

**DEPARTMENT OF CIVIL AVIATION
MALAYSIA
AIRWORTHINESS NOTICE**

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Date: 15 May 2005

FLIGHT RECORDERS - AEROPLANE

1. Introduction

- 1.1. DCA has adopted the ICAO Annex 6 with regards to Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR) the requirements of the Fifth Schedule (affecting FDR/ CVR) of CAR are amended accordingly and is reflected in this Notice.
- 1.2. The Scale of Equipment as specified in the Fifth Schedule of CAR is to be read in conjunction with this Notice

2. General

Note 1: Flight recorders comprise two systems, a flight data recorder (FDR) and a cockpit voice recorder (CVR).

Note 2: Combination recorders (FDR/CVR) can only be used to meet the flight recorder equipage requirements as stated in this notice.

- 2.1 A type 1 FDR shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation.

Note 3 : The use of engraving metal foil FDR shall be discontinued by 1 January 1995.

Note 4 : The use of photographic film FDRs shall be discontinued from 1 January 2003.

Note 5 : The use of analogue FDRs using frequency modulation (FM) should be discontinued by 5 November 1998

- 2.2 Types II and IIA FDRs shall record the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices.

3. **All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2005, which utilize data link communications and are required to carry a CVR, shall record on a flight recorder, all data link communications to and from the aeroplane. The minimum recording duration shall be equal to the duration of CVR, and shall be correlated with the recorded cockpit audio.**

- 3.1 From 1 January 2007, all aeroplanes which utilises data link communications and are required to carry a CVR shall record on a flight recorder. The minimum recording duration shall be equal to the duration of the CVR, and shall be correlated to the recorded cockpit audio.

- 3.2 Sufficient information to derive the content of the data link communications message was displayed to or generated by the crew shall be recorded.

Note 6: Data link communications include, but are not limited to, automatic dependent surveillance (ADS), controller-pilot data link communications (CPDLC), data link-flight information services (D-FIS) and aeronautical operational control (AOC) messages.

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

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

4. **Type IA FDR shall record the parameters required to determine accurately the aeroplane flight path, speed, altitude, engine power, configuration and operation. The parameters that satisfy the requirements for a Type IA FDR are listed in the paragraphs below. The parameters without an asterisk (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameters is used by aeroplane systems or the flight crew to operate the aeroplane.**

- 4.1 The following parameters satisfy the requirements for flight path and speed :
- Pressure altitude
 - Indicated airspeed or calibrated airspeed
 - Air-ground status and each landing gear air-ground sensor when practicable.
 - Total or outside air temperature
 - Heading (primary flight crew reference)
 - Normal acceleration
 - Lateral acceleration
 - Longitudinal acceleration (body axis)
 - Time or relative time count
 - Navigation data.*: drift angle, wind speed, wind direction, latitude/longitude
 - Groundspeed.*
 - Radio altitude *
- 4.2 The following parameters satisfy the requirements for altitude :
- Pitch attitude
 - Roll attitude
 - Yaw or sideslip angle*
 - Angle of attack*
- 4.3 The following parameters satisfy the requirements of engine power :
- Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust/power lever position
 - Thrust reverse status*
 - Engine thrust command*
 - Engine thrust target*
 - Engine bleed valve position*
 - Additional engine parameters.*: EPR, N1, indicated vibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3
- 4.4 The following parameters satisfy the requirements for configuration :
- Pitch trim surface position
 - Flaps*.: trailing edge flap position, cockpit control selection
 - Slats*.: leading edge flap (slat) position, cockpit control selection
 - Landing gear*.: landing gear, gear selector position
 - Yaw trim surface position*
 - Roll trim surface position *
 - Cockpit trim control input position pitch*
 - Cockpit trim control position roll*
 - Cockpit trim control position yaw*
 - Ground spoiler and speed brake*.: Ground spoiler position, ground spoiler selection, speed brake position, speed brake selection
 - De-icing and/or anti-icing systems selections*
 - Hydraulic pressure (each system)*
 - Fuel quantity*
 - AC electrical bus status.*
 - DC electrical bus status*
 - APU bleed valve position*
 - Computed centre of gravity*
- 4.5 The following parameters satisfy the requirements for operation :
- Warnings
 - Primary flight control surface and primary flight control pilot input :: pitch axis, roll axis, yaw axis
 - Marker beacon passage
 - Each navigation receiver frequency selection
 - Manual radio transmission keying and CVR/FDR synchronization reference
 - Autopilot/autothrottle/AFCS mode and engagement status*
 - Selected barometric setting*: pilot, first officer
 - Selected altitude (all pilot selectable modes of operation)*
 - Selected speed (all pilot selectable modes of operation)*

- Selected match (all pilot selectable modes of operation)*
- Selected vertical speed (all pilot selectable modes of operation)*
- Selected heading (all pilot selectable modes of operation)*
- Selected flight path (all pilot selectable modes of operation)*: course/ DSTRK, path angle
- Selected decision height*
- EFIS display format* : pilot, first officer
- Multi-function/ engine/ alert display format*
- GPWS/ TAWS/ GCAS status* : selection of terrain display mode including pop-up display status, terrain display alerts, both cautions and warnings, and advisories, on/off switch position
- Low pressure warning*: hydraulic pressure, pneumatic pressure
- Computer failure*
- Loss of cabin pressure*
- TCAS/ ACAS (traffic alert and collision avoidance system/ airborne collision avoidance system)*
- Ice detection*
- Engine warning each engine vibration*
- Engine warning each engine over temperature*
- Engine warning each engine oil pressure low*
- Engine warning each engine over speed*
- Wind shear warning*
- Operational stall stick shaker and pusher activation*
- All cockpit light control input forces*: control wheel, control column, rudder pedal cockpit input forces
- Vertical deviation*: glide path, MLS elevation, GNSS approach path
- Horizontal deviation*: ILS localizer, MLS azimuth, GNSS approach path
- DME 1 and 2 distances*
- Primary navigation system reference*: GNSS, INS, VOR/DME, MLS, Loran C, ILS
- Brakes*: left and right brake pressure. left and right brake pedal position
- Date *
- Event marker*
- Head up display and use*
- Para visual display on

Note 7 : Parameter require including range, sampling accuracy and resolution as contained in the Minimum Operational Performance Specification (MOPS) document for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents.

Note 8 :The numbers of parameters to be recorded will depend on aeroplane complexity parameters without an (*) are to be recorded regardless of aeroplane complexity. Those parameters designated by an (*) are to be recorded if an information source for the parameter is used by aeroplane systems and/or flight crew to operate the aeroplane.

5. Flight Data Recorder- duration

All FDRs shall be capable of retaining the information recorded during at least the last 25 hours of their operation except for the Type IIA FDR which shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

6. Flight data recorders -aeroplanes for which the Individual certificate of airworthiness is first issued on or after 1 January 1989.

- 6.1 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg shall be equipped with a Type I FDR.
- 6.2 All aeroplanes of a maximum take-off mass of over 5 700 kg up to and including 27 000 kg, shall be equipped with a Type II FDR.
- 6.3 *Recommendation - All multi-engine turbine powered aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is last issued on or after 1 January 1990 should be equipped with Type IIA FDR.*

7. Flight data recorders -aeroplanes for which the individual certificate of airworthiness was first Issued on or after 1 January 1987 but before January 1989.

- 7.1 All turbine-engine aeroplanes of a maximum certificated take-off mass of over 5 700 kg except those in paragraph 7.3 shall be equipped with FDR which shall recorded time, altitude, airspeed, normal acceleration and heading.

- 7.2 *Recommendation - All turbine-engine aeroplane, of a maximum take-off mass of over 5 700 kg, except those in paragraph 7.3 should be equipped with a FDR which 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.*
- 7.3 All turbine-engine aeroplanes of a maximum take-off mass of over 27 000 kg that area of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 should be equipped with a Type II FDR.
- 8. Flight Data Recorders -aeroplanes for which the individual certificated of airworthiness was first issued before 1 January 1987.**
- 8.1 All turbine-engine aeroplanes of a maximum take-off mass of over 5 700 kg shall be equipped with FDR which shall record time, altitude, airspeed, normal acceleration and heading.
- 8.2 *Recommendation - All turbine-engine aeroplanes of a maximum certificated take-off mass of over 27 000 kg that are of types of which the prototype was certified by the appropriate national authority after 30 September 1969 should be equipped with a FDR which should record, in addition to tune, altitude, airspeed, normal acceleration and heading, such additional parameters as are necessary to meet the objectives of determining :*
- a) the attitude of the aeroplane in achieving its flight path.*
- b) the basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.*
- 9. Flight Data Recorder- aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2005.**
- All aeroplanes of a maximum certificated take-off mass of over 5 700 kg shall be equipped with a Type 1A FDR.
- 10. Cockpit Voice Recorders -aeroplanes for which the individual certificated of airworthiness is first issued on or after 1 January 1987.**
- 10.1 All aeroplanes of a maximum certificated take-off mass of over 5 700 kg shall be equipped with CVR, the objective of which is the recording of the aural environment on the flight deck during flight time.
- 10.2 *Recommendation. – All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5 700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 1990 should be equipped with a CVR, the objective of which is the recording of the aural environment on the flight deck during flight time.*
- 11 Cockpit Voice Recorder. – aeroplanes for which the individual certificated of airworthiness was first issued before 1 January 1987.**
- Note 9: CVR performance requirements are as contained in the Minimum Operational Performance Specifications (MOPS) document, for Flight Recorder Systems of the European Organization for Civil Aviation Equipment (EUROCAE) or equivalent documents*
- 11.1 All turbined-engine aeroplanes of 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, the objective of which is the recording of the aural environment on the flight deck during flight time.
- 11.2 *Recommendation - All turbined-engine aeroplanes of 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 should be equipped with a CVR the objective of which is the recording of the aural environment on the flight deck during flight time.*
- 12. Cockpit Voices Recorder – duration.**
- 12.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.

12.2 *Recommendation – A CVR, installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which is individual certificate of airworthiness is first issued on or after 1 January 1990, should be capable of retaining the information recorded during at least the last two hours of its operation.*

12.3 A CVR installed in aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued after 1 January 2003 shall be capable of retaining the information during at least the last two hours of its operation.

12.4 Flight Recorders Instruction and Installation

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

Note 10: Industry crashworthiness and fire protection specifications can be found in documents such as the European Organization for Civil Aviation Equipment (EUROCAE) documents ED55 and ED56A.

13. Flight Recorders Operation.

13.1 Flight recorders shall not be switched off during flight time.

13.2 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 unless permitted by the DCA.

Note 11: The need for removal of the flight recorder records, from the aircraft will be determined by the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

Note 12: The operational responsibilities regarding the retention of flight recorder records are contained in CAR Reg. 60 and 86.

13.3 Flight Recorder – continued serviceability.

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

14. Compliance.

14.1 All aeroplane are required to comply with the requirement by the date specified in this notice. The FDR and CVR shall be of those that comply to the requirements specified in Appendix 1 of this notice.

Note13: FDR and CVR installed to meet the requirements of FAR Part 121 and JAR OPS 1 can be considered as meeting these requirements.

15. Cancellation

15.1 This Notice cancels Airworthiness Notice No. 83, Issue 1, dated 01 October 2002.

DIRECTOR GENERAL
DEPARTMENT OF CIVIL AVIATION
MALAYSIA