



TERMS OF REFERENCE

- Task Nr:** ATM/ANS.002
- Issue:** 1
- Date:** 15 September 2009
- Regulatory reference:**
- Regulation (EC) No 216/2008¹
 - Executive Director Decision No 2003/12/RM of 5 November 2003²
- Reference documents:**
- Opinion No 01/2008³ of the European Aviation Safety Agency of 15 April 2008 for amending Regulation (EC) No 216/2008.
 - Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Single European Sky II: towards more sustainable and better performing aviation {SEC(2008) 2082}.
 - Proposal for a Regulation of the European Parliament and of the Council amending Regulation (EC) No 216/2008 in the field of aerodromes, air traffic management and air navigation services and repealing Council Directive 06/23/EEC COM (2008) 390 final.
 - European Parliament legislative resolution of 25 March 2009 on the proposal for a regulation of the European Parliament and of the Council amending Regulation (EC) 216/2008 in the field of aerodromes, air traffic management and air navigation services and repealing Council Directive 2006/23/EC (COM(2008)0390 – C6-0251/2008 – 2008/0128(COD)).
 - ICAO State Letter AN 7/1.3.96-09/57 dated 30 June 2009.

1. Subject: Introduction of TCAS II software Version 7.1

2. Problem / Statement of issue and justification; reason for regulatory evolution (regulatory tasks):

Following a series of mid-air encounters in which safety margins have been lost, including two accidents (Yaizu 2001 and Überlingen 2002), EUROCONTROL sponsored the Safety Issue Rectification Extension (SIRE) team to undertake a series of safety studies. These studies revealed two major reasons for the loss of separation:

- failure of TCAS II to reverse some Resolution Advisories (RA) when a reversal is required to resolve the threat of collision;

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, 19.03.2008, p. 1).

² ED Decision on acceptable means of compliance for airworthiness of products, parts and appliances (« AMC-20 »)

³ [Opinion 01/2008](#)

- frequent instances of flight crews unintentional incorrect manoeuvres in the wrong direction to the "Adjust Vertical Speed Adjust" RA.

The incorrect manoeuvre to an Adjust Vertical Speed Adjust RA has been further identified by the BUREAU D'ENQUETES ET D'ANALYSES POUR LA SECURITE DE L'AVIATION CIVILE as the cause of a serious incident in French airspace⁴. These incidents and studies have been evaluated by EUROCAE and RTCA and have resulted in the publication of revised Minimum Operational Performance Standards (MOPS) (ED-143 and DO-185B) that address these issues.

Further studies⁵ have concluded that due to the combination of these two safety issues aircraft equipped with TCAS II version 7.0 face a mid-air collision risk of 2.7×10^{-8} per flight hour. This in theory corresponds to one collision every 3 years in European Airspace.

As the estimated probability of a mid-air collision of 2.7×10^{-8} per flight hour due to the identified deficiencies within the current version 7.0 software is considered to be an unacceptable safety risk the Agency has undertaken a series of related tasks to reduce the risk to an acceptable level. These being:

- the issue of a revised ETSO to adopt the EUROCAE ED-143 MOPS – see NPA 2009-03. issued 13 March 2009;
- the issue of a Safety Information Bulletin (SIB) regarding the Misinterpretation of ACAS Resolution Advisory (RA) Aural Annunciation Messages – see SIB No 2009-16 issued 09 June 2009;
- the investigation of possibilities to mandate the carriage of TCAS II version 7.1.

Mandated Carriage Possibilities

A number of possible methods to mandate the carriage of TCAS II Version 7.1 were investigated by the Agency. These being:

- the Issue of a Airworthiness Directive (AD) or;
- the Issue of a Safety Directive (SD) following adoption of the option that would result from NPA 2009-01 (currently still in the consultation phase) or;
- an Implementing Rule (IR) issued within the amended Basic Regulation for the Agency's 2nd extension.

The use of an AD was considered not to be a practical solution due to the difficulty in justifying the use of the AD methodology in this case and the associated difficulties linked to issuing an AD applicable mainly to US products as the FAA has no plans to mandate the carriage of version 7.1. Furthermore the applicable aircraft would only be those aircraft registered in EU Member States. This would result in a partial implementation of the total population of aircraft operating within the airspace at any time, thus only having a limited benefit in improving the overall safety of the airspace associated with the deficiencies identified with TCAS II version 7.0.

The issue of SD in accordance with the proposed new paragraph 21A.3C, as introduced by NPA 2009-01 (Operational Suitability Certificate and Safety Directives) could be undertaken to require the applicable aircraft (those registered in EU Member States) to be upgraded to the TCAS II version 7.1. As per the AD solution, this would also result in a partial implementation of the total population of aircraft operating within the airspace at any time, also resulting in a limited benefit in the improvement of the overall safety of the airspace associated with the deficiencies identified with TCAS II version 7.0. It was also noted that the consultation phase for the NPA 2009-01 that introduces the possible use of an SD ended on the 30 June 2009. It is therefore anticipated that the adoption of

⁴ Incident grave survenu en vol le 23 mars 2003 aux avions immatriculés F-GPMF et F-GHQA exploités par Air France
RAPPORT f-mf030323 f-qa030323

⁵ EUROCONTROL document – Decision criteria for regulatory measures on TCAS II version 7.1 Safety Issue Rectification Extension Plus Project (SIRE+ Project), ACAS/08-103 dated 25 July 2008

the resulting Opinion would not occur until 2012. Thus an SD can not be issued by the Agency until 2012 at the earliest assuming that the NPA is issued concurrently. The issue of an SD was therefore considered not to be a practical solution.

An assessment of the revised Basic Regulation, as agreed by the European Parliament on the 25th March 2009 and awaiting formal adoption by the Council, has concluded that:

- Based on the amended text of Article 8, it is possible to impose ATM/ANS related IR's on operators of aircraft registered in a Member State or registered in a third country and operated by a Community operator (Article 4(1) (b) and (c)); and
- Taking into account the new article 9, it is possible to impose ATM/ANS related IR's for operators of aircraft used by a third country operator (Article 4(1)(d));

Once the regulation adopting the second extension comes into force, the adoption of specific IR's mandating the use of certain equipment by operators (both Community operators and third country operators operating in Europe) is possible.

Thus the adoption of such an IR will require all airspace users to ensure that they are equipped with the applicable software version of TCAS II. This will therefore result in the greatest improvement in the airspace safety associated with the elimination of the identified deficiencies with version 7.0.

It has therefore been concluded that a rulemaking task to develop the necessary text for an IR requiring the carriage of TCAS II with software version 7.1 as the minimum standard for aircraft operating within European airspace (without prejudice to existing limitations and exceptions) should be started. Such an IR could subsequently be replaced and incorporated within the rules that will be applicable to ATM/ANS. These rules are to be developed as part of the Agency's second extension.

3. Objective:

To develop an IR to introduce TCAS II with software version 7.1 as soon as practically possible to all aeroplanes that are currently mandated to carry ACAS II (TCAS II version 7.0) and all other aeroplanes equipped with ACAS II, taking into account proposed amendments to ICAO Annex 10 and to update, as appropriate, the necessary acceptable means of compliance (AMC-20).

4. Specific tasks and interface issues (Deliverables):

Development of an Opinion for a Commission Regulation and a Decision of the Executive Director of the Agency.

5. Working Methods (in addition to the applicable Agency procedures):

Agency

6. Time scale, milestones:

Related NPA: 2010/Q1

Related Agency Opinions: 2010/Q4.

Related Executive Director Decisions with respect to the update of AMC-20: 2010/Q4.