European Aviation Safety Agency
Rulemaking Directorate

EXPLANATORY NOTE

AMC-20 Amendment 8

Executive Director Decision 2011/001/R amends Executive Director Decision No. 2003/12/RM[1] of 05 November 2003 on general acceptable means of compliance for airworthiness of products, parts and appliances (« AMC-20 »).

This Amendment 8 of AMC-20 incorporates the output from the following EASA rulemaking task:

Rulemaking Task No.	TITLE	NPA No.
ATM.002	Introduction of ACAS II software version 7.1	2010-03

This NPA was subject to consultation in accordance with Article 52 of the Basic Regulation[2] and Article 5(3) and 6 of the rulemaking procedure established by the Management Board[3]. The Agency has addressed and responded to the comments received on the NPA. The responses are contained in a comment-response document (CRD) which has been produced for the NPA and which is available on the Agency's website.

Detailed changes incorporated in the text proposed in the NPA are summarised in the following pages for ease of reference.

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1 Decision 2003/12/RM of the Executive Director of the European Aviation Safety Agency of 5 November 2003. Decision as last amended by Decision 2010/012/R of the Executive Director of the Agency of 16 December 2010 (AMC-20 Amendment 7).

2 Regulation (EC) No 216/2008 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 L79, of 19.3.2008, p.1.) Regulation as last amended by Regulation 1108/2009 of the European Parliament and of the Council of 21 October 2009 (OJ L 309, 24.11.2009, p. 51).

3 Management Board Decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material ('Rulemaking Procedure'), EASA MB/08/07, 13.6.2007.

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TITLE: AMC-20 Amendment 8

Rulemaking Task No.: ATM.002

Title: Introduction of ACAS II software version 7.1

NPA No.: NPA 2010-03

CRD No.: CRD 2010-03

LIST OF PARAGRAPHS AFFECTED

- Cover + Contents
- New AMC 20-15 added

In response to CRD 2010-03, the Agency received several substantial reactions, which are reproduced below together with the Agency's responses:

Commentor / Reference	Reaction	EASA Response
Eurocopter	The proposed redrafting of Section 4 of AMC 20-15 (Safety Objectives) does not provide the clarification expected	Note See the response to the next reaction.
Eurocopter	AMC 20-15 Section 4 Safety Objectives is supposed to provide « Acceptable criticality levels » as stated in last sentence of first paragraph. "Criticality levels" are usually expressed in terms of failure conditions classifications and not in terms of events probabilities. Considering the usual inverse relationship which must exist between the Average Probability per Flight Hour and the severity of Failure Condition effects, can we infer, from the proposed probability figures in sub-section 4.3, that a misleading RA is not to be classified as Hazardous/Severe-major, despite the failure condition classification specified in ETSO-C119c, and despite the obligation of the pilot under AUR.ACAS.200 ? In addition, "false alert" and "misleading RA" (as defined in the Note under sub-section 4.3,) have not the same criticality. The rationale for allotting the same safety objective would deserve more explanations	Partially accepted EASA wishes to thank Eurocopter for their constructive comments to the NPA. The first paragraph of Section 5 has been re-worded to reflect some of the comments received from Eurocopter. The word 'criticality' was removed from the first paragraph of Section 5 as there is no recognition of this word in the AMC to CS 25.1309. It now reads: *5 SAFETY OBJECTIVES* *The applicant should perform a Functional Hazard Assessment (FHA) and System Safety Assessment (SSA) for the proposed ACAS II installation. For the purposes of this AMC, system includes all airborne devices contributing to the ACAS II function. Guidance is provided in AMC 25.1309. Acceptable probability levels for functionality and alerts are given below:* The probability figures given in section 5.3 are includes all airborne devices contributing to the ACAS

		II function (including sensors, etc) whereas the failure classification given in the ETSO refers to the equipment only. EASA agree that "false alert" and "misleading RA" (as defined in the Note under sub-section 5.3,) do not have the same criticality. To maintain the integrity of ACAS II it is considered essential that ACAS II maintains a low "false alert" rate and that failure to achieve this will reduce the crew's confidence in the system. For this reason it is considered acceptable to use the same probability of failure for both "false alert" and "misleading RA". EASA has also reviewed, again, the proposal by Eurocopter dated 23 April 2010 and would like to provide the following comments: i. Additional considerations may apply in case of autopilot implementation of ACAS Resolution Advisories – EASA will address autopilot implementation in a separate document. ii. The ACAS II system is a safety related system required by the operating rules; as such, the system is considered to be essential for safety in flight. Allowance may however be made for the fact that the ACAS II system does not free the pilot from its primary responsibility for avoiding midair collisions – ACAS is a 'safety net' and is not essential for safety in flight. iii. EASA note that Eurocopter have split the failure conditions for 'Traffic Advisory' and 'Resolution

		Advisory'. EASA consider that this is not required as the crew should not take any avoiding based on TA display or aural warnings.
Peter Reid	As a licensed engineer for the past 35 years, one thing has been at the forefront of aviation safety, and that is the industries insistence on double checking any item carried out on an aircraft that effects safety. If aircraft are released without an experienced fully licensed B1 0r B2 engineer certifying that it is safe to fly, you are removing another check which could prevent an accident. At the end of the day nobody is perfect, we all make mistakes, our main aim should be not to make them in the first place, but they do happen, so our second aim is to spot these mistakes, this is best achieved by having engineers at the sharp end of the industry releasing aircraft safely before flight.	Noted. The AMC 20-15 proposes that the applicant should perform a Functional Hazard Assessment (FHA) and System Safety Assessment (SSA) to establish the ACAS II criticality and hazards associated with the proposed installation. This exercise should ensure that the design of the installation meets the objectives listed in Section 6 of the proposed AMC. The ground and flight testing guidance, contained in Section 6, should also ensure correct operation of the ACAS. Section 8 contains guidance relating to the Instructions for Continued Airworthiness (ICA) and includes precautions which should be followed when testing an ACAS. We agree with your comments and think that the proposed AMC provides a basis for an applicant to ensure ACAS II is designed, installed and maintained adequately.
Skyguide	EASA Response to SKYGUIDE comment N°128 does not consider the fact that there are wide spread implementations of the ARTAS system with embedded algorithms which will when receiving the negative mode C readouts treat these XPDRs as either unreliable, malfunctioning or similar and following the local implementation rules/safety requirements possibly force them to all the radar screens (skyguide implementation prior to latest modifications). This may result in exactly the opposite to the desired effect. Further, if at the ICAO level the procedure is agreed also with the industry (EUROCAE was deeply involved) and no notice of "impracticality" was	Partially accepted. As you mention in your comment 128, the ICAO guidance material Doc. 9924 was newly released. In fact the publication dates of Doc. 9924 and the AMC 20-15 NPA nearly coincide (respectively 15 and 25 of March 2010). During the drafting period only the existing technical documentation was considered i.e. EUROCAE ED-73C issued September 2008. Your concerns about the negative readouts of XPDRs are noted, but since the testing procedure requests the Mode A code of the tested transponder to be set to 7776 (assigned as a

	received it is difficult to understand why would this be so in Europe. In addition, in Switzerland, when discussed with the organizations handling the transponder tests – this (setting the XPDR to 60 000ft) was not raised as a difficulty.	test code by ORCAM) or other agreed with the ATC code, it is assumed that these XPDR readouts will be filtered or disregarded by technical or other means. The aim of the procedure is during the test an unrealistic altitude to be transmitted. The main consideration for choosing -1000 ft setting is that in this case an ACAS false warning to any other aircraft is quite unlikely event. However, during a recent Eurocae and RTCA meeting, this point was raised and it was agreed that in the interests of harmonisation the operator should be given the option to use an altitude of -1000 feet or more than 60,000 feet. The decision to use either altitude would be based on discussions between the maintenance organisation and the local Air Traffic Control. The AMC will therefore include an option to use 60,000 feet.
	ACAS II version 7.0 to ACAS II version 7.1 aircraft level changes are major in accordance with the criteria given in the Guidance Material (GM) in Part 21A.91, Appendix A, paragraph 4.	Noted. The guidance material to Part 21 provides guidance in the classification of changes, Thus paragraph 7.6 has been deleted.