

PROPOSAL TO AMEND CAR SECTION 2 SERIES I PART VI – COCKPIT VOICE RECORDERS & COCKPIT AUDIO RECORDING SYSTEM

CAR Section 2 Series 'I', Part – VI is proposed to be amended to incorporate recent amendment in ICAO Annexes. The proposed amendment is arranged to show deleted text, new or amended text as shown below:

- (a) Deleted text is marked with strikethrough;
- (b) New or amended text is highlighted in grey;

SUBJECT: COCKPIT VOICE RECORDERS & COCKPIT AUDIO RECORDING SYSTEM

1. PURPOSE:

Rule 57 of the Aircraft Rules, 1937 requires that every aircraft shall be fitted and equipped with instruments and equipment, including radio apparatus and special equipment as may be specified according to the use and circumstances under which the flight is to be conducted.

This part of Civil Aviation Requirement lays down the requirements for fitment of Cockpit Voice Recorder (CVR) & Cockpit Audio Recording System (CARS) on aircraft registered in India and aircraft leased and imported into the country.

This CAR has been issued under the provision of Rule 29C of the Aircraft Rules, 1937.

2. DEFINITION:

Cockpit Voice Recorder (CVR): It is a flight recorder installed in the aircraft for the purpose of recording the aural environment on the flight deck during flight time for the purpose of accident/ incident prevention and investigation.

Cockpit Audio Recording System (CARS): It is a lightweight flight recording system installed in the aircraft for the purpose of recording the voice communication transmitted from or received in the aeroplane by radio and also the aural environment on the flight deck during flight time for the purpose of accident/ incident prevention and investigation.

3. AEROPLANES – COMMERCIAL AIR TRANSPORT

3.1 Operations Applicability:

- 3.1.1 All turbine-engined aeroplanes of a maximum certificated take-off mass of over 2250 kg, upto and including 5700 kg for which the application for type certification is submitted to DGCA on or after 1 January, 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.
- 3.1.2 All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700 kg or less for which the individual certificate of airworthiness is first issued

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

~~3.1.3 All aeroplanes of a maximum certificated take-off mass of over 5700kg 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.~~

3.1.43 All aeroplanes of a maximum certificated take-off mass of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

3.1.54 All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 5700kg 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.

3.1.65 Deleted

3.1.76 Deleted

3.2 Discontinuation-Recording Technology:

~~3.2.1 The use of magnetic tape and wire CVRs shall be discontinued from 1st January, 2016. CVRs and CARS shall not use magnetic tape or wire.~~

3.3. Duration:

~~3.3.1 All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.~~

3.3.21 From 1 January 2016, all All CVRs shall be capable of retaining retain the information recorded during at least the last two 2 hours of their operation.

~~3.3.3 All aeroplanes, for which the individual certificate of airworthiness is first issued on or after 1 January 1990, and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of their operation.~~

3.3.22 All aeroplanes of a maximum certificated take-off mass of over 27000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021 shall be equipped with a CVR capable of retaining which shall retain the information recorded during at least the last 25 hours of its operation.

3.4 Cockpit Voice Recorder Alternate Power

3.4.1 An alternate power source shall automatically engage and provide ten 10 minutes, plus or minus one minute, of operation whenever aeroplane power to the recorder ceases, either by normal shutdown or by any other loss of power. The alternate power source shall power the CVR and its associated

cockpit area microphone components. The CVR shall be located as close as practicable to the alternate power source.

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

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

3.4.2 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the application for type certification is submitted to DGCA on or after 1 January 2018 shall be provided with an alternate power source, as defined in 3.4.1 that powers the forward CVR in the case of combination recorders.

3.4.3 All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2018 should be provided with an alternate power source, as defined in 3.4.1 that powers at least one CVR.

4. AEROPLANES – GENERAL AVIATION

4.1 Operations Applicability:

4.1.1 All turbine-engined aero planes of a maximum certificated take-off mass of over 5700 kg for which the application for type certification is submitted to DGCA on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with a CVR.

4.1.2 All turbine-engined aeroplanes with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot should be equipped with a CVR or a CARS.

4.1.3 All aero planes of a maximum certificated take-off mass of over 5700kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987, shall be equipped with a CVR.

4.1.4 **Deleted**

4.1.5 **Deleted**

4.2 Discontinuation Recording Technology:

~~4.2.1 The use of magnetic tape and wire CVRs shall be discontinued, from 1st January, 2016. CVRs and CARS shall not use magnetic tape or wire.~~

4.3 Duration:

~~4.3.1 All CVRs shall be capable of retaining the information recorded during at least the last 30 minutes of their operation.~~

~~4.3.21 From 1 January 2016, all All CVRs/CARS shall be capable of retaining the information recorded during at least the last two 2 hours of their operation.~~

~~4.3.2 All aeroplanes, for which the individual certificate of airworthiness is first issued on or after 1 January 1990, and that are required to be equipped with a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of their operation.~~

5. HELICOPTERS - COMMERCIAL AIR TRANSPORT & GENERAL AVIATION

5.1 Operations Applicability:

5.1.1 All helicopters of a maximum certificated take-off mass of over 3175 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.

5.1.2 All helicopters of a maximum certificated take-off mass of over 7000kg shall be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed shall be recorded on the CVR.

5.1.3 Deleted

5.1.4 Deleted

5.2 Discontinuation Recording Technology:

~~5.2.1 The use of magnetic tape and wire CVRs shall be discontinued, from 1st January, 2016. CVRs and CARS shall not use magnetic tape or wire.~~

5.3 Duration:

~~5.3.1 A CVR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation.~~

~~5.3.21 From 1 January 2016, all All helicopters required to be equipped with a CVR, shall be equipped with a CVR capable of which shall retaining the information recorded during the last two 2 hours of its operation.~~

~~5.3.2 All helicopters, for which the individual certificate of airworthiness is first issued on or after 1 January 1990, and that are required to be equipped with~~

~~a CVR, should have a CVR capable of retaining the information recorded during at least the last two hours of their operation.~~

6. Data Link Recorders (DLR)

6.1 Operations **Applicability:**

6.1.1 All aeroplanes/helicopters 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 para 1.2 of Appendix- II and are required to carry a CVR, shall record on a **crash protected** flight recorder the data link communications messages.

6.1.2 All aeroplanes/helicopters which are modified on or after 1 January 2016 to install and utilize any of the data link communications applications listed in para 1.2 of Appendix- II and are required to carry a CVR shall record on a **crash protected** flight recorder the data link communications messages.

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

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

6.2 Duration

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

6.3 Correlation

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

7. GENERAL REQUIREMENTS

7.1 Construction and Installation

The CVR 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-1:- The detailed requirements regarding flight recorder (CVR/CARS) are given in Appendix-I.

7.2 Operation

7.2.1 CVRs/CARS shall not be switched off during flight time.

7.2.2 In order to preserve CVR/CARS records, CVR/CARS should **shall** be deactivated upon completion of flight time following an accident or incident.

The flight recorders shall not be reactivated before their disposition in accordance with instruction issued by DGCA.

7.2.3 Flight Recorder Records - An operator shall ensure, to the extent possible, in the event the aeroplane becomes involved in an accident or incident, the preservation of all related flight recorder records and, if necessary, the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with instruction issued by DGCA.

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

7.3 Continued Serviceability

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

Note - *Procedures for the inspection of the flight recorder systems are given in Appendix-I.*

7.4 Combination Recorders

7.4.1 All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the application for type certification is submitted to DGCA on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, should be equipped with two combination recorders (FDR/CVR).

7.4.2 All aeroplanes of a maximum certificated take-off mass of over 15000 kg for which the application for type certification is submitted to DGCA on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

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

Note:-*The requirement of 7.4 may be satisfied by equipping the aeroplanes with two combination recorders (one forward and one aft) or separate devices.*

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

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DRAFT

**COCKPIT VOICE RECORDERS (CVR) &
COCKPIT AUDIO RECORDING SYSTEM (CARS)**

1. GENERAL REQUIREMENTS

1.1 Cockpit voice recorder/Cockpit Audio Recording system (CARS) containers shall be painted a distinctive orange colour.

~~a) be painted a distinctive orange or yellow colour;~~

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

a) carry reflective material to facilitate their location; and

b) have securely attached an automatically activated underwater locating device. For aeroplanes used for commercial operation such device shall be operating at a frequency of 37.5 kHz. At the earliest practicable date but not later than 1 January 2018, this device shall operate for a minimum of 90 days.

Note. — ~~Current industry practice is to phase out yellow flight recorder containers at the end of the service life of the flight recorder.~~

1.3 Automatic deployable flight recorder containers shall:

a) be painted a distinctive orange colour, however the surface visible from outside the aircraft may be of another colour;

b) carry reflective material to facilitate their location; and

c) have an integrated automatically activated ELT.

1.4 The cockpit voice recorder systems shall be installed so that:

a) the probability of damage to the recordings is minimized;

~~b) 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;~~

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

~~d) if the flight recorder systems have a bulk erasure device, the same shall be deactivated., the installation shall be designed to prevent operation of the device during flight time or crash impact.; and~~

e) aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques.

The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimized.

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

1.5 The flight recorder systems shall be installed so that 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.

1.65 The cockpit voice recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

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

1.87 The manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recording recorder systems:

- a) manufacturer's operating instructions, equipment limitations and installation procedures;
- b) parameter origin or source and equations which relate counts to units of measurement; and
- c) manufacturer's test reports.

2. Cockpit Voice Recorder (CVR) & Cockpit Audio Recording System (CARS)

2.1 ~~Signals to be recorded~~ Start and Stop Logic

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

2.2 Signals to be recorded

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

- a) voice communication transmitted from or received in the aircraft aeroplane by radio;

- b) aural environment on the flight deck;
- c) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed;
- d) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and
- e) voice communication of flight crew members using the passenger address system, if installed

2.2.2 The preferred CVR audio allocation should be as follows:

- a) pilot-in-command audio panel;
- b) co-pilot audio panel;
- c) additional flight crew positions and time reference; and
- d) cockpit area microphone.

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

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

2.2.4 The preferred CARS audio allocation should be as follows:

- a) voice communication; and
- b) aural environment on the flight deck.

~~2.1.3 The CVR shall be capable of recording - on at least four channels simultaneously. On a tape-based CVR, to ensure accurate time correlation between channels, the CVR is to 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.~~

~~The preferred channel allocation shall be as follows:~~

~~Channel 1 — co-pilot headphones and live boom microphone~~

~~Channel 2 — pilot headphones and live boom microphone~~

~~Channel 3 — area microphone~~

~~Channel 4 (Aero plane) — time reference plus the third and fourth crew members' headphone and live microphone, if applicable.~~

~~Channel 4 (Helicopters) — time reference, main rotor speed or the flight Deck vibration environment, the third and fourth crew member's headphones and live microphones, if applicable.~~

~~**Note 1:** — Channel 1 is located closest to the base of the recording head.~~

~~**Note 2:** — The preferred channel allocation presumes 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.~~

3. Inspections of Flight Recorder Systems (CVR) / (CARS)

3.1 Prior to the first flight of the day, the built-in test features for the cockpit voice recorders/Cockpit Audio Recording System and Flight Data Acquisition Unit, when installed shall be monitored by manual and/or automatic checks.

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

3.3 Recording ~~system~~ inspections shall be carried out as follows:

- a) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
- b) the analysis of the CVR or CARS recording 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 aeroplane 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;
- c) The CVR or CARS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system

need not be checked if their serviceability can be detected by other aircraft systems;

- d) a) the read out of the recorded data from the cockpit voice recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;
- e) b) 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;
- f) c) an examination of the recorded signal on the CVR or the CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;
- g) d) where practicable, during the annual examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable;
- h) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

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

3.5 A report of the recording system inspection shall be made available on request to DGCA for monitoring purposes.

3.6 Calibration of the FDR system:

- a) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at 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
- b) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer, or at least every two years.

Data Link Recorder (DLR)

1. Applications to be recorded

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

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

1.2 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 asterisk (*) shall be recorded only as far as is practicable given the architecture of the system.

- ~~Data link initiation capability~~
- ~~Controller-pilot data link communications~~
- ~~Data link flight information services~~
- ~~Automatic dependent surveillance contract~~
- ~~Automatic dependent surveillance broadcast*~~
- ~~Aeronautical operational control*.~~

Note: ~~Descriptions of the applications are contained in Table-1 of this Appendix.~~

Table – 1

DESCRIPTION OF APPLICATIONS FOR DATA LINK RECORDERS

(Supplementary to Para 6.1.1 & 6.1.2)

Item No.	Application type	Application description	Recoding 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 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, DATIS, 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 helicopter are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6.	Aeronautical Operational Control Data	This includes any application transmitting or receiving data used for AOC purposes (per the ICAO definition of AOC).	M*

Key:

C: Complete contents recorded.

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

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