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APPLICATION OF AIRBORNE CONFLICT MANAGEMENT: DETECTION, PREVENTION, & RESOLUTION

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1 PURPOSE AND SCOPE

Note: *Aspects of this concept are still under development and have not yet been validated. The document is not intended to set requirements, but is intended to serve as a foundation for follow-on requirements development.*

1.1 Introduction

This document presents an operational concept for the Application of Airborne Conflict Management (ACM) using Automatic Dependent Surveillance-Broadcast (ADS-B). The ACM concept includes detecting conflicts, monitoring for potential conflicts, and suggesting resolutions to prevent a violation of airspace separation criteria against all other properly equipped aircraft/vehicles. (This concept was formerly known as Conflict Detection and Resolution [CD&R].)(See Appendix D for definitions.)

ACM is a core enabling function for the global implementation of the *Free Flight* concept, as it will aid pilots to fly user-preferred trajectories while avoiding conflicts with other aircraft. The long surveillance range afforded by ADS-B will enable alerts to be issued in time to solve the conflicts with minimum disruption to flight path. It is expected that the time provided by this long range will allow for a variety of solutions, or optimized solutions, thus enabling the choice of user-preferred trajectories while avoiding conflicts with other aircraft.

ACM includes three different functions: Conflict Detection (CD), Conflict Prevention (CP), and Conflict Resolution (CR). These functions need not all be present in an ACM system.

The CD part of this application will provide automated alerting and relevant traffic information, if displayed, to help the pilot detect existing conflicts with other aircraft based on current flight states and intents. The actions in response to these alerts may have to be coordinated with the air traffic service provider or may be solely managed by the pilot, depending on the operating environment and flight rules in effect at the time of the encounter.

The CP part of this application will predict conflicts that may occur if current flight state or own ship intent is changed. As such, it will offer guidance cues to prevent changes that will lead to conflicts.

The CR part of this application will provide recommended conflict resolutions or guidance cues. The CR function is designed to be completely interoperable with and functionally independent of existing Airborne Collision Avoidance Systems (ACAS).

Under normal circumstances, conflicts are expected to be resolved at long range by minor changes to the flight path. However, ACM is also designed with two shorter-range alert thresholds in which increasingly urgent alerts and updated resolutions are provided as necessary for required avoidance maneuvers.

In the future, it will be desirable for an ACM system to also take into account known, non-aircraft "threats" (e.g., terrain, weather, and restricted airspace); however, such capabilities are not described in this document.

This concept is being developed by a subgroup of Working Group 1 (WG-1) of RTCA Special Committee 186 (SC-186) on ADS-B. The group includes representatives from

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