European Union Aviation Safety Agency

Explanatory Note to Decision 2019/013/R

The installation of flight recorders on large aeroplanes and large rotorcraft, and the regular update of CS-25, 'CS-25 Amendment 23' and 'CS-29 Amendment 7'

RELATED NPA/CRD 2018-03 AND 2018-05 — RMT.0249 AND RMT.0673

EXECUTIVE SUMMARY

The objectives of this Decision are to:

(a) enhance and modernise the certification specifications and acceptable means of compliance for the installation of flight recorders on board large aeroplanes and large rotorcraft (CS-25 and CS-29), and

(b) amend the certification specifications and acceptable means of compliance for large aeroplanes following the selection of non-complex, non-controversial and mature subjects (the regular update of CS-25).

These amendments are expected to increase safety, increase cost-effectiveness and improve harmonisation with the Federal Aviation Administration (FAA) regulations.

Action area:	Aircraft tracking, rescue operations and accident investigation, regular updates		
Affected rules:	CS-25, CS-29		
Affected stakeholders:	Type certificate (TC) holders and applicants for TC / supplemental type certificate (STC) of large aeroplanes and large rotorcraft, operators, flight crews, NAAs		
Driver:	Safety, efficiency/proportionality	**Rulemaking group:**	No
Impact assessment:	Light (RMT.0249) None (RMT.0673)	**Rulemaking Procedure:**	Standard

RMT.0249: 18.1.2014	**27.3.2018**	**15.7.2019**
RMT.0673: Regular update	**18.6.2018**	

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1. About this Decision

The European Union Aviation Safety Agency (EASA) developed ED Decision 2019/013/R in line with Regulation (EU) 2018/1139[1] and the Rulemaking Procedure[2].

This rulemaking activity is included in the European Plan for Aviation Safety (EPAS)[3] under Rulemaking Tasks (RMTs).0249 and .0673. The scope and timescales of the tasks were defined in the related Terms of Reference[4].

The draft text of this Decision has been developed by EASA. All the interested parties were consulted through Notices of Proposed Amendment (NPAs) 2018-03 and 2018-05[5]. 61 comments were received on NPA 2018-03, and 30 comments were received on NPA 2018-05 from all the interested parties, including industry, national aviation authorities, Eurocontrol, and several unions.

EASA reviewed the comments that were received during the public consultation. The comments that were received and EASA's responses to them are presented in Comment-Response Documents (CRDs) 2018-03 and 2018-05[6].

The final text of this Decision, along with the certification specifications and acceptable means of compliance, has been developed by EASA.

The major milestones of this rulemaking activity are presented on the title page.

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1 Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1535612134845&uri=CELEX:32018R1139).

2 EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure).

3 https://www.easa.europa.eu/document-library/general-publications?publication_type%5B%5D=2467

4 https://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions

5 In accordance with Article 115 of Regulation (EU) 2018/1139 and Articles 6(3) and 7 of the Rulemaking Procedure.

6 https://www.easa.europa.eu/document-library/comment-response-documents

2. In summary — why and what

2.1. Why we need to change CS-25 and CS-29

(a) The installation of flight recorders

The following issues have been identified:

(1) Cockpit voice recorder (CVR) power supply: it was found during the investigations of accidents that the CVRs had been depowered prematurely while they could have kept recording useful information if an alternate power source had been installed. It also appeared during some of the investigations that some installations had both the flight data recorder (FDR) and the CVR powered by the same electrical bus, so that a failure of this bus had disabled both the flight recorders while the aircraft was still flying and controllable. Safety recommendations have been addressed to EASA and the FAA on these issues.

(2) Automatic stopping of the recording after an accident: several safety investigation bodies have reported reliability issues with negative acceleration sensors, i.e. so-called g-switches, which are used to stop the flight recorders after a crash impact. In several occurrences involving high levels of airframe vibrations, some g-switches were triggered prematurely during the occurrences, and, therefore, the recording of voices or data was stopped before the end of the flight. Safety recommendations have been addressed to EASA and the FAA on these issues.

(3) Combination recorders: the certification specifications and acceptable means of compliance related to combination recorders and the means of compliance with the operational requirements for them are not consistent or not complete. EASA has addressed the certification of combination recorders through specific certification review items (CRIs).

(4) Deployable recorders: the use of a deployable recorder has been identified as one possible way to comply with point CAT.GEN.MPA.210 of Regulation (EU) No 965/2012[7], which requires some categories of large aeroplanes that will be first issued with individual Certificates of Airworthiness (CofAs) on or after 1 January 2021 to be equipped with 'robust and automatic means to accurately determine, following an accident where the aeroplane is severely damaged, the location of the point of end of flight'. However, the current provisions in CS 25.1457 (CVR) and CS 25.1459 (FDR) are not adequate for deployable flight recorders.

(5) Performance specifications for flight recorders: the AMC to CS 25.1457, CS-25.1459, CS-29.1457 and CS-29.1459 need to be amended to update or add a reference to the industry standard regarding the performance of the installed system.

[7] Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1557921887778&uri=CELEX:32012R0965).

(b) Regular update of CS-25

The following issues have been identified:

Item 1: Full and unrestricted movement of cockpit controls

While some of the large aeroplane manufacturers and airworthiness authorities (including EASA) already interpret CS 25.777(c), or the equivalent FAA FAR 25.777(c), as requiring that flight crew members of different statures should be able to adequately and simultaneously command full differential brakes and full rudder in the same direction, this interpretation is not universal. Conversely, a certification demonstration of such cockpit controls capability is not necessarily performed by all large aeroplane manufacturers.

EASA has therefore identified the need to clarify the intent of CS 25.777(c).

Item 2: Flap and slat interconnection

AMC 25.701(d) entitled 'Flap and slat interconnection' refers to FAA Advisory Circular (AC) 25-14 'High Lift and Drag Devices' as an acceptable means of compliance with CS 25.701(d).

FAA AC 25-14 was cancelled by the FAA on 14 March 2000, and its full content has been incorporated into FAA AC 25-22 'Certification of Transport Airplane Mechanical Systems'.

Item 3: Ventilation

CS 25.831(a) is not harmonised with the equivalent FAA FAR 25.831(a), as it provides fresh air requirements for crew members only, and it does not address operations with the air conditioning system off, so it triggers the need for applicants to propose equivalent safety findings (ESFs).

Item 4: The quantity of available oxygen

CS 25.1441(c) requires a means to allow the crew to readily determine, during flight, the quantity of oxygen that is available in each source of supply. If an applicant installs an oxygen chemical generator or a small sealed, one-time use, gaseous oxygen bottle, it is not possible to directly comply with CS 25.1441(c) for these sources. Consequently, applicants systematically apply for ESFs.

Item 5: Ashtrays in the lavatories

Regardless of whether smoking is allowed, CS 25.853(g) requires ashtrays to be located conspicuously both inside and outside each lavatory. FAA FAR 25.853(g) does not require an ashtray to be installed inside each lavatory. This lack of harmonisation has existed since the first issue of CS-25, when EASA decided to keep the same rule as in JAR-25.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of Regulation (EU) 2018/1139. This Decision will contribute to the achievement of the overall objectives by addressing the issues outlined in Section 2.1.

The specific objectives of this Decision are therefore to:

(a) increase the robustness of flight recorders to the loss of their power supplies;

(b) prevent the premature termination of recording due to the untimely triggering of a negative acceleration sensor;

(c) adapt the certification specifications and acceptable means of compliance for combination recorders;

(d) define the certification specifications for deployable recorders; and

(e) reflect the state of the art of large aeroplane certification and improve the harmonisation of CS-25 with the Federal Aviation Administration (FAA) regulations.

2.3. How we want to achieve it — overview of the amendments

(a) The installation of flight recorders

(1) CVR power supply: CS 25.1457(d), CS 25.1459(a), CS 29.1457(d) and CS 29.1459(a), and the related AMC, have been amended to ensure that a CVR continues to record after the interruption of the normal electrical power source, and to prevent the failure of a single power supply from disabling both the FDR and the CVR.

(2) Automatic stopping of the recording after an accident: AMC 25.1457, AMC 25.1459, AMC 29.1457 and AMC 29.1459 have been amended to ensure that a negative acceleration sensor (g-switch) is not used as the sole means to detect a crash impact and to automatically stop a flight recorder after the detection of such a crash impact. In addition, conditions have been introduced to address the use of the recorder start-and-stop logic to provide a means to automatically stop the CVR after a crash impact.

(3) Combination recorders: CS 25.1457 (e), CS 25.1459 (b), CS 29.1457 (e), CS 29.1459 (b), and the related AMC, have been amended to accommodate the installation of flight data and cockpit voice combination recorders, in line with the requirements set forth in Regulation (EU) No 965/2012 on air operations.

(4) Deployable recorders: CS 25.1457 (d), (e) and (g), CS 25.1459 (a), (b) and (d), and the related AMC, have been amended to introduce provisions for the installation of a deployable recorder, which is one possible means to comply with point CAT.GEN.MPA.210 ('Location of an aircraft in distress – Aeroplanes') of Regulation (EU) No 965/2012 on air operations.

(5) Performance specifications for CVR and FDR: EUROCAE document ED-112A has been introduced as a reference industry standard in AMC 25.1457, AMC 25.1459, AMC 29.1457, and AMC 29.1459.

(b) Regular update of CS-25

Item 1: Full and unrestricted movement of cockpit controls:

AMC 25.777(c) is created to clarify the intent of CS 25.777(c).

Item 2: Flap and slat interconnection:

AMC 25.701(d) is amended to add the correct reference to the FAA Advisory Circular AC 25-14.

Item 3: Ventilation

CS 25.831(a) is amended in harmonisation with FAA FAR 25.831(a), and AMC 25.831(a) is amended to add acceptable means of compliance for operations without air conditioning (based on the content of previously accepted ESF).

Item 4: The quantity of available oxygen

CS 25.1441(c) is amended to introduce an exception applicable to oxygen chemical generators or small sealed, one-time use, gaseous oxygen bottles. AMC 25.1441(c) is created to address the design and the maintenance of these sources of oxygen supply to ensure that oxygen is actually available, reflecting on the content of a generic ESF.

Item 5: Ashtrays in the lavatories

CS 25.853(g) is amended in harmonisation with FAA FAR 25.853(g), by deleting the requirement to install ashtrays inside lavatories.

2.4. What are the stakeholders' views

(a) The installation of flight recorders: the comments received were overall supportive of the proposed amendments, and some of them made proposals to clarify some elements.

(b) Regular update of CS-25: the comments received were mostly supportive and were mainly aimed at clarifying or improving the proposed changes. Nevertheless, some comments raised in relation with the proposed CS 25.831 amendment (ventilation) were controversial and outside the scope of a 'Regular update' task as they proposed to mandate some new design requirements such as air monitoring systems, cabin/bleed air filters, specific new contaminants concentration limits, or bleed-free system architecture; these comments have not been accepted.

2.5. What are the benefits and drawbacks

(a) The installation of flight recorders

The following benefits are expected:

(1) an increase in the level of safety, while addressing some safety recommendations;

(2) cost savings for search and rescue activities;

(3) cost savings for certification activities; and

(4) greater harmonisation with the FAA regulations.

No drawbacks have been identified.

(b) Regular update of CS-25

The amendments reflect the state of the art of large aeroplane certification and improve the harmonisation of CS-25 with the FAA regulations. Overall, this will provide a moderate safety benefit, and will provide some economic benefits by streamlining the certification process.

No drawbacks have been identified.

3. How do we monitor and evaluate the rules

No specific monitoring action is recommended. Feedback information from certification projects, as well as lessons learned from accident or incident safety investigations in the next few years, will be used by EASA to assess the benefits that are introduced by these amendments of CS-25 and CS-29, and the possible need for improvements or adaptations.

4. References

4.1. Related regulations

— N/A

4.2. Affected decisions

— Decision No. 2003/2/RM of the Executive Director of the Agency of 17 October 2003 on certification specifications, including airworthiness codes and acceptable means of compliance, for large aeroplanes (« CS-25 »)

— Decision No. 2003/16/RM of the Executive Director of the Agency of 14 November 2003 on certification specifications for large rotorcraft (« CS-29 »)

4.3. Other reference documents

— N/A

5. Appendices

— Appendix 1 to ED Decision 2019/013/R | CRD to NPA 2018-03

— Appendix 2 to ED Decision 2019/013/R | CRD to NPA 2018-05