European Union Aviation Safety Agency

Explanatory Note to Decision 2018/015/R

CS-VLR Amendment 3, CS-27 Amendment 6 and CS-29 Amendment 6

RMT.0134 (27&29.029)

EXECUTIVE SUMMARY

The objective of this Decision is to provide cost-efficient rules in the field of rotorcraft certification and thereby at the same time maintain a high level of safety.

This Decision creates new or amends existing AMC to the certification specifications (CSs) for very light, small and large rotorcraft that deal with the following topics:

— External Loads

— Flight and navigation instruments

— Certification of rotorcraft avionics equipment

— Guidance for rotorcraft Night Vision Imaging System (NVIS) aircraft lighting systems

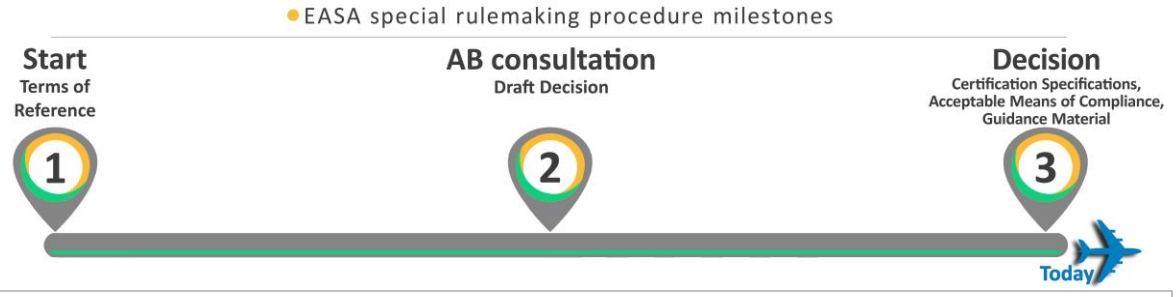
— Guidance on analysing an Advanced Flight Controls (AdFC) System

— Guidance on creating a system level Functional Hazard Assessment (FHA)

— Installation of Automatic Flight Guidance and Control Systems (AFGCS) in rotorcraft

The amendments are expected to improve harmonisation through greater alignment with the latest versions of the equivalent Federal Aviation Administration (FAA) Advisory Circulars (ACs) 27-1B and 29-2C. Where necessary, an EASA-specific AMC has been developed in order to align with EASA's interpretation of the CSs to which the AMC relates.

Action area:	Rotorcraft operations		
Affected rules:	CS-VLR, CS-27 and CS-29		
Affected stakeholders:	Rotorcraft manufacturers		
Driver:	Efficiency/proportionality	**Rulemaking group:**	No
Impact assessment:	None	**Rulemaking Procedure:**	Direct publication



Regular update of rotorcraft AMC	**26.6.2018**	**17.12.2018**

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Table of contents

1. About this Decision

The European Union Aviation Safety Agency (EASA) developed ED Decision 2018/015/R in line with Regulation (EC) No 216/2008[1] and the Rulemaking Procedure[2].

This rulemaking activity is included in the European Plan for Aviation Safety (EPAS)[3] under rulemaking task (RMT).0134 (27&29.029). The scope and timescales of the task were defined in the related Terms of Reference[4].

The draft text of this Decision has been developed by EASA and was consulted[5] with the Advisory Bodies (ABs) in accordance with Article 15 'Special rulemaking procedure: direct publication' of MB Decision No 18-2015. Due to the nature of the amendments, which are considered to have a negligible impact, and the fact that the matter has already been utilised by the FAA and other applicants, EASA elected to utilise the 'direct publication' procedure to introduce these amendments to CS-VLR, CS-27 and CS-29.

EASA reviewed the comments received during the AB consultation. The comments received and EASA's responses to them are summarised under 2.4 below.

The final text of this Decision with the CSs and the AMC has been developed by EASA having taken into account the input provided through the AB consultation.

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

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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) (http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1467719701894&uri=CELEX:32008R0216)

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/tor-rmt0134-2729029

5 From 26 June till 30 July 2018.

2. In summary — why and what

2.1. Why we need to change the CS/AMC/GM

There is a need to maintain and update the AMC to the CSs for rotorcraft on a regular basis to ensure that they reflect the latest technological developments and accepted certification practices. This ensures that the AMC remain relevant for the certification of modern rotorcraft.

The EASA rotorcraft CSs (CS-VLR, CS-27 and CS-29) are unique in the EASA regulatory framework in that the AMC contained in Book 2 of the CSs directly refer to the respective FAA ACs.

The direct reference to the FAA ACs has the advantage of providing a degree of harmonisation with the FAA, which considerably benefits the rotorcraft community. Prior to adopting any changes to the FAA ACs into the EASA CSs, EASA assesses any potential effects of the changes, and, where necessary, develops specific AMC that complement or replace the respective FAA AC.

Currently, FAA AC 27-1B has been adopted by EASA as Book 2 to CS-VLR and CS-27, and AC 29-2C has been adopted as Book 2 to CS-29. In the meantime, there have been a number of updates to the FAA ACs, which needed to be considered by EASA in order to maintain this alignment.

FAA AC 27-1B and AC 29-2C Changes 5, 6 and 7 introduced a number of significant changes to the FAA ACs. Below is a list of the main topics addressed within the changes to the ACs.

Change 5

AC Reference	Topic
27 MG 17	Guidance on analyzing an Advanced Flight Controls (AdFC) System
29 MG 17	Guidance on analyzing an Advanced Flight Controls (AdFC) System

Change 6

AC Reference	Topic
27 MG 23	Automatic Flight Guidance and Control Systems (AFGCS) installation in Part 27 rotorcraft.
29 MG 23	Automatic Flight Guidance and Control Systems (AFGCS) installation in Part 29 rotorcraft.

Change 7

AC Reference	Topic
AC 27.865B	External Loads
AC 29.865B	External Loads
AC 29.1303	Flight and navigation instruments
AC 29.1305	Powerplant instruments
AC 27.1321	Arrangement and Visibility
AC 29.1321	Arrangement and Visibility
AC 29.1322	Warning, Caution, and Advisory Lights
AC 27 MG 1	Certification procedure for rotorcraft avionics equipment
AC 29 MG 1	Certification procedure for rotorcraft avionics equipment
AC 27 MG 16	Certification guidance for rotorcraft Night Vision Imaging System (NVIS) aircraft lighting systems
AC 29 MG 16	Certification guidance for rotorcraft Night Vision Imaging System (NVIS) aircraft lighting systems
AC 27 MG 19	Guidance on Electronic Display Systems (EDS) for rotorcraft installations
AC 29 MG 19	Guidance on Electronic Display Systems (EDS) for rotorcraft installations
AC 27 MG 20.	Human Factors (HF)
AC 29 MG 20	Human Factors (HF)
AC 27 MG 21	Guidance on creating a system level Functional Hazard Assessment (FHA)
AC 29 MG 21	Guidance on creating a system level Functional Hazard Assessment (FHA)
AC 27 Appendix B	Airworthiness guidance for rotorcraft instrument flight
AC 29 Appendix B	Airworthiness guidance for rotorcraft instrument flight

FAA AC 27-1B and AC 29-2C Changes 5, 6 and 7 can be found on the FAA regulatory and guidance library website by following the links below:

AC 27-1B Change 5

https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_27-1B_thru_Chg_5.pdf

AC 27-1B Change 6

https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_27-1B_thru_Chg_6.pdf

AC 27-1B Change 7

https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_27-1B_with_changes_1-7.pdf

AC 29-2C Change 5

https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_29-2C_thru_Chg_5.pdf

AC 29-2C Change 6

https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_29-2C_thru_Chg_6_.pdf

AC 29-2C Change 7

https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_29-2C_Change_1-7.pdf

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[6]. This Decision will contribute to the achievement of the overall objectives by addressing the issues outlined in Section 2.1.

The specific objective of this Decision is to improve efficiency between the FAA and EASA by minimising the differences between the AMC to EASA CS-VLR, CS-27 and CS-29 and the FAA ACs. This will be achieved by reducing the gap between the AMC to EASA CS-VLR, CS-27 and CS-29 and the latest version of the published FAA ACs.

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

After a detailed review of the changes that were introduced in AC 27-1B and AC 29-2C Changes 5, 6 and 7, it was determined that some of the changes were at variance with EASA's interpretation or its regulatory system, and therefore EASA-specific AMC had to be developed. All other ACs are to be adopted as EASA AMC by reference.

AMC 27.45 'Performance General'

This AMC has been developed due to a comment that was received on AMC 27.865 that requested further clarification on the simulation of engine failures. The text of AMC 27.865 has been based upon the equivalent text contained in FAA AC 29-2C - AC 29.45. § 29.45 (Amendment 29-24).

AMC 27/29.865 'External Loads'

In CS-27 and CS-29 Amendment 5, AMC 27/29.865 were amended to differentiate between complex and simple Personal Carrying Device Systems (PCDS) and were based upon FAA AC 27-1B and AC 29-2C Change 4.

[6] 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=1536149403076&uri=CELEX:32018R1139).

EASA has reviewed FAA AC 27-1B and AC 29-2C Change 7, and has largely incorporated them into the existing AMC 27/29.865 (based upon Change 4). However, during this review, some elements of FAA AC 27-1B and AC 29-2C Change 7 were found to need further work before harmonisation can be reached (e.g. on the hoist operator attachment point), and therefore the existing AMC 27/29.865 (based upon Change 4) has been retained.

In addition, the existing AMC 27/29.865 have been amended as follows to better reflect the EASA regulatory system:

— AMC No 1 to CS 27.865 'Class D (Human External Cargo) for Operations within Europe' has been rewritten to match the European Union Air Operations rules.

— Throughout the AMC, Rotorcraft-Load Combinations (RLC) class references have been removed, as they correspond to FAA Air Operations rules.

Based upon recent experiences, the latest FAA recommendation regarding hoist operator harness quick releases has been emphasised in AMC 27/29.865.

AMC 27.865 and AMC 29.865 have both been modified in a similar manner.

AMC 29.1303 'Flight and navigation instruments'

AMC 29.1303 has been developed to reflect a minor difference in the interpretation of FAA AC 29-2C AC 29.1303 § 29.1303. This minor difference is that an instrument used to display attitude should be shown to be useable throughout the possible rotorcraft angular position and rotational operating range, and not the operating range of the instrument.

AMC 27/29 MG 1 'Certification procedure for rotorcraft avionics equipment'

AMC 27/29 MG 1 have been developed to reflect some differences in the guidance that should be given to applicants regarding the certification of avionics equipment installed on rotorcraft. These include changes to:

— ensure that the operating environmental conditions for avionics equipment are properly established;

— ensure that the lower limits of localiser performance are assessed;

— ensure that the assessment of the glideslope performance demonstrates correct functioning of the system, and that suitable glide path angles are established; and

— clarify that the guidance contained in AC 20-138 for inertial navigation may need to be refined when applied to rotorcraft.

AMC 27/29 MG 16 'Certification guidance for rotorcraft Night Vision Imaging System (NVIS) aircraft lighting systems'

AMC 27/29 MG 16 have been developed to reflect some differences in the approach to the integration of NVIS into rotorcraft. These include changes to:

— the references to European Technical Standard Orders (ETSOs);

— clarify that Class A night vision goggles (NVGs) are deemed to be not acceptable for certification by EASA;

— inform applicants about the need to consider the classification of design changes of NVIS-approved rotorcraft, and to take into account the effects on cockpit/cabin lighting characteristics and the NVIS; and

— inform applicants that a radio altimeter with analogue representation is required by Commission Regulation (EU) No 965/2012 on Air Operations.

AMC 27/29 MG 17 'Guidance on analysing an Advanced Flight Controls (AdFC) System'

After a detailed review of MG 17, it was concluded that it does not reflect the current certification practices that should be applied to AdFC systems. It is anticipated that a dedicated RMT will address AdFC systems in the near future. Therefore, MG 17 is not adopted as an EASA AMC.

AMC 27/29 MG 21 'Guidance on creating a system level Functional Hazard Assessment (FHA)'

After a detailed review of MG 21, it was concluded that it does not reflect the current best practices for safety assessment. It is anticipated that a dedicated RMT will address safety assessment processes in the near future. Therefore, MG 21 is not adopted as an EASA AMC.

AMC 27/29 MG 23 'Automatic Flight Guidance and Control Systems (AFGCS) installation in rotorcraft'

New AMC 27/29 MG 23 are proposed that reflect some differences between EASA and the FAA regarding the approach used for the installation of Automatic Flight Guidance and Control Systems (AFGCS) in rotorcraft. The primary difference is that EASA considers that DO-325 and DO-336 contain appropriate guidance for showing compliance, but that they are not considered, in isolation, to be AMC.

Secondly, within the EASA regulatory system, it is not envisaged that an applicant uses an ETSO to obtain approval for the installation of an AFGCS.

2.4. What are the stakeholders' views

Comments were received during the consultation of the draft Decision with the Advisory Bodies on the following aspects:

— The existing text of FAA ACs 27-1B and 29-2C Changes 5, 6 and 7

This existing text was not intended to be the main focus of the consultation as this material is already in use by some rotorcraft designers and manufacturers. This type of comments was mainly received on the AMC to 27/29.865 and the terminology used within.

— External loads (AMC to 27/29.865)

The majority of comments were received on this topic and included:

- Requests for clarification on the simulation of engine failures by 'rapidly moving the throttle to IDLE'. Some commenters were of the opinion that this is not applicable to engines that incorporate modern full authority digital engine control (FADEC) and therefore the text was amended accordingly. Commenters requested further guidance on the simulation of engine failures. AMC 27.45, which is based upon the equivalent text contained in FAA AC 29-2C - AC 29.45. § 29.45 (Amendment 29-24), was developed to provide further guidance.
- Remarks that the environmental qualification temperature limits were potentially too stringent. EASA considers these values to be 'typical' rather than specifically required.

- The request to separate the certifications of the external load attaching means and the PCDS. It should be noted that only complex PCDS are required to be included within the scope of type certification.
- The protection of the quick release system (QRS) against sources of electrical fields. The text was amended to clarify the electrical fields to be considered.

Note: Some of the comments that were received on the AMC to 27/29.865 will be taken into further consideration in a separate dedicated Rulemaking Tasking (RMT) on rotorcraft hoists.

— Night Vision Imaging Systems AMC 27/29 MG 16

Comments were received on the text highlighting that the Air Operations Regulation requires a radio altimeter with an analogue representation. The intent of this text was to provide a warning to applicants that this operational requirement may affect the scope of the certification of their design. It was not intended to provide an interpretation of this requirement.

2.5. What are the benefits and drawbacks

This task amends AMC that have been found during certification activities to be either incomplete, misleading, outdated or not to reflect the latest accepted certification practices. The amendment will provide clarity to industry regarding what is expected from them during the certification of rotorcraft products. In addition, it will maintain alignment with the latest versions of the FAA ACs, thereby improving harmonisation.

2.6. How do we monitor and evaluate the rules

As this is a regular update, no specific monitoring and evaluation is proposed. EASA constantly strives to improve product certification specifications, and will monitor feedback from applicants on the implementation and usage of these proposed changes to CS-VLR, CS-27 and CS-29.

3. References

3.1. Affected decisions

— Decision No. 2003/017/RM of the Executive Director of the Agency of 14 November 2003 on certification specifications for very light rotorcraft ('CS-VLR')

— Decision No. 2003/15/RM of the Executive Director of the Agency of 14 November 2003 on certification specifications for small rotorcraft ('CS-27')

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

3.2. Other reference documents

— Federal Aviation Administration Advisory Circular (AC) 27-1B — Change 7, dated 4 February 2016

— Federal Aviation Administration Advisory Circular (AC) 29-2C — Change 7, dated 4 February 2016