

ELEVENTH AIR NAVIGATION CONFERENCE

Montreal, 22 September to 3 October 2003

Agenda Item 1: Introduction and assessment of a global air traffic management (ATM) operational concept

1.4 The role of airborne collision avoidance systems (ACAS) technologies :

ACAS IMPROVEMENTS — DOWNLINK OF RAs

(Presented by the International Federation of
Air Line Pilots' Associations — IFALPA)

SUMMARY

Accidents and incidents involving ACAS actions highlight the need for awareness of the aircraft RA status by the ATC controller on the ground. Measures should be implemented to enable the ATC controller to recognize the current RA status of an aircraft.

Action by the conference is in paragraph 4.

1. INTRODUCTION

1.1 Present ICAO provisions

1.1.1 ICAO Annex 10, Volume IV, *Chapter 4 — Airborne Collision Avoidance System* — requires in paragraph 4.3.6.2.1 that, when an airborne collision avoidance system (ACAS) RA exists, ACAS shall:

- a) transfer to its Mode S transponder an RA report for transmission to the ground in a Comm-B reply (4.3.11.4.1); and
- b) transmit periodic RA broadcasts (4.3.7.3.2).

1.1.2 Paragraph 4.3.7.3.2 states that RA broadcasts shall be transmitted at full power from the bottom antenna at jittered, nominally 8s intervals for the period that the RA is indicated, and gives further detailed technical guidance to achieve the broadcast with different antenna configurations.

2. AWARENESS OF AIRCRAFT RA STATUS

2.1 The mid-air collision that occurred over Southern Germany in 2002 has emphasised in a tragic way the reasons why air traffic control (ATC) should not intervene when a pilot has stated that an RA manoeuvre is in progress.

2.2 ICAO Annex 10 provisions show that the RA awareness of ATC does not need to rely on the prescribed radiotelephony (RTF) notification of RAs by pilots only. The airborne collision avoidance system specifications do include RA report specifications.

2.3 However, this airborne report is unnoticed on the ground today for a variety of reasons, such as:

- a) ATC Mode S radar (ground) systems are not widespread;
- b) ATC non-radar RA receivers appear to be non-existent; and
- c) even if the report could be “received”, its decoding and annunciation to the active controller does not appear to be part of current ATC radar systems.

2.4 In addition, the possible time delay until a posted RA can be transmitted and will have been received can be significant.

2.5 It appears necessary and advantageous to align the capabilities of the ground system with those of the airborne system.

3. DISPLAY OF AIRCRAFT RA STATUS AT ATC GROUND STATION

3.1 The display of the “aircraft RA status” at controller stations may enhance the awareness of ground ATC personnel that aircraft under their control may deviate from a cleared flight profile in response to an ACAS command.

3.2 RA broadcast receivers should be implemented at such ATC ground stations, where secondary surveillance radar (SSR) Mode S with the associated data link capability is not available or not operationally used.

3.3 It is understood that there may be significant human factors considerations involved with implementation of such technology. The implications of these considerations should be thoroughly investigated and taken into account prior to implementation.

3.4 In view of the time delays involved with both, SSR radar returns and RA broadcasts, it should be noted that RA manoeuvring can be in progress a considerable time before it is annunciated at the controller station. In view of the need to reduce the delay between the occurrence of an RA and its ensuing notification communications, an increase of the report rate to a technically feasible value in the order of not less than one report per second should be considered. It should be noted that these reports will only be transmitted during the rare times of an RAs occurrence.

4. **ACTION BY THE CONFERENCE**

4.1 The conference is invited to:

- a) note the information provided in this paper;
- b) consider alignment of the ground system capabilities to those of airborne systems with regard to downlink of aircraft RA status; and
- c) consider an increase of the report rate to a technically feasible value in the order of not less than one report per second.

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