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Development and Implementation Planning Guide for Automatic Dependent Surveillance Broadcast (ADS-B) Applications

RTCA DO-249
October 6, 1999

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Foreword

This document was prepared by Special Committee-186 (SC-186). It was approved by the RTCA Program Management Committee on October 6, 1999. It outlines suggested activities for the development and implementation of ADS-B applications. The purpose of this planning guide is to document the range of activities that need to take place in order to guide an application from an initial concept to operational use. This document is intended for airspace users (e.g., air carrier, general aviation, military), service providers, manufacturers, and the supporting research and development community. This is guidance material to help direct the development activities towards operational implementation, but is not a replacement for any regulatory certification, operational approval, or acquisition process.

RTCA, Incorporated, is a not-for-profit corporation formed to advance the art and science of aviation and aviation electronic systems for the benefit of the public. The organization functions as a Federal Advisory Committee and develops consensus-based recommendations on contemporary aviation issues. RTCA's objectives include, but are not limited to:

- Coalescing aviation system user and provider technical requirements in a manner that helps government and industry meet their mutual objectives and responsibilities;
- Analyzing and recommending solutions to the system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency;
- Developing consensus on the application of pertinent technology to fulfill user and provider requirements, including development of minimum operational performance standards for electronic systems and equipment that support aviation; and
- Assisting in developing the appropriate technical material upon which positions for the International Civil Aviation Organization and the International Telecommunication Union and other appropriate international organizations can be based.

The organization's recommendations are often used as the basis for government and private sector decisions as well as the foundation for many Federal Aviation Administration Technical Standard Orders.

Since RTCA is not an official agency of the United States Government, its recommendations may not be regarded as statements of official government policy unless so enunciated by the U.S. government organization or agency having statutory jurisdiction over any matters to which the recommendations relate.

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1.0 Introduction

1.1 Background

RTCA Special Committee-186 (SC-186) is charged with developing industry standards for Automatic Dependent Surveillance-Broadcast (ADS-B) and monitoring the implementation of those standards to facilitate direct feedback from users and providers into the standards process. This focus on operational implementation demonstrates SC-186's strong commitment to meeting the needs and priorities of the Air Traffic Management (ATM) system users and service providers. To document the ADS-B development and implementation process, SC-186 prepared this planning guide. The planning guide is largely based on current ADS-B / Cockpit Display of Traffic Information (CDTI) development and implementation activities for enhanced visual acquisition applications. These activities are the first to use the RTCA ADS-B Minimum Aviation System Performance Standards (MASPS) [1] and the RTCA Guidance for Initial Implementation of CDTI [2] to build and certify an ADS-B / CDTI system.

Much effort was taken to harmonize this planning guide with a similar template being developed by International Civil Aviation Organization (ICAO) Secondary Surveillance Radar and Collision Avoidance Systems Panel (SICASP) Working Group 2 – Airborne Separation Assurance System (ASAS) Sub-Group [3]. These documents are closely aligned, although the scope of the ASAS template is limited to development activities.

1.2 Purpose and Scope

This planning guide outlines suggested activities for the development and implementation of ADS-B applications. It is intended for airspace users (e.g., air carrier, general aviation, military), service providers, manufacturers, and the supporting research and development community. This is guidance material to help direct the development activities towards operational implementation, but is not a replacement for any regulatory certification, operational approval, or acquisition process. While this planning guide was initially developed under RTCA SC-186 for ADS-B applications, it was realized that this methodology also could be used to validate and approve other advanced communications, navigation, and surveillance (CNS) applications, such as required navigation performance-based moving map displays, aviation data bases, and flight information services. This planning guide focuses on pilot and controller functions. However, it is acknowledged that ADS-B and other CNS applications also may be developed to support other users, such as Airline Operation Centers (AOC), Fixed Base Operators, military, airport operations, or other aviation organizations.

The purpose of this planning guide is to document the range of activities that need to take place to bring an application from an initial concept to operational use. Thirteen activities are

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outlined, with activities 1 through 10 designated as ”Development,” and activities 11, 12 and 13 designated as “Implementation.” Note that the ”Development” activities are precursors to “Implementation,” but also will be considered during the equipment certification and operational approval phases of “Implementation.” Implementation activities included in this planning guide are specific to the U.S. Federal Aviation Administration (FAA), but may be applicable to other civil aviation authorities.

1.3 Using the Planning Guide

An effective forum with full participation by all appropriate aviation organizations is necessary for the successful accomplishment of the development and implementation process. All identified stakeholders should participate appropriately as early as possible in this process. Stakeholders will include air traffic services, flight standards, and aircraft certification offices; airlines, general aviation, military, and other users; avionics and airframe manufacturers; controller, maintenance, and pilot unions; and research and development organizations. In addition, given the international nature of aviation, special efforts should be taken to ensure international harmonization (e.g., ICAO annexes, regional forums, Standards and Recommended Practices [SARPs]).

This planning guide does not assign specific organizations to activities as this may vary according to the application and to the phase of the process. However, the sponsoring organization (the organization driving the operational implementation) would have overall responsibility for the development activities with coordination and input from manufacturers, research and development organizations, and others as necessary. The FAA or other civil aviation authorities would have oversight on the certification and operational approval process. Implementation transition would require a cooperative effort by both the sponsoring organization and the oversight civil aviation authority.

The thirteen activities are listed in an approximate sequential order. However, each activity does not have to be completed prior to starting the next activity. In many cases, a parallel and iterative process should be used to feed data and experience from one activity to another. It should be noted that not all activities may be required for specific applications. This planning guide is applicable to new applications using existing systems.

As development and implementation activities proceed, various products will be developed that address the activities in this planning guide. Separate products corresponding to each element in this planning guide may not be necessary. This planning guide does not prescribe a specific format for these products, but rather serves as a checklist to ensure that needed activities are completed.

Appendix A provides an example of an enhanced visual acquisition application development and implementation by giving an overview of initial ADS-B activities as they relate to this planning guide.

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