



Explanatory Note to Decision 2015/021/R

Amendment of AMC/GM for flight recorders

RELATED NPA/CRD 2013-26 — OPINION No 01/2014 — RMT.0400 (OPS.090(A)) & RMT.0401 (OPS.090(B))
12.10.2015

EXECUTIVE SUMMARY

The objective of this Decision is to address four issues in the AMC/GM to the European Air Operations rules (Annexes to Regulation (EU) No 965/2012) which create an unnecessary burden on industry and need to be amended as soon as possible. Firstly, this Decision addresses an urgent need to update the Acceptable Means of Compliance (AMC) on flight recorder serviceability. The adoption of the Regulation based on Opinion No 01/2014 takes more time than expected while changes in the AMC/GM on flight recorder serviceability, presented in Comment-Response Document (CRD) 2013-26, still need to be adopted. Since the Regulation to be adopted will not change the Implementing Rule on flight recorder serviceability, the associated AMC/GM can be amended regardless of the adoption of the Regulation.

Secondly, this Decision addresses a regulatory-coordination issue related to the flight parameter named 'Primary flight control surface and primary flight control pilot input'. According to ICAO Annex 6 Part I, under certain conditions, both primary flight control surface and primary flight control pilot input do not need to be recorded, but this is not reflected in the AMC.

Furthermore, this Decision addresses a regulatory-coordination issue related to the flight parameter named 'All flight control input forces' to be recorded by a flight data recorder for aeroplanes manufactured as of 1 January 2016. This flight parameter must be recorded with no exception for aeroplanes manufactured as of 1 January 2016 while, according to ICAO Annex 6 Part I and Part II, recording is only required under certain conditions. This non-alignment creates an issue for certain aircraft manufacturers.

Finally, this Decision clarifies the operational performance requirements applicable to the cockpit voice recorder (CVR) and to CVR-dedicated equipment (microphones, preamplifiers, etc.) installed on aeroplanes manufactured as of 1 January 2016. The CVR should comply with recent industry standards, however, older industry standards are still valid for the CVR-dedicated equipment. This needs to be clarified.

This Decision, therefore, proposes:

- to introduce the AMC/GM included in CRD 2013-26;
- to align the recording conditions of the flight parameters 'Primary flight control surface and primary flight control pilot input' and 'All flight control input forces' with the provisions of ICAO Annex 6 Part I and Part II; and
- to clarify in the AMC related to CVR performance which are the standards applicable to the CVR itself and which are the standards applicable to its dedicated equipment.

Applicability		Process map	
Affected regulations and decisions:	ED Decision 2014/015/R (AMC/GM to Part-CAT); ED Decision 2013/021/R (AMC/GM to Part-NCC); ED Decision 2014/018/R (AMC/GM to Part-SPO).	Concept Paper:	No
		Rulemaking group:	No
		Terms of Reference:	26.9.2012
		RIA type:	Full
		Technical consultation during NPA drafting:	No
Affected stakeholders:	Aircraft operators; flight crew members; aircraft pilots.	Publication date of the NPA:	20.12.2013
		Duration of NPA consultation:	3 months
Driver/origin:	Safety / Regulatory coordination and reduce regulatory burden	Review group:	No
		Focused consultation:	No
Reference:	ICAO Annex 6 Part I, Part II, and Part III.	Publication date of the Opinion (RMT.0400 (OPS.090(a)):	6.5.2014



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1. Procedural information

1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed ED Decision 2015/021/R in line with Regulation (EC) No 216/2008¹ (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure².

This rulemaking activity addresses three issues identified in the AMC/GM to the European Air Operations rules (Annexes to Regulation (EU) No 965/2012), creating an unjustified burden on industry, and is included in the Agency's [4-year Rulemaking Programme](#) under RMT.0400 (OPS.090(A)) & RMT.0401 (OPS.090(B)). The scope and timescale of the task were defined in the related [Terms of Reference](#) (see process map on the title page).

The draft text of this Decision with the Acceptable Means of Compliance (AMC)/Guidance Material (GM) has been developed by the Agency. On the issue of flight recorder serviceability, all interested parties were consulted through NPA 2013-26³ and 8 comments were received from interested parties, including industry, National Aviation Authorities (NAAs), safety investigation authorities.

The Agency has reviewed the comments received on the NPA. These comments and the Agency's responses thereto are presented in Comment-Response Document (CRD) 2013-26⁴.

The other two issues addressed by this Decision (misplaced Flight Data Recorder (FDR) parameter, and performance specifications applicable to the cockpit voice recorder (CVR)-dedicated equipment) were raised by industry because they are creating an unnecessary burden. In addition, the solutions proposed to address these two issues are considered not having an impact on the availability of flight recorder data for safety investigations. Therefore, no consultation was organised on these issues.

The final text of this Decision with AMC/GM has been developed by the Agency.

The process map on the title page summarises the major milestones of this rulemaking activity.

1.2. Structure of the related documents

Chapter 1 contains the procedural information related to this task. Chapter 2 explains the core technical content. The text of the AMC/GM is annexed to the ED Decision.

¹ Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1)

² The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision EASA MB Decision 01-2012 of 13 March 2012 concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material (Rulemaking Procedure).

³ In accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure.

⁴ <http://easa.europa.eu/document-library/comment-response-documents/crd-2013-26>



2. Explanatory Note

2.1. Overview of the issues to be addressed

Four issues are addressed in this Decision:

- (a) The adoption of the Regulation based on Opinion No 01/2014 takes more time than expected, while there is an urgent need to adopt changes in the AMC and GM on flight recorder serviceability that were presented in CRD 2013-26 (AMC and GM to sub-paragraph (b) of CAT.GEN.MPA.195, sub-paragraph (b) of NCC.GEN.145 and sub-paragraph (b) of SPO.GEN.145).
 - (1) Sub-paragraph (b) of CAT.GEN.MPA.195 contains the following requirement:

‘(b) The operator shall conduct operational checks and evaluations of flight data recorder (FDR) recordings, cockpit voice recorder (CVR) recordings and data link recordings to ensure the continued serviceability of the recorders.’
 - (2) Some conditions in AMC1 CAT.GEN.MPA.195(b) are too stringent, especially when considering modern technologies. For instance, the inspection of the flight recorder recording is recommended to be performed every year even if the flight recorder is solid-state and fitted with a built-in test feature. This results in unnecessary and costly serviceability tasks for all solid-state flight recorders — that is more than 75 % of the flight recorders installed on aircraft of European aircraft operators according to NPA 2013-26).
 - (3) Since the first anniversary of the entry into force of Part-CAT will be on 28 October 2015, these conditions should be relaxed without delay for solid-state flight recorders to avoid unnecessary recording inspections.
 - (4) In addition, further to operators’ feedback, the wording of some conditions in AMC/GM to sub-paragraph (b) of CAT.GEN.MPA.195 should be clarified.
 - (5) The same issue affects AMC/GM to sub-paragraph (b) of NCC.GEN.145 and sub-paragraph (b) of SPO.GEN.145.
 - (6) The changes proposed in CRD 2013-26 would solve this issue.
- (b) ICAO Annex 6 Part I, specifies with regard to the flight parameter ‘Pilot input and/or control surface position-primary controls’ of Table A8-1 (Parameter No 18) of Appendix 8 that: ‘For aeroplanes with control systems in which movement of a control surface will back drive the pilot’s control, “or” applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot’s control, “and” applies’ (see Note No 5 to Table A8-1). With respect to Parameter No 18, AMC1 CAT.IDE.A.190 appears to be more stringent than ICAO Annex 6 Part I as in AMC1 CAT.IDE.A.190 the parameter is described as a ‘Primary flight control surface and primary flight control pilot input’, and Note No 5 of Table A8-1 is not reflected in said AMC. Similarly, ICAO Annex 6 Part II specifies with regard to Parameter No 18 that ‘For aeroplanes with control systems in which movement of a control surface will back drive the pilot’s control, “or” applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot’s control, “and” applies’ (see Note No 5 to Table A2.3-1). However, this is not reflected in AMC1 NCC.IDE.A.165.



- (c) The flight parameter ‘All flight control input forces’ is recommended to be recorded by the FDR for aeroplanes first issued with an individual CofA on or after 1 January 2016 (see AMC1 CAT.IDE.A.190, AMC1 NCC.IDE.A.165, AMC1 SPO.IDE.A.145). However, in ICAO Annex 6 Parts I and II, this flight parameter is considered for recording only ‘if an information data source for the parameter is used by the aeroplane systems or the flight crew to operate the aeroplane’. Hence, AMCs to European Air Operations rules appear to be unjustifiably more stringent than ICAO Annex 6 as regards this flight parameter. When this flight parameter is not already measured and used by other aircraft systems, recording it entails significant redesign costs. In addition, on smaller aeroplanes (below 10 000 kg), it may be difficult to find enough space to install the sensors. This is known to be an issue for at least one aircraft manufacturer.
- (d) Finally, this Decision clarifies which operational performance requirements are applicable to the CVR and to its dedicated equipment:
- (1) The European Organisation for Civil Aviation Equipment (EUROCAE) Document 56A (ED-56A), an older industry standard defining minimum operational performance specifications for this equipment, has been referred to in Section 2 of JAR OPS 1⁵, ACJ OPS 1.700 and JAR OPS 3⁶, ACJ OPS 3.700, and it has remained an applicable standard for older types (for example, see AMC1 CAT.IDE.A.185).
 - (2) This industry standard is not anymore adequate for new models of CVR, therefore, the new CS-ETSO C123b and the AMC, applicable to aircraft manufactured as of 1 January 2016, to the European Air Operations rules refer to a more recent industry standard (namely EUROCAE ED-112).
 - (3) However, ED-56A is still considered valid with respect to the equipment dedicated to the CVR. The issues identified relating to the CVR recording quality were not linked⁷ with the standard applicable to CVR-dedicated equipment.
 - (4) CVR-dedicated equipment includes but is not limited to:
 - (i) cockpit equipment, such as a monitor and failure indication, one or more cockpit area microphones (CAMs) and associated preamplifiers;
 - (ii) means of converting the analogue audio signals to a digital format;
 - (iii) audio interface equipment, including microphone/telephone signal summing amplifiers;

⁵ Joint Aviation Requirements, JAR-OPS 1, Commercial Air Transportation (Aeroplanes), Amendment 2.

⁶ Joint Aviation Requirements, JAR-OPS 3, Commercial Air Transportation (Helicopters), Amendment 5.

⁷ Most findings related to CVR audio quality were related to one of the following causes:

(a) Unreliability of the recording technology used in the CVR itself. This is already addressed by the draft Regulation based on Opinion No 01/2014, which require that by 1 January 2019, the CVR shall not record on magnetic tape or magnetic wire.

(b) Issues with the installation design of the CVR equipment leading to insufficient installed performance. This aspect is addressed by the EASA Certification Memorandum CM-AS-001. In addition, EASA rulemaking task RMT.0249 includes a review of paragraph 1457 of the Certification Specifications (CSs) applicable to aeroplanes (CS-23, CS-25) and helicopters (CS-27, CS-29) in order to cover this aspect.

(c) Checks by the aircraft operator not performed at a frequency and to a depth sufficient to ensure that the CVR recording quality will not degrade for long periods of time.



- (iv) a means of converting a time synchronisation signal to a format which can be recorded; and
 - (v) digital data buses and/or networks providing communications between elements of the CVR system.
- (5) The application of more recent industry standards to the CVR-dedicated equipment generates costs for aircraft manufacturers without clear benefits for the CVR audio quality or reliability.

2.2. Objectives

The overall objectives of the EASA system are defined in Article 2 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Chapter 2. The specific objective of this proposal is, therefore, to:

- accelerate the adoption of the AMC/GM on flight recorder serviceability included in CRD 2013-26;
- align the recording conditions defined for the flight Parameters Nos 18 and No 75 in the AMCs applicable to the FDR with those contained in ICAO Annex 6 Part I; and
- allow ED-56A to be applied to the CVR-dedicated equipment when installed on aircraft manufactured as of 1 January 2016.

2.3. Overview of the amendments

2.3.1 AMC/GM related to flight recorder serviceability

- (a) The AMC/GM related to flight recorder serviceability have been modified as proposed in CRD 2013-26:
- (1) AMC1 CAT.GEN.MPA.195(b), AMC1 NCC.GEN.145(b) and AMC1 SPO.GEN.145(b) have been modified;
 - (2) the related GM (GM1 CAT.GEN.MPA.195(b), GM1 NCC.GEN.145(b) and GM1 SPO.GEN.145(b)) have also been modified; and
 - (3) in addition, GM which contain explanations of the terms in use (GM2 CAT.GEN.MPA.195(b), GM2 NCC.GEN.145(b) and GM2 SPO.GEN.145(b)) have been created.
- (b) Compared with the text proposed in CRD 2013-26, two minor changes have been introduced:
- (1) The condition on the interval between two successive operational checks when no means is available in the cockpit for preflight checking of the flight recorders for proper operation has been reworded.
 - (i) The new paragraph (c) proposed in CRD 2013-26 to be included in AMC1 CAT.GEN.MPA.195(b), AMC1 NCC.GEN.145(b) and AMC1 SPO.GEN.145(b) reads:

‘(c) when installed, the aural or visual means for preflight checking the flight recorders for proper operation should be used every day. When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at time intervals not exceeding 7 days.’



- (ii) In the case where the aircraft would not be operated for a given period of time, this alternative operational check would still need to be performed every seven days, which would put an unnecessary burden on the aircraft operator. Therefore, the following amendment is proposed:
- ‘(c) when installed, the aural or visual means for preflight checking the flight recorders for proper operation should be used every day. When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at intervals not exceeding seven calendar days of operation.’
- (2) The description of the usual content of an inspection of the CVR recording in subparagraph (b) of GM1 CAT.GEN.MPA.195(b) has been changed. In particular, the condition ‘subject to prior approval by the flight crew’ has been removed.
- (i) This is because, in the draft Regulation based on Opinion No 01/2014, a distinction is proposed between the use of the CVR for ensuring its serviceability and its use for other purposes. Ensuring the continued serviceability of the CVR is of utmost importance and it should not depend on the good will of the flight crew. In addition, given the organisation and usual constraints of maintenance activities, it is impractical to obtain the flight crew’s consent each time a CVR recording needs to be inspected for serviceability.
- (ii) However, if the aircraft operator would like to use the CVR recording for other purposes than ensuring CVR serviceability (e.g. for investigating an incident), then different conditions apply. In particular, a procedure related to the handling of the CVR recording must be established and the prior consent of the flight crew members is required.
- (iii) Hence, the text of CAT.GEN.MPA.195(f) has been changed into the following in the draft Regulation:
- ‘(f) Without prejudice to Regulation (EU) No 996/2010 of the European Parliament and of the Council⁸:
- (1) Except for ensuring the CVR serviceability, CVR recordings shall not be disclosed or used unless:
- (i) a procedure related to the handling of CVR recordings and of their transcript is in place;
- (ii) all crew members and maintenance personnel concerned have given their prior consent; and
- (iii) they are used only for maintaining or improving safety.
- (1a) When a CVR recording is inspected for ensuring the CVR serviceability, the operator shall ensure the privacy of the CVR recording and the CVR recording shall not be disclosed or used for other purposes than ensuring the CVR serviceability.’

⁸ Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC (OJ L 295, 12.11.2010, p. 35).



- (iv) Therefore, for consistency with the text of CAT.GEN.MPA.195(f), the condition 'subject to prior approval by the flight crew' has been removed from sub-paragraph (b) of GM1 CAT.GEN.MPA.195(b).
- (v) The same correction has been made to sub-paragraph (b) of GM1 NCC.GEN.145(b) and to sub-paragraph (b) of GM1 SPO.GEN.145(b).

2.3.2 Recording of the flight parameter 'Primary flight control surface and primary flight control pilot input'

- (a) In Table 1 of AMC1 CAT.IDE.A.190, the flight Parameter No 18 has been renamed 'Primary flight control surface and/or primary flight control pilot input'.
- (b) In addition, the following sentence has been added to the definition of flight Parameter No 18: 'For aeroplanes with control systems in which movement of a control surface will back drive the pilot's control, 'or' applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot's control, 'and' applies'.
- (c) The same change has been made to AMC1 NCC.IDE.A.165 and AMC1 SPO.IDE.A.145. This aligns the recording condition of flight Parameter No 18 with the recording condition specified in ICAO Annex 6 (Part II, Appendix 2.3, Section 2.2 and Table A2.3-1).

2.3.3 Recording of the flight parameter 'All flight control input forces'

- (a) In AMC1 CAT.IDE.A.190, the flight Parameter No 75 'All flight control input forces' has been moved from Table 1 to Table 2.
- (b) As a consequence, flight Parameter No 75 is to be recorded onto the FDR only if 'the data source for the parameter is either used by aeroplane systems or is available on the instrument panel for use by the flight crew to operate the aeroplane'.
- (c) This aligns the recording condition of flight Parameter No 75 with the recording condition specified in ICAO Annex 6 (Part I, Appendix 8, Section 2.2 and Table A8-1).
- (d) The same change has been made to AMC1 NCC.IDE.A.165 and to AMC1 SPO.IDE.A.145. This aligns the recording condition of flight Parameter No 75 with the recording condition specified in ICAO Annex 6 (Part II, Appendix 2.3, Section 2.2 and Table A2.3-1).

2.3.4 Operational performance requirements applicable to the CVR-dedicated equipment

- (a) AMC1 CAT.IDE.A.185 has been amended to specify that for aeroplanes with an individual CofA first issued as of 1 January 2016, the operational performance requirements applicable to CVR-dedicated equipment should be those laid down in either ED-56A or ED-112 or any later equivalent standard produced by EUROCAE. The operational performance requirements applicable to the CVR itself should continue to be those laid down in ED-112 or any later equivalent standard produced by EUROCAE without any changes.
- (b) AMC1 CAT.IDE.H.185 has been amended to specify that for helicopters with an individual CofA first issued as of 1 January 2016, the operational performance requirements applicable to CVR-dedicated equipment should be those laid down in either ED-56A or ED-112 or any later equivalent standard produced by EUROCAE. The operational performance requirements applicable to the CVR itself should continue to be those laid down in ED-112 or any later equivalent standard produced by EUROCAE without any changes.



- (c) AMC1 NCC.IDE.A.160 and AMC1 NCC.IDE.H.160 have been amended to specify that the operational performance requirements applicable to CVR-dedicated equipment should be those laid down in either ED-56A or ED-112 or any later equivalent standard produced by EUROCAE.
- (d) AMC1 SPO.IDE.A.140 and AMC1 SPO.IDE.A.140 have been amended to specify that the operational performance requirements applicable to CVR-dedicated equipment should be those laid down in either ED-56A or ED-112 or any later equivalent standard produced by EUROCAE.



3. References

3.1. Related regulations

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).

3.2. Affected decisions

- Decision 2014/015/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-CAT of Regulation (EU) No 965/2012 and repealing Decision 2012/018/R of the Executive Director of the Agency of 24 October 2012 'AMC and GM to Part-CAT — Issue 2';
- Decision 2013/021/Directorate R of the Executive Director of the Agency of 23 August 2013 on adopting Acceptable Means of Compliance and Guidance Material for Non-commercial operations with complex motor-powered aircraft (Part-NCC); and
- Decision 2014/018/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-SPO of Regulation (EU) No 965/2012 'AMC and GM to Part-SPO'.

3.3. Reference documents

- EUROCAE ED-56A, 'Minimum Operational Performance Specifications for Cockpit Voice Recorder Systems', December 1993;
- EUROCAE ED-112, 'Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems', March 2003; and
- International Civil Aviation Organization (ICAO) Annex 6 to the Convention on International Civil Aviation 'Operation of Aircraft', Part I 'International Commercial Air Transport — Aeroplanes', Part II, 'International General Aviation — Aeroplanes' and Part III, 'International Operations — Helicopters', ninth Edition, July 2010.

