Civil Aviation Safety Authority
of Papua New Guinea

Advisory Circular

AC91.14

Light Weight Flight Recorder Requirements

Issue 2

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GENERAL

Civil Aviation Safety Authority Advisory Circulars (AC) contain information about standards, practices and procedures that the Director has found to be an Acceptable Means of Compliance (AMC) with the associated rule.

An AMC is not intended to be the only means of compliance with a rule, and consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices or procedures are found to be acceptable, they will be added to the appropriate Advisory Circular.

This Advisory Circular also includes Explanatory Material (EM) where it has been shown that further explanation is required. Explanatory Material must not be regarded as an acceptable means of compliance.

PURPOSE

This Advisory Circular provides regulatory information for Installation, Testing, Operation and Maintenance of Light Weight flight recorders installed in aircraft operating under Papua New Guinea Rule Parts 125, 135 and 136.

CHANGE NOTICE

This AC replaces the Issue 1 dated 22 October 2022.

APPROVAL

This AC has been approved for publication by the Director of Civil Aviation

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1. EM GENERAL

1.1 The flight data recording equipment installed in the aircraft shall be installed in accordance with the manufacturer's instructions acceptable to the Director as per the Rule Part 91.501 (3) –Subpart F.

1.2 This Advisory Circular is applicable to all aircraft operated in Papua New Guinea under rule parts 135, 136 and 125.

1.3 Rule parts 135.365, 136.515 and 125.369 prescribes the requirements for the fitment of flight data recorders for operations under:

- Part 135 – Air Operations: Small Aeroplanes
- Part 136 – Air Operations: Helicopters
- Part 125 – Air Operations: Medium Aeroplanes

This Advisory Circular provides information on light weight flight recorders considered acceptable to the Director for fitment on Part 135, 136 and 125 aircraft.

Note: *All information contained in this AC is explanatory material therefore all items may be regarded as tagged* ***EM***

2. EM DEFINITIONS

Aircraft Data Recording System (ADRS): A light weight aircraft flight recorder that records aircraft data.

Airborne Image Recording System (AIRS): A light weight aircraft flight recorder that records aircraft cockpit images.

Class C AIR: An Airborne Image recorder that captures the images of instruments and the control panels.

Cockpit Audio Recording System (CARS): A light weight aircraft flight recorder that records aircraft communications and cockpit environmental noise.

Commercial Operation: An aircraft operation involving transportation of passengers, cargo or mail for remuneration or hire.

Flight Recorder: A type of recorder accepted by the Director to be installed in the aircraft for the purpose of complementing accident/incident investigation.

Light Weight Flight Recorders: Low cost, lightweight and compact flight data recorders installed on smaller aircraft because of performance limitations without giving up critical benefits in flight data recording system of complicated FDRs of larger aircraft.

MCTOW: means Maximum Certificated Take-Off Weight

3. EM LIGHT WEIGHT FLIGHT RECORDER CLASSIFICATION

Light Weight flight recorders required to be installed comprise one or more of the following systems:

- An aircraft data recording system (ADRS); or
- A cockpit audio recording system (CARS); or
- An airborne image recording system (AIRS).

4. EM LIGHT WEIGHT FLIGHT RECORDERS

4.1 EM Operational Rule Requirements

4.1.1 EM 135.365 Small Aeroplanes – Commercial Air Transport

4.1.1.1 All aeroplanes fitted with turbine engines operated as commercial air transport of a MCTOW of 5700 kg or less and engaged in international air operations shall be equipped with a flight data recorder in accordance with Part 135 Appendix A.3.

4.1.1.2 Part 135 Appendix A.3(4) to A.3(7) provides operators options to fit audio/video recorders acceptable to the Director as follows:

- An aircraft data recording system (ADRS); or
- A cockpit audio recording system (CARS); or
- An airborne image recording system (AIRS); or
- A single recorder capable of recording all three above

4.1.2 EM 136.515 Helicopters – Commercial Air Transport

4.1.2.1 Fitment of flight data recorders to helicopters of a MCTOW up to 3175kg is not required, however, operators may opt to fit a light-weight flight recorder.

4.1.2.2 All helicopters of a MCTOW of over 3175 kg shall be equipped with A flight data recorder in accordance with Part 136 Appendix A.2.

4.1.2.2 Part 136 Appendix A.2(3) to A.2(7) provide operators options to fit audio/video recorders acceptable to the Director as follows:

- An aircraft data recording system (ADRS); or
- A cockpit audio recording system (CARS); or
- An airborne image recording system (AIRS); or
- A single recorder capable of recording all three above

4.1.3 EM 125.369 Medium Aeroplanes – Commercial Air Transport

4.1.3.1 All aeroplanes operated as commercial air transport of a MCTOW of over 5700 kg or is type-certified for more than 9 passenger seats shall be equipped with a flight data recorder in accordance with Part 125 Appendix A.4.

4.1.3.2 Part 125 Appendix A.4 (4) to A.4 (7) provides operators options to fit audio/video recorders acceptable to the Director as follows:

- An aircraft data recording system (ADRS); or
- A cockpit audio recording system (CARS); or
- An airborne image recording system (AIRS); or
- A single recorder capable of recording all three above

5. EM COCKPIT AUDIO RECORDING SYSTEM (CARS) PARAMETERS

As a minimum, the CARS shall record the following mandatory parameters:

- voice communication transmitted from or received by the aircraft radio;
- aural environment in the flight deck; and
- voice communication of flight crew members in the flight deck using the aircraft's interphone system, if installed.

6. EM AIRCRAFT DATA RECORDING SYSTEM (ADRS) PARAMETERS

As a minimum, the ADRS should record the following mandatory parameters:

- heading
- pitch attitude
- roll attitude
- ground speed
- vertical speed
- latitude
- longitude
- pitch rate
- roll rate
- yaw rate
- normal acceleration
- lateral acceleration
- longitudinal acceleration
- altitude

7. EM AIRBORNE IMAGE RECORDER (AIR) AND AIRBORNE IMAGE RECORDING SYSTEMS (AIRS) PARAMETERS

7.1 Classes of AIR/AIRS

7.1.1 An AIR or AIRS can be of a type that captures the general cockpit area in order to provide data supplemental to conventional flight recorders; or

7.1.2 An AIR or AIRS can be of a type that captures instruments and control panels or both.

7.2 As a minimum, the AIRS should record the following mandatory parameters:

- heading
- pitch attitude
- roll attitude
- ground speed
- vertical speed
- latitude
- longitude
- pitch rate
- roll rate
- yaw rate
- normal acceleration
- lateral acceleration
- longitudinal acceleration
- audio – Crew and ATC communication/Ambient audio
- altitude
- aircraft tracking
- Cockpit imaging

8. EM LIGHT WEIGHT FLIGHT RECORDERS CONSIDERED ACCEPTABLE TO THE DIRECTOR

8.1 Table 1 below contains light weight flight recorders that have been assessed against the requirements of this Advisory Circular and are considered acceptable to the Director for fitment on Part 135, 136 and 125 aircraft:

Table 1 – List of Light Weight Flight Recorders considered acceptable to Director

	LIGHT WEIGHT FLIGHT RECORDER TYPE	RECORDER CAPABILITY / LIMITS
1	APPAREO VISION 1000 SYSTEM	CARS, ADRS & AIR/AIRS capable
2	APPAREO AIRS-400 SYSTEM	CARS, ADRS & AIR/AIRS capable
3	FLIGHTCELL SMARTHUB	CARS, ADRS & AIR/AIRS capable

8.2 AOC holders, may make application to the Director for assessment and acceptance of other light weight flight recorders.

9. EM LIGHT WEIGHT FLIGHT RECORDERS – AIR OPERATOR REQUIREMENTS

9.1 EM Construction and Installation Procedures

9.1.1 Light Weight 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. Light Weight Flight recorders should meet the prescribed crashworthiness and fire protection specifications in EUROCAE ED-112, ED-56A, ED-55, ED155A, RTCA/DO-160G Minimum Operational Specifications (MOPS), or earlier equivalent documents.

9.1.2 Installation of Light Weight Flight Recorders on aircraft should be carried out in accordance with guidance contained in PNG Advisory Circular AC 43-12 Avionics Installations – Acceptable Technical Data, as applicable.

9.2 EM Air Operator – Operational Procedures

AOC holders shall ensure that their operational procedures including MEL, reflect procedures consistent with the operational requirements specified in rules 135.71, 136.71 and 125.77 and the following:

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

9.2.2 Flight recorder records preservation post-accident or serious incident in accordance with paragraph 9.4.

9.3 EM Aircraft Minimum Equipment List (MEL)

The Light-Weight Flight Recorder system shall be included in the aircraft Minimum Equipment List.

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

Light Weight Flight Recorder systems should be categorized as category B item(s) in the aircraft MEL.

9.4 EM Flight Recorder Records Preservation - Post Accident or serious incident

AOC holders, shall ensure, to the extent possible, in the event the aeroplane /helicopter becomes involved in an accident or serious incident to be investigated by the PNG AIC or the Director:

9.4.1 the preservation of all related flight recorder records and, if necessary, the associated flight recorders, and their retention in safe custody pending their disposition in accordance with instruction issued by PNG Accident Investigation Commission (PNG AIC); and

9.4.2 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 as determined in accordance with the instructions issued by Director or the PNG AIC.

10. EM AIRCRAFT MAINTENANCE PROGRAM INSPECTION REQUIREMENTS

Operators should ensure the following are incorporated into the aircraft maintenance programme for each aircraft;

10.1 The inspection of the recorder and the recorded data shall be included in the aircraft maintenance schedule /checks;

10.2 Analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording.

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

10.4 A report of the recording system shall be made available on request to the Director for monitoring or surveillance purposes or to the Accident Investigation Commission (AIC) for accident investigation purposes.

11. EM POWER SUPPLY REQUIREMENT

An operator should ensure that the recording system is powered from both the normal and emergency electrical buses. This ensures the recording system is still powered and uninterrupted should the main electrical power be lost.

12. EM UNDERWATER LOCATING DEVICES (ULD) REQUIREMENT

12.1 Underwater locator devices must be installed in the aircraft as close as possible to the recording equipment if the aircraft is required to be operated over water.

12.2 An ULD must meet the requirements of the TSO C121b and shall operate for a minimum of 90 days.