements.

of Subpart 8.7. A flight shall not be commenced unless the performance information provided in the flight manual, supplemented as necessary with other data acceptable to the Authority, indicates that the Standards of Subpart 8.7 can be complied with for the flight to be undertaken.

(b)In applying the Standards of this Subpart, account shall be taken of all factors that significantly affect the performance of the airplane (including, but not limited to: the mass of the airplane, the operating procedures, the pressure altitude appropriate to the elevation of the airport, the ambient temperature, the wind, the runway slope and surface conditions of the runway, i.e presence of snow, slush water and/or ice, for landplanes, water surface condition for seaplanes). Such factors shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance in accordance with which the airplane is being operated. (31 October 2013)

8.7.2.4.1 TAKE-OFF LIMITATIONS: AIRPLANES

(a) . . .

(5) The airplane shall be able, in the event of a critical engine failing, or for other reasons, at any point in the take-off, either to discontinue the take-off and stop within the accelerate-stop distance available, or to continue the take-off and clear all obstacles along the flight path by an adequate vertical or horizontal distance, described in paragraph (6), until the airplane is in a position to comply with Subpart 8.7.2.6. When determining the resulting take-off obstacle accountability area, the operating conditions, such as crosswind component and navigation accuracy, must be taken into account.

Note. ICAO Annex 6 Part 1, Attachment C contains guidance on the vertical and horizontal distances that are considered adequate to show compliance with this Standard.(31 October 2013)

8.7.2.6EN ROUTE LIMITATIONS: ONE ENGINE INOPERATIVE

(a) Airplane. No person may take off an airplane used in commercial air transport having two power units unless that airplane can, in the event of the critical engine becoming inoperative at any point along the route, or planned diversion there-from, to continue the flight to a suitable airport or planned diversions there from, to continue the flight to an airport, at which the Standard of Subpart 8.7.2.7 can be met, without flying below the minimum flight altitude at any point, where a landing can be made while allowing: (31 October 2013)

8.7.2.7 EN ROUTE LIMITATIONS: TWO ENGINES INOPERATIVE

(a) Airplane. No person may take-off an airplane used in commercial air transport having three or more engines, on any part of a route where the location of en-route alternate airports and the total duration of the flight are such that the probability of a second engine becoming inoperative must be allowed for if the general level of safety implied by the Standards of this chapter is to be maintained, the airplane shall be able, in the event of any two engines becoming inoperative, to continue the flight to an en-route alternate airport and land while allowing: (31 October 2013)

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CAPT. EFREN C. ROCAMORA
NAME AND SIGNATURE

8.8.1.7 INSTRUMENT APPROACH OPERATING MINIMA

(a) . . .

(b) Each Operator shall establish airport/heliport-operating minima for each airport/heliport to be used in operation, and shall approve the method of determination of such minima. That minima shall not be lower than any that may be established for such airports by the State in which the airport is located, except when specifically approved by that State.

Note 1: This Standard does not require the State in which the aerodrome is located to establish aerodrome operating minima.

Note 2: The use of head-up displays (HUD) or enhanced vision systems (EVS) may allow operations with lower visibilities than normally associated with the aerodrome operating minima.(31 October 2013)

8.8.1.32 AIRPLANEOPERATING PROCEDURES FOR RATES OF CLIMB AND DESCENT

(a) Unless otherwise specified in an air traffic control instruction, to avoid unnecessary airborne collision avoidance system (ACAS II) resolution advisories in aircraft at or approaching adjacent altitudes or flight levels, operators should specify procedures by which an airplane climbing or descending to an assigned altitude or flight level, especially with an autopilot engaged, may do so at a rate less than 8 m (26 ft)/sec or 450 m (1500 ft)/min (depending on the instrumentation available throughout the last 300 m (1000 ft) of climb or descent to the assigned level when the pilot is made aware of another aircraft at or approaching an adjacent altitude or flight level.

Note: Material concerning the development of these procedures is contained in the PANS-OPS (ICAO Doc 8168) Volume I, Part III, Section 3, Chapter 3. (31 October 2013)

8.10.1.34 RECURRENT TRAINING: CABIN CREW

(c) Each Operator shall establish and maintain a training program, approved by the Authority, to be completed by all persons before being assigned as a cabin crew member. Cabin crew members shall complete a recurrent training program annually. This training programs shall ensure that each person is

(1) . . .

(2)Drilled and capable in the use of emergency and life-saving equipment required to be carried, such as life jackets, life rafts, evacuation slides, emergency exits, portable

fire extinguishers, oxygen equipment, first-aid and universal precaution kits, automated external defibrillators;(31 October 2013)

(3) . . .

(4) Aware of other crew members' assignments and functions in the event of an emergency so far as is necessary for the fulfillment of the cabin crew member's own duties;

(5)Aware of the types of dangerous goods which may, and may not, be carried in a passenger cabin; and

(6)Knowledgeable about human performance as related to passenger cabin safety duties including flight crew-cabin crew member's coordination.

Note 1: Requirements for the training of cabin crew members in the transport of dangerous goods are included in the Dangerous Goods Training Program contained in ICAO Annex 18 – The safe Transport of Dangerous Goods by Air *and the* Technical Instruction for the Safe Transport of Dangerous Goods by Air *(ICAO Doc 9284).*

Note 2: Guidance material to design training program to develop knowledge and skill in human performance can be found in the Human Factors Training Manual *(ICAO Doc 9683).*(31 October 2013)

8.11 FATIGUE MANAGEMENT FOR FLIGHT TIME, FLIGHT DUTY PERIODS, DUTY PERIODS AND REST PERIODS: COMMERCIAL AIR TRANSPORT

8.11.1.1 Applicability

(a) . . .

(b) Each operator shall formulate rules to limit flight time, flight duty periods, duty periods and rest periods for all its crew members. These rules shall also make provision for adequate rest periods and shall be such as to ensure that fatigue occurring either in a flight or successive flights or accumulated over a period of time due to these and other tasks does not endanger the safety of a flight. These rules shall be in accordance with the regulations established by the Authority, or approved by the Authority, and included in the operations manual.

Note: Guidance on the establishments of limitations is given in ICAO Annex 6, Part 1 Attachment A.

(c) This subpart is applicable to the management of fatigue-related safety risks of crew members and flight operations officers/flight dispatchers engaged in commercial air transport flight operations.

(d) For the purpose of managing fatigue, the Operator shall establish regulations specifying the limitations applicable to flight time, flight duty periods, duty periods and rest periods for flight and cabin crew members. These regulations shall be based upon

scientific principles and knowledge where available, with the aim of ensuring that the flight and cabin crew members are performing at an adequate level of alertness.

Note: Guidance for the development of prescriptive fatigue management regulations is given in ICAO Annex 6 Part 1, Attachment A.(31 October 2013)

8.11.1.2MANAGING FATIGUE-RELATED SAFETY RISKS

(a) For the purpose of managing fatigue-related safety risks, an AOC holder shall establish either:

(1) flight time, flight duty period, duty period and rest period limitations that are within the prescriptive fatigue management regulations in Subpart 8.12; or

(2) a Fatigue Risk Management System (FRMS) in compliance with Subsection 8.11.1.2(e); or

(3) a FRMS in compliance withSubpart 8.11.1.2(e) for part of its operations and the requirements of Subpart 8.12 for the remainder of its operations.

(b) Where the operator adopts prescriptive fatigue management regulations for part or all of its operations, the Authority may approve, in exceptional circumstances, variations to these regulations on the basis of a risk assessment provided by the operator. Approved variations shall provide a level of safety equivalent to, or better than that achieved through the prescriptive fatigue management regulations.

(c) The Authority shall approve an operator's FRMS before it may take the place of any or all of the prescriptive fatigue management regulations. An approved FRMS shall provide a level of safety equivalent to, or better than, the prescriptive fatigue management regulations.

(d) Operators using an FRMS must adhere to the following provisions of the FRMS approval process that allows the Authority to ensure that the approved FRMS meets the requirements of Subpart 8.11.1.2(c).

(1) Establish maximum values for flight times and/or flight duty period(s) and duty period(s), and minimum values for rest periods that shall be based upon scientific principles and knowledge, subject to safety assurance processes

Note: ICAO Doc 9966, Fatigue Risk Management Systems Manual, provides a definition forSafety Assurance Processes.

(2) Adhere to Authority mandates to decrease maximum values and increase in minimum values in the event that the operator's data indicates these values are too high to too low, respectively; and

(3) Provide justification to the Authority for any increase in maximum values or decrease in minimum values based on accumulated FRMS experience and fatigue-related data before such changes will be approved by the Authority.

(e) Operators implementing an FRMS to manage fatigue-related safety risks shall, as a minimum:

(1) Incorporate scientific principles and knowledge within the FRMS;

(2) Identify fatigue-related safety hazards and the resulting risks on an ongoing basis;

(3) Ensure that the remedial actions, necessary to effectively mitigate the risks associated with the hazards, are implemented promptly;

(4) Provide for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions; and

(5) Provide for continuous improvement to the overall performance of the FRMS.(31 October 2013)

8.11.1.7 FLIGHT TIME, FLIGHT DUTY, DUTY AND REST PERIODS RECORDS

(a) Each AOC holder shall maintain records for each crew member and flight operations officer/flight dispatcher of flight time, flight duty periods, duty periods, and rest periods. (31 October 2013)

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CAPT. EFREN C. ROCAMORA
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IS: 8.11.1.2 MANAGING FATIGUE-RELATED SAFETY RISKS

(a) FRMS policy and documentation

(1) FRMS policy

(i) The operator shall define its FRMS policy, with all elements of the FRMS clearly identified.

(ii) The policy shall require that the scope of FRMS operations be clearly defined in the operations manual.

(iii)The policy shall:

(A)reflect the shared responsibility of management, flight and cabin crews, and other involved personnel;

(B)clearly state the safety objectives of the FRMS;

(C)be signed by the accountable executive of the organization;

(D)be communicated, with visible endorsement, to all the relevant areas and levels of the organization;

(E)declare management commitment to effective safety reporting;

(F)declare management commitment to the provision of adequate resources for the FRMS;

(G)declare management commitment to continuous improvement of the FRMS;

(H)require that clear lines of accountability for management, flight and cabin crews, and all other involved personnel are identified; and

(I)require periodic reviews to ensure it remains relevant and appropriate.

Note: Effective safety reporting is described in ICAO Doc 9859, Safety Management Manual (SMM).

(b)FRMS documentation

(1)An operator shall develop and keep current FRMS documentation that describes and records:

(i)FRMS policy and objectives

(ii)FRMS processes and procedures;

(iii)accountabilities, responsibilities and authorities for these processes and procedures;

(iv)mechanism for ongoing involvement of management, flight and cabin crew members, and all other involved personnel;

(v)FRMS training programs, training requirements and attendance records;

(vi)scheduled and actual flight times, duty periods and rest periods with significant deviations and reasons for deviations noted; and

(vii)FRMS outputs including findings from collected data, recommendations, and actions taken.

(c)Fatigue risk management processes

(1)Identification of hazards

An operator shall develop and maintain three fundamental and documented processes for fatigue hazard identification:

(i)Predictive

Predictive process shall identify fatigue hazards by examining crew scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include but are not limited to:

(A)operator or industry operational experience and data collected on similar types of operations;

(B)evidence-based scheduling practices; and

(C)bio-mathematical models.

(ii)Proactive

The proactive process shall identify fatigue hazards within current flight operations. Methods of examination may include but are not limited to:

(A)self-reporting of fatigue risks;

(B)crew fatigue surveys;

(C)relevant flight and cabin crew performance data;

(D)available safety databases and scientific studies; and

(E)analysis of planned versus actual time worked.

(iii)Reactive

The reactive process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how impact of fatigue could have been minimized. At a minimum, the process may be triggered by any of the following:

(A)fatigue reports;

(B)confidential reports;

(C)audit reports;

(D)incidents; and

(E)flight data analysis events.

(2)Risk assessment

An operator shall develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation.

(i)The risk assessment procedures shall review identified hazards and link them to:

(A)operational processes;

(B)their probability;

(C)possible consequences; and

(D)the effectiveness of existing safety barriers and controls.

(3)Risk mitigation

(i)An operator shall develop and implement risk mitigation procedures that;

(A)select the appropriate mitigation strategies;

(B)implement the mitigation strategies; and

(C)monitor the strategies' implementation of effectiveness.

(d)FRMS safety assurance processes

(1)The operator shall develop and maintain FRMS safety assurance processes to:

(i)proved for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to:

(A)hazard reporting and investigations;

(B)audits and surveys; and

(C)reviews and fatigue studies'

(ii)provide a formal process for the management of change which shall include but is not limited to:

(A)identification of changes in the operational environment that may affect FRMS;

(B)identification of changes within the organization that may affect; and

(C)consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes and

(iii)provide for the continuous improvement of the FRMS. This shall include but is not limited to:

(A)the elimination and/or modification of risk controls have has unintended consequences or that are no longer needed due to changes in the operational or organizational environment;

(B)routine evaluations of facilities, equipment, documentation and procedures; and

(C)the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

(e)FRMS promotion processes

(1)FRMS promotion processes support the ongoing development of the FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the operator as part of its FRMS:

(i)training programs to ensure competency commensurate with the roles and responsibilities of management, flight and cabin crew, and all other involved personnel under the planned FRMS; and

(ii)explains FRMS communication channels used to gather and disseminate FRMS-related information.(31 October 2013)

PCAR PART 9

9.3.1.2 OPERATIONS MANUAL

(b) From 1 January 2006, an operations manual, which may be issued in separate parts corresponding to specific aspects of operations. provided in accordance with Subpart 9.3.1.2 shall be organized with the following structure:

a) General;

b) Aircraft operating information;

c) Areas, routes and aerodromes; and

d) Training. (31 October 2013)

(a) From 1 January 2006, an operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with Subpart 9.3.1.2 shall be organized with the following structure:

(1) General;

(2) Aircraft operating information;

(3) Areas, routes and aerodromes; and

(4) Training.(31 October 2013)

(b) . . .

(c) . . .

(19) Instruction on the use of autopilots and auto-throttles in IMC.

Note: Instruction on the use of autopilots and auto throttles, together with IS: 9.3.1.2(c) (20) and (21), are essential for avoidance of approach and landing accidents and controlled flight unto terrain accidents.

(20) Limitation on high rates of descent near the surface.

(21) Instructions and training requirements for the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system (GPWS).

(22)Information and policy relating to fatigue management including:

(i)rules pertaining to flight time, flight duty period, duty period-limitations and rest requirements for flight and cabin crew members in accordance with Subpart 8.11; and

(ii)policy and documentation pertaining to the operator's FRMS in accordance with IS: 8.11.1.2.

(d)

8.1.5 DETERMINATION OF THE QUANTITIES OF FUEL, OIL AND WATER METHANOL CARRIED.

The methods by which the quantities of fuel, oil and water methanol to be earned are determined and monitored in flight. This section shall also include instructions on the measurement and distribution of the fluid earned on board. Such instructions shall take account of all circumstances likely to be encountered on the flight, including the possibility of in-flight re-planning arid of failure of one or more of the aircraft's power plants. The system for maintaining fuel and oil records shall also be described.(31 October 2013)

8.1.6 . . .

8.1.7

8.1.8 Flight and Duty Time

(a) Flight and Duty Time Limitations and Rest Schemes

(i)Flight Crew

(ii)Cabin Crew

(iii)Flight Operations Officer/ Flight Dispatcher(31 October 2013)

8.2 . . .

8.3 FLIGHT PROCEDURES

8.3.1 NAVIGATION PROCEDURES

(d)Instructions and training requirements for the use of head-up displays (HUD) and enhanced vision systems (EVS) equipment as applicable.(31 October 2013)

IS: 9.3.1.4 AIRCRAFT OPERATING MANUAL

12.1 INSTRUCTION AND INFORMATION

(l) The increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities.

(m) Instruction for determining aerodrome operating minima for instrument approaches using HUD and EVS.(31 October 2013)

EFFECTIVITY:

These amendments shall take effect immediately after compliance with the requisite single publication and a copy filed to the U.P. Law Center – Office of the National Administrative Register.

So Ordered. Signed this 29 day of OCT 2013, CAAP, Pasay City

LT GEN WILLIAM K HOTCHKISS III AFP (RET)
Director General

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AIDA S. ROMULO
Chief, Central Records
and Archives Division

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