



Explanatory Note to Decision 2019/022/R

Software assurance level requirements for safety (support) assessment of changes to air traffic management/air navigation services functional systems

RELATED NPA/CRD 2017-10 —RMT.0469

EXECUTIVE SUMMARY

The objective of this Decision is to maintain a high level of safety by providing a set of harmonised software assurance level (SWAL) measures for providers of air traffic management (ATM)/air navigation services (ANS) and other ATM network functions when dealing with the (safety) assessment of changes to a functional system. It thus aims at achieving a smooth transition into the new ATM/ANS regulatory framework.

This Decision amends ED Decision 2017/001/R with a set of acceptable means of compliance (AMC) and guidance material (GM) for the definition and implementation of a software (safety) assurance system by providers of ATM/ANS that is based on the requirements laid down in Regulation (EC) No 482/2008, which is repealed by Regulation (EU) 2017/373.

The amendments are expected to maintain safety that has already be achieved with the implementation of Regulation (EC) No 482/2008.

Action area:	Safety management		
Affected rules:	GM to Part-DEFINITIONS, AMC/GM to Part-ATM/ANS.AR, Part-ATM/ANS.OR, and Part-ATS of the ATM/ANS Regulation		
Affected stakeholders:	Air navigation service providers (ANSPs), competent authorities, manufacturers		
Driver:	Safety	Rulemaking group:	No
Impact assessment:	No	Rulemaking Procedure:	Standard

EASA rulemaking process



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1. About this Decision

The European Union Aviation Safety Agency (EASA) developed ED Decision 2019/022/R in line with Regulation (EU) 2018/1139¹ (the ‘Basic Regulation’) and the Rulemaking Procedure².

This rulemaking activity is included in the European Plan for Aviation Safety (EPAS) [2019-2023](#) under rulemaking task (RMT).0469. The scope and timescales of the task were defined in the related Terms of Reference³.

The draft text of this Decision has been developed by EASA. All the interested parties were consulted through Notice of Proposed Amendment (NPA) 2017-10⁴. EASA received 315 comments, whose distribution is shown in Figure 1 below.

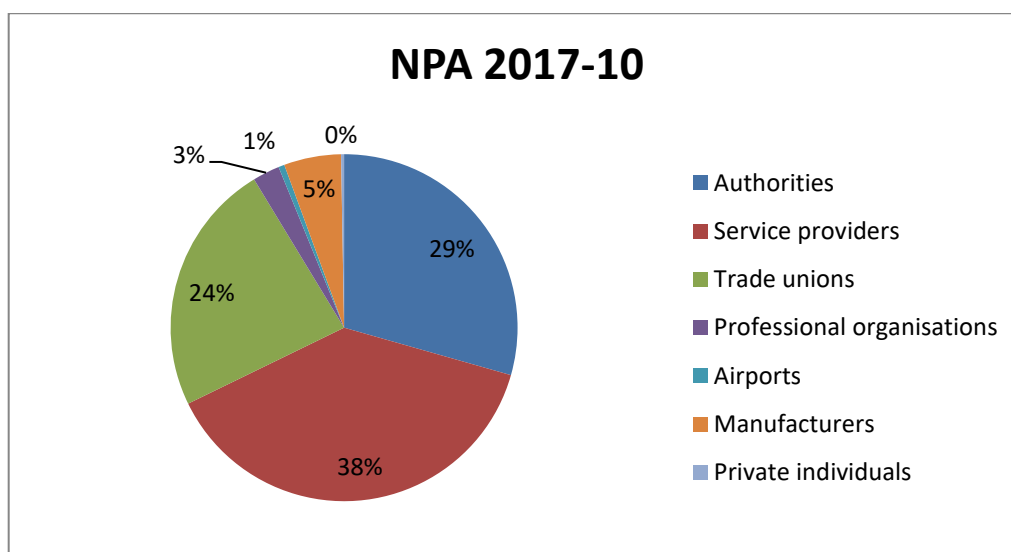


Figure 1: Percentage of comments per type of stakeholder

EASA reviewed the comments received during the public consultation. The comments received and EASA’s responses to them are presented in Comment-Response Document (CRD) 2017-10⁵.

The final text of this Decision with the AMC and GM has been developed by EASA based on the comments submitted to the NPA as well as on the input of the focused consultation in the form of a thematic meeting that took place on 16 October 2018. The aim of the meeting was to commonly identify and analyse the issues, and to provide guidance for the review of the proposals towards

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/sites/default/files/dfu/ToR%20RMT.0469%20and%200470.pdf>

⁴ In accordance with Article 115 of Regulation (EU) 2018/1139 and Articles 6(3) and 7 of the Rulemaking Procedure.

⁵ <https://www.easa.europa.eu/document-library/comment-response-documents>

drafting the final ED Decision. These meetings involved experts who contributed actively to the NPA consultation.

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



2. In summary — why and what

2.1. Why we need to change the AMC & GM

Regulation (EU) 2017/373⁶ lays down common requirements for providers of ATM/ANS and other ATM network functions and their oversight, and repeals amongst others Regulation (EC) No 482/2008⁷ that establishes a software safety assurance system to be defined and implemented by ANSPs, especially air traffic service (ATS) providers, entities providing air traffic flow management (ATFM) and air space management (ASM) for general air traffic, and providers of communication, navigation and surveillance (CNS) services. Regulation (EU) 2017/373 was developed based on EASA Opinions Nos 03/2014 and 02/2015.

Opinion No 03/2014 resulted from the consultation of three NPAs, one of them being NPA 2014-13 on 'Assessment of changes to functional systems by service providers in ATM/ANS and the oversight of these changes by competent authorities' issued on 24 June 2014.

NPA 2014-13 proposed:

- explicit requirements for the oversight of changes to functional systems after their implementation during the continuous oversight by the competent authorities;
- explicit requirements for the approval of the change management procedures from competent authorities;
- enhancement of the requirements for the review decision and the review of the changes to functional systems by competent authorities;
- more explicit requirements to introduce processes into the management system of certified service providers in order to actively monitor the behaviour of the functional system and, where underperformance is identified, to establish and eliminate its causes or mitigate its effects;
- explicit requirements for the change management procedures and for the changes affecting more than one certified service provider and aviation undertakings; and
- requirements for the assessment and the assurance of changes to the functional systems applicable to all certified service providers.

By enhancing the understanding of these concepts, it is expected that harmonisation across Europe will also improve.

However, during the Single Sky Committee (SSC) process as well as other forums, e.g. EASA Advisory Body meetings, EASA was warned of a potential safety weakness as regards the software assurance aspects when dealing with the safety (support) assessment of changes to a functional system in ATM/ANS and other ATM network functions. In the current regulatory framework, the software aspects are covered in detail through Regulation (EC) No 482/2008, which applies to any changes to

⁶ Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (OJ L 62, 8.3.2017, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1568628081721&uri=CELEX:32017R0373>).

⁷ Commission Regulation (EC) No 482/2008 of 30 May 2008 establishing a software safety assurance system to be implemented by air navigation service providers and amending Annex II to Regulation (EC) No 2096/2005 (OJ L 141, 31.5.2008, p. 5) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1568628163515&uri=CELEX:32008R0482>).

the software of the systems for ATS, ASM, ATFM, and CNS. Additionally, the software aspects for aeronautical information services (AIS) provision are included in Regulation (EU) No 73/2010⁸. On the contrary, Regulation (EU) 2017/373 sets requirements for the assessment and assurance of the changes to functional systems, which is consistent with the concept of the existing requirements laid down in Regulation (EC) No 482/2008 in a more generic manner by providing more flexibility, but also extending the scope of the assurance process to the other parts of the functional system (people, procedures and equipment, i.e. hardware) rather than to the software alone. However, this has been seen as a gap compared to the current system.

In this context, following the NPA 2014-13 consultation, the conclusion reached was that Regulation (EC) No 482/2008 could be repealed, thereby simplifying the regulatory framework and avoiding a double set of requirements. Nevertheless, it was identified that the more detailed provisions of Regulation (EC) No 482/2008 should be moved to AMC/GM. Being AMC/GM, they would serve as a means by which the implementing rule requirements, where the software assurance aspects are addressed, can be met, offering, thus, the benefit of presumption of compliance. However, applicants may decide to show compliance with the requirements using other means and may propose an alternative means of compliance (AltMoC), based, or not, on those issued by EASA. These AltMoC can be only used when it is demonstrated that the safety objective set out in the implementing rules is met.

This Decision proposes a transposition of the already known provisions (with some adaptations) in Regulation (EC) No 482/2008 to the AMC material and the introduction into the GM of part of the references to some of the existing industrial standards, which may be used by the ANSPs to build their software assurance systems.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of the Basic Regulation. 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, therefore, to maintain the level of safety in the definition and implementation of the software assurance systems

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

As explained in Section 2.1, the repeal of Regulation (EC) No 482/2008 by Regulation (EU) 2017/373 resulted in the simplification of the regulatory framework and the avoidance of a double set of requirements. As a consequence, the more detailed provisions of Regulation (EC) No 482/2008 should also be moved to AMC & GM. In this context, EASA completed the AMC & GM published with ED Decision 2017/001/R by addressing the software (safety) assurance aspects.

This set of AMC & GM indicates the characteristics/objectives of the assurance system to be applied to the development and verification of the software components of the functional system. Furthermore, references to the currently available standards (e.g. EUROCAE ED-109A and its

⁸ Commission Regulation (EU) No 73/2010 of 26 January 2010 laying down requirements on the quality of aeronautical data and aeronautical information for the single European sky (OJ L 23, 27.1.2010, p. 6) (<http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1492593011927&uri=CELEX:32010R0073>).

supplements, ED-153, ED-76A for AIS, etc.) that could be used by the service providers are included, as part of GM, in order to satisfy the characteristics of the assurance system specified at AMC level.

2.3.1. Amendments to Annex I ‘GM to Part-DEFINITIONS’

New GM is introduced to illustrate the meaning of ‘software’ in the context of ‘functional system’.

2.3.2. Amendments to Annex II ‘AMC/GM to Part-ATM/ANS.AR — Requirements for competent authorities — oversight of services and other ATM network functions’

With the entry into force of the Basic Regulation, some adjustments to GM on allocation of tasks to qualified entities were required to ensure consistency in the principles.

2.3.3. Amendments to Annex III ‘AMC/GM to Part-ATM/ANS.OR — Common requirements for service providers’

The service provider is required to produce an assurance argument whether or not it is to be reviewed by the competent authority. In this context, GM2 ATM/ANS.OR.A.045(a) clarifies with regard to the notification that depending on the complexity of the change to the functional system and the criticality of the software, the depth of the evaluation may vary. Therefore, the service provider should coordinate as soon as possible with the competent authority in order to define a software oversight strategy as part of the change review activities. On the other hand, GM1 ATM/ANS.OR.A.050 aims to ensure that the service provider makes available the required assurances to the competent authority by demonstrating that the software assurance system meets the objectives.

Subpart C establishes the requirements to be met by service providers other than ATS providers and ensures that safety support assessment and assurance of changes to the functional system is carried out. As regards software assurance, AMC5 ATM/ANS.OR.C.005(a)(2) provides the means for compliance on the software assurance when the service provider introduces new software or modifies the existing one. In addition, AMC6 ATM/ANS.OR.C.005(a)(2), on the software assurance processes, provides the minimum evidence and arguments that need to be considered/addressed by the software assurance processes, their definition and also specifies what they should ensure and cover. These AMC originate mainly from Articles 3(2), 4 and 5 and Annex II to Regulation (EC) No 482/2008. In order to support the implementation of AMC6 ATM/ANS.OR.C.005(a)(2), new GM is developed to address:

- clarification on the terminologies;
- the SWALs;
- the SWALs allocation; and
- examples of existing industrial standards.

In addition, GM2 ATM/ANS.OR.C.005(a)(2) is amended to further illustrate the meaning of the term ‘software assurance level’.

2.3.4. Amendments to ‘AMC/GM to Part-ATS — Specific requirements for providers of air traffic services’

Similar provisions to the ones mentioned in Section 2.3.3. have also been developed for ATS providers, i.e. two new AMC are proposed to ATS.OR.205(a)(2) ‘Safety assessment and assurance of changes to the functional system’ supplemented by GM to AMC4 ATS.OR.205(a)(2).

The only new GM compared to the GM on software assurance for providers other than ATS providers, is that which addresses the allocation of the SWALs by the ATS providers.

2.4. What are the stakeholders' views

EASA received comments supporting the amendments that were proposed in NPA 2017-10.

On the other hand, some of the comments received during the NPA consultation focused on the applicability of the software assurance AMC & GM to MET providers.

EASA acknowledged that some of the service providers other than the ones that apply today Regulation (EC) No 482/2008 (e.g. MET, FPD, DAT providers) are more and more influenced by the software. Therefore, it was concluded that the features of these providers' systems are affected by the current regulatory requirements, which also supports the approach that the proposed set of AMC & GM should apply to all service providers of ATM/ANS, including AIS and MET providers towards software assurance level standardisation.

EASA reviewed all the comments and, based on them, adjusted the AMC and GM that are annexed to this Decision.

Following the NPA 2017-10 consultation, as regards hardware assurance, it is concluded that further consideration is required and this element should be consulted via a separate NPA.

2.5. What are the benefits and drawbacks

When 'transposing' Regulation (EC) No 482/2008 that establishes a software safety assurance system to be implemented by ANSPs, especially ATM and CNS providers, only the necessary adjustments have been made by associating the provisions with the rules laid down in Regulation (EU) 2017/373 without detriment to the principles preserved. Therefore, EASA simply transposed the remaining provisions of Regulation (EC) No 482/2008 with no major changes to the principles.

In this context, the benefit expected from this proposal is that service providers can continue with their existing SWAL systems as part of the safety (support) assessments and hence, there are no drawbacks identified. Therefore, the possibility for choosing the options on how to proceed with the development of rules on the software changes to the functional system in ATM/ANS was very limited.

For this reason, no regulatory impact assessment (RIA) has been developed for this task. Moreover, in this context, EASA has already performed a RIA for a number of key regulatory developments with the publication of NPA 2014-13, addressing, amongst other issues, the changes affecting software and Regulation (EC) No 482/2008.

In addition, the implementation feedback of Regulation (EC) No 482/2008 from EASA standardisation inspections has not shown relevant issues with the implementation across the EU Member States.



3. How do we monitor and evaluate the rules

The impact assessment conducted for RMT.0469 was presented in NPA 2014-13 on 'Assessment of changes to functional systems by service providers in ATM/ANS and the oversight of these changes by competent authorities' issued on 24 June 2014. EASA will monitor and evaluate the implementation of the AMC and GM through its regular standardisation activities. Through this evaluation, it will be assessed how well the adopted AMC and GM have been or are currently applied. The decision whether an evaluation will be necessary will be taken based also on the monitoring results.

EASA recalls that this Decision transposes the already known provisions (with some adaptations) in Regulation (EC) No 482/2008 to the AMC material and introduces into the GM part some references to existing industrial standards, which may be used by the ANSPs to build their software assurance systems.

All these activities are performed with the aim of achieving a smooth transition into the new ATM/ANS regulatory framework from 2 January 2020.



4. References

4.1. Related regulations

- 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).
- Commission Regulation (EC) No 482/2008 of 30 May 2008 establishing a software safety assurance system to be implemented by air navigation service providers and amending Annex II to Regulation (EC) No 2096/2005 (OJ L 141, 31.5.2008, p. 5).
- Commission Implementing Regulation (EU) No 1034/2011 of 17 October 2011 on safety oversight in air traffic management and air navigation services and amending Regulation (EU) No 691/2010 (OJ L 271, 18.10.2011, p.15).
- Commission Implementing Regulation (EU) No 1035/2011 of 17 October 2011 laying down common requirements for the provision of air navigation services and amending Regulations (EC) No 482/2008 and (EU) No 691/2010 (OJ L 271, 18.10.2011, p. 23).
- Regulation (EC) No 550/2004 of the European Parliament and of the Council of 10 March 2004 on the provision of air navigation services in the single European sky (the service provision Regulation) (OJ L 96, 31.3.2004, p. 10).
- Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (OJ L 62, 8.3.2017, p. 1).

4.2. Affected decisions

- Executive Director Decision 2017/001/R of 8 March 2017 issuing Acceptable Means of Compliance and Guidance Material to Commission Implementing Regulation (EU) 2017/373

4.3. Other reference documents

- EUROCAE ED-109A/RTCA DO-278A — Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems, dated January 2012
- EUROCAE ED-12C/ RTCA DO-178C — Software Considerations in Airborne Systems and Equipment Certification, dated January 2012
- EUROCAE ED-153 — Guidelines for ANS Software Safety Assurance, dated August 2009



- EUROCAE ED-76A/RTCA DO-200B — Standards for Processing Aeronautical Data (only for AIS providers), dated June 2015



5. Appendix

Cross reference table — Regulation (EC) No 482/2008 of 30 May 2008 establishing a software safety assurance system to be implemented by air navigation service providers v ED Decision 2019/022/R

Regulation (EC) No 482/2008	Subject	Decision reference
Article 1	Subject matter and scope	n/a
Article 2	Definitions	n/a
Article 3	General safety requirements	n/a
Article 3(1)		n/a
Article 3(2)(a)		AMC6 ATM/ANS.OR.C.005(a)(2), point (a)(1) AMC4 ATS.OR.205(a)(2), point (a)(1)
Article 3(2)(b)		AMC6 ATM/ANS.OR.C.005(a)(2), point (a)(2) AMC4 ATS.OR.205(a)(2), point (a)(2)
Article 3(2)(c)		AMC6 ATM/ANS.OR.C.005(a)(2), point (a)(3) AMC4 ATS.OR.205(a)(2), point (a)(3)
Article 3(2)(d)		AMC5 ATM/ANS.OR.C.005(a)(2), point (a) AMC3 ATS.OR.205(a)(2), point (a)
Article 3(2)(e)		AMC6 ATM/ANS.OR.C.005(a)(2), point (b) AMC4 ATS.OR.205(a)(2), point (b)
Article 3(3)		GM1 ATM/ANS.OR.A.045(a) GM1 ATM/ANS.OR.A.050
Article 4	Requirements applying to the software safety assurance system	ATM/ANS.OR.B.010(a)(1)
Article 4(1)		Regarding the need to have documented software assurance processes: AMC5 ATM/ANS.OR.C.005(a)(2), point (a) AMC3 ATS.OR.205(a)(2), point (a)
Article 4(2)		Same reference as Annex I
Article 4(3)(a)		Same reference as Annex II Part A
Article 4(3)(b)		Same reference as Annex II Part B
Article 4(3)(c)		Same reference as Annex II Part C
Article 4(3)(d)		Same reference as Annex II Part D
Article 4(4)		Mainly addressed in NPA 2014-13; The software elements are dealt with in: AMC6 ATM/ANS.OR.C.005(a)(2), point (c)

Regulation (EC) No 482/2008	Subject	Decision reference
		AMC4 ATS.OR.205(a)(2), point (c) <i>Note: with the exception of the element pertaining to how to consider the independent execution of activities, which is moved to GM.</i>
Article 4(5)		AMC5 ATM/ANS.OR.C.005(a)(2), point (b) AMC3 ATS.OR.205(a)(2), point (b)
Article 5	Requirements applying to changes to software and to specific software	The software elements are: AMC6 ATM/ANS.OR.C.005(a)(2), point (e) AMC4 ATS.OR.205(a)(2), point (e)
Article 6	Amendment to Regulation EC (No) 2096/2005	n/a
Article 7	Entry into force	n/a
Annex I	Requirements applying to the software assurance level referred to in Article 4(2)	The software elements are dealt with in: AMC3 ATS.OR.205(a)(2)
Annex II — Part A		AMC6 ATM/ANS.OR.C.005(a)(2), points (a)(1)(i) and (ii) AMC4 ATS.OR.205(a)(2), points (a)(1)(i) and (ii)
Annex II — Part B		AMC6 ATM/ANS.OR.C.005(a)(2), points (a)(4) and (5) AMC4 ATS.OR.205(a)(2), points (a)(4) and (5)
Annex II — Part C		AMC6 ATM/ANS.OR.C.005(a)(2), point (d) AMC4 ATS.OR.205(a)(2), point (b)
Annex II — Part D		AMC6 ATM/ANS.OR.C.005(a)(2), points (a)(2)(i) and (ii) AMC4 ATS.OR.205(a)(2), points (a)(2)(i) and (ii) <i>Note: with some specific development regarding the derived requirements</i>

6. Related documents

CRD 2017-10 'Software assurance level requirements for safety assessment of changes to air traffic management/air navigation services functional systems'

