SC-186 WG1 Conflict Detection and Resolution Subgroup

# Response to WG3 concerns regarding ADS-B MASPS Issue Paper 12 requesting TCAS RA information be broadcast in ADS-B On Condition Message

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## Introduction

The Conflict Detection and Resolution (CD&R) subgroup of SC-186 WG1 has been developing operational concepts for a variety of airborne conflict detection, prevention and resolution applications (more generally called Airborne Conflict Management, or ACM). Due to the differing technologies, there is no expectation that an ACM system can or will coordinate advisories with ACAS. There are numerous concerns about the interaction of ACM systems with the current ACAS avionics. The published operational concept for ACM (RTCA, December 2000) includes a chapter devoted to these issues.

The ACM document describes several methods to reduce or eliminate the possibility of resolution conflict between ACAS and ACM. These generally involve the ACM system receiving information regarding the ACAS equipage of the target aircraft, and information about any resolution advisories (RAs) being generated by ACAS.

The ACM document is only an operational concept document. It does not contain details of system operation, such as specific use of this ACAS information, as such detail has not yet been developed. The need for ACAS equipage and RA information is anticipated, as there is no alternative concept for reducing possible interoperability problems without (unnecessarily) disabling of the ACM system. As such, the ACM group submitted a request to include ACAS equipage and RA information broadcast as part of the ADS-B MASPS revision. The CD&R sub-group, as well as the rest of the aviation community, is well aware that the use of this information, as well as other interoperability issues, will require extensive study and analysis.

## The WG3 Response To This Request

WG3 responded to this request by recommending that the issue be deferred until the next revision of the ADS-B MASPS. They cited several concerns about how the ACAS data will be used, and the availability of the data for broadcast.

Several members of the CD&R sub-group, as well as other interested parties knowledgeable with ACAS and the ACM concept, felt that some of the specific concerns were incorrect, while others were needless and due to lack of understanding of the ACM

concept. Several informal responses to the concerns were generated, and it was suggested that WG3 revisit their concern paper.

At the July 10-11 meeting of WG3, the paper was revisited. At that time, WG3 reiterated that their recommendation was to defer inclusion of the requested fields, although they seemed to agree that the primary reason for this recommendation is that the use of the ACAS data is currently undefined. WG3 agreed at this time to recommend reserving data fields for this information until such time as specific requirements are developed (or deemed unnecessary). WG3 also decided not to withdraw the concern paper.

CD&R Response to WG3 Recommendations and Concerns

A representative from the CD&R sub-group agreed with the July 11 WG3 recommendation to delay implementing the suggested fields, but to reserve the data fields until requirements are defined. However, the CD&R group maintains that some of the specific concerns in the WG3 paper are mistaken, as they are based on incorrect information and assumptions. (Note that WG3 did not read the published RTCA ACM concept document prior to writing their concerns.)

Specifically:

Concern 1. It appears that the concern that the requested ACAS data is unavailable is incorrect. The data appears to be readily available.

Concerns 2 and 3. The concern about independence between ACAS and ACM seems confused. It is our understanding that ACAS, as a collision avoidance backup system, should be kept independent from other separation assurance systems, such as air traffic control and ACM. The broadcast of ACAS information would not be used to alter ACAS performance in any way. The ACM concept document, in fact, suggests using this data to assure that ACM either shuts off or modifies its advisories so as not to thwart the independent ACAS.

Concern 4. Studies indicate that the differing surveillance methods used by the two systems will result in each predicting different conflicts. In particular, the increased surveillance accuracy afforded by ADS-B is likely to eliminate many of the nuisance alarms present with ACAS. In such cases, a maneuver by either aircraft could prompt an alert in ACM after ACAS has issued an RA. There are many other possible situations, which could lead to an ACM advisory activity around the time of an ACAS RA, including some failure of the ACM system. In any case, the requested information would be used to prevent thwarting ACAS.

Concern 5. The CD&R group shares these concerns, and believes that the interoperability and interaction of ACAS and ACM must be thoroughly studied and addressed as part of the development and implementation of ACM.