Civil Aviation Safety Authority
of Papua New Guinea

Advisory Circular

AC125/135/136-1

Installation, Testing, Operation and Maintenance of CVRs

Issue 1

01 December 2022

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 methods acceptable to the CASA for showing compliance with the requirements on the Installation, Testing, Operation and Maintenance of Cockpit Voice Recorder (CVR) systems installed in aircraft operating under Papua New Guinea Rule Part 125 and 136.

RELATED CAR

This AC relates to CAR Part 125.367 (Appendix A-A.3) and CAR Part 136.513 (Appendix A- A.1).

CHANGE NOTICE

This AC replaces the Initial Issue dated 01 April 2015.

APPROVAL

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

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1. Applicability

CVR Systems installed in or to be installed in PNG registered aircraft to be operated in accordance with Part 125 or Part 136.

CVR Systems approved through a FAA, CASA Australia, DOT Canada, EASA, NZ CAA or UK CAA Type Certificate or Supplemental Type Certification process are acceptable and do not require additional testing provided the CVR unit and ULD meet the design standards of Part 125 and Part 136 Appendix A.

2. Introduction

Part 125.367 and Part 136.513 require the installation of CVR systems in certain aircraft. This Advisory Circular provides guidance to designers, operators and maintainers of the requirements to be satisfied with CVR systems to ensure they perform their proper function.

3. Design Standards

All CVR Systems installed in Part 125 or Part 136 aircraft must comply with the design standard specified in the aircrafts Type Certificate Data Sheet or to a later design standard acceptable to the Director.

In the case of the DHC-6 series, which is certificated to CAR 3, CASA advises that FAR 23.1457 at Amendment 35 or later Amendment is an acceptable design standard.

Design Standards for CVRs and ULDs are specified in Appendix A of Part 125 and Part 136.

4. Test Procedures

First of Type or First of Model installations require testing to ensure the recordings are suitable for use in an accident investigation. To this end, a test recording should be made in flight in accordance with the flight test schedule at Appendix 1 of this document. The recorder unit or a copy of the recording is to be forwarded to a test facility acceptable to CASA for analysis. It is the Operator's responsibility to negotiate with the test facilities.

Test facilities currently acceptable to CASA are:

Flight Data Systems

31 McGregor's Drive

Keilor Park

Victoria 3042

Australia

Email: admin@fliqhtdata.com.au

Australian Transport Safety Bureau (ATSB)

62 Northbourne Avenue

Canberra ACT 2601

Australia

Email: atsbinfo@atsb.gov.au

5. Operational Requirements

Part 125.75 and Part 136.71 require that a flight crew member shall ensure that:

(1) The cockpit -voice recorder is operated continuously from the start of the checklist commenced before engine start until the completion of the final checklist at the termination of flight; and

(2) If the aeroplane is equipped to record the uninterrupted audio signals received from a boom or a mask microphone, boom microphones are used below 10,000 feet altitude; and

(3) If an erasure feature is used in the cockpit -voice recorder, only information recorded more than 30 minutes earlier than the last record is erased or otherwise obliterated.

Operators must ensure that the above three requirements are met; this may include changes to checklists to include operation of the CVR Self-Test feature prior to engine start. Refer to the manufacturer's manuals for procedures for operation of the Self-Test feature.

Designers should consider the use of a Flight Manual Supplement to assist operators meet the above requirements.

6. Maintenance Requirements

The requirements below must be incorporated in the approved maintenance programme required by Part 119.61 Items (a), (b), (c) and (d) shall be performed at intervals not exceeding 2000 flight hours or 12 months, whichever occurs first. In additional, the ULD battery shall be replaced at intervals specified by the manufacturer.

(a) Confirm the CVR is recording on each voice channel by carrying out a complete audio system check in accordance with the manufacturer’s instructions.

(b) Confirm the proper functioning of the bulk Erase function. Ensure the Erase function cannot be operated in flight and any Erase inhibit switch functions correctly.

(c) Check the operation of the crash sensor switches.

(d) Carryout functional testing and cleaning of the ULD in accordance with the manufacturer's instructions.

APPENDIX 1 Cockpit Voice Recorder – Flight Test First of Type or First of Model

1. General

1.1 First of type or First of Model CVR Systems are to be flight tested and the recording, so obtained is to be analysed. The test and analysis must demonstrate adequate recording quality during all normal regimes of flight including taxying, take-off, cruise, approach and landing. For Helicopters, hover and auto- rotation should be included.

1.2 Since the duration of the recording is limited to 30 minutes, the CVR circuit breaker should be tripped between each test phase and at the end of the landing run.

1.3 If time permits, systems which generate sounds on the flight deck and which not otherwise be used during the test flight. Should be operated with appropriate announcements.

1.4 This appendix provides guidance for flight testing both aeroplanes and helicopters. It may need to be adapted to suit the particular installation being tested.

1.5 The replay and analysis must be performed by a test facility acceptable to CASA. The test facility must ensure the privacy of the recordings.

1.6 Recordings offered for analysis may be released to the operator's Part 119 organisation, CASA, the PNG Accident Investigation Commission and, if appropriate, other Airworthiness Authorities. The agreement of the flight crew concerned is assumed unless instructions, in writing, are given by the flight crew stating any restrictions to be applied.

2. Procedure

IMPORTANT To enable proper analysis of the recording, it is essential that adequate commentary on the flight is provided, e.g. crew actions altitudes and speed. Each test should be clearly announced and the crew member identified, e.g. "Co-pilot" testing oxygen mask microphone with interphone off".

2.1 Prior to Engine Start

2.1.1 Check that the CVR is operating.

2.1.2 Press the ERASE button. (This may require operation of any inhibit function)

2.1.3 Press the CVR TEST button.

2.1.4 Select BOON microphone and interphone 'ON' at all positions.

2.1.5 Announce aircraft type, registration, date, time and crew complement.

2.2 Engine Start

2.2.1 (Helicopters only) during rotor spin-up, call out RPM at 50%, 80% and 100%.

2.2.2 Make a test announcement from each crew member position in turn using the boom microphones with interphone selected 'ON' followed by a second announcement with the interphone ' OFF' (to evaluate the " hot" microphone) :

(i) LEFT HAND SEAT POSITION

— INTERPHONE ON
"This is the Captain's Position with boom microphone interphone on"

— INTERPHONE OFF
"This is the Captain's Position with boom microphone interphone off "

(ii) RIGHT HAND SEAT POSITION

— INTERPHONE ON
"This is the First Officer's Position with boom microphone interphone on"

— INTERPHONE OFF
"This is the First Officer's Position with boom microphone interphone on"

(iii) ENGINEER/THIRD CREWPOSITION

— INTERPHONE ON
"This is the Engineer's Position/ third crew Position with boom microphone interphone on"

— INTERPHONE OFF
"This is the Engineer's Position/ third crew Position with boom microphone interphone off"

2.2.3 Repeat 2.2.2 using the oxygen mask microphone.

2.2.4 (Aeroplanes only) Announce and test the stall warning stick shaker.

2.2.5 (Helicopters only) Close the flight deck windows.

2.3 Take off

2.3.1 With headsets worn and *boom* microphones *available for use,* record *a normal* take -off and initial climb.

2.3.2 Announce landing gear and flap selections and other actions.

2.4 Cruise

2.4.1 With interphone OFF, announce and activate aural warnings and voice activated warning system (if fitted)

2.4.2 (Aeroplanes only) Accelerate to, and announce VMO. Continue until the overspeed warning sounds. Reduce speed as required.

2.4.3 Perform a test transmission from each pilot's station using VHF and boom microphones

2.4.4 Perform a test transmission from each pilot's station using VHF, a hand-held microphone and the flight deck loudspeakers (for response from ground station).

2.4.5 Perform a test transmission from each pilot's station using HF and boom microphones

2.4.6 Perform a test transmission using the Marine and/or UHF radio (if fitted).

2.4.7 Perform test broadcasts from the flight deck and the cabin using the passenger address system (if fitted)

2.4.8 (Helicopters only) Call out rotor RPM.

2.4.9 Announce and open the flight deck cabin door. Announce and close the door after 30 seconds

2.4.10 Where permitted by the Flight Manual and in cruise, announce and open the flight deck windows. Announce and close the windows after 30 seconds.

2.4.11 Select and *identify navigation aids on each navigation set (this* may be carried out at any stage of the flight).

2.5 Helicopter Auto–Rotation and Hover

2.5.1 At a safe altitude, perform an auto-rotation descent with power recovery.

2.5.2 Announce and hover for approximately one minute.

2.6 Landing

2.6.1 Record final approach and landing including ILS and Marker audio identification. Announce landing gear and flap selection and other actions.

2.6.2 At end of landing run call out the time. (Note 30 minutes tape limitations).

2.6.3 Select BOOM microphone and interphone 'ON 'at all positions and announce "End of Test ".

2.6.4 DONOTERASE.

2.6.5 PULL CVR CIRCUIT BREAKER.

3. Replay and Analysis

3.1 The CVR or a downloaded recording of the test should be sent to a test facility Acceptable to CASA. A copy of the test schedule used during the flight should accompany the tape recording. In all cases, the manufacturer and model of the CVR and the position of the area microphone in the particular aircraft should be stated in the documentation supplied with the CVR or downloaded recording

3.2 The test facility should establish that recordings of adequate quality have been made on all channels for the test conditions stated in 2. In addition **to** subjective listening tests, proper signal recording level should be confirmed.

3.3 The test facility should furnish a report to the operator together with a copy to CASA. The report should identify the aircraft and test flight concerned and should confirm that all input channels were identified for the various test conditions. Details of any other observations made from the recording should be included. For helicopters, correlation between rotor speed announcements by the crew and recorded rotor speed data should be established and recorded.

4. Disposal of Recording

4.1 The original recording need not be copied unless specific instructions have been given by the operator.

4.2 For the first of type or first of model, the original recording should be forwarded to the Accidents Investigation Commission Port Moresby for retention for use as a reference tape for the aircraft type or with the prior concurrence of AIC, the Director, CASA PNG.

4.3 In all other cases, the tape should be returned to the operator.