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Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System

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FOREWORD

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1 PURPOSE AND SCOPE

1.1 Introduction

This document contains Minimum Operational Performance Standards (MOPS) for the Aircraft Surveillance Applications (ASA) System. These standards specify system characteristics that should be useful to designers, manufacturers, installers and users of the equipment.

These MOPS for the ASA System contain requirements for processing, control and display of traffic and Ownship information for use by the flight crew in performing airborne applications.

Compliance with these standards is recommended as one means of assuring that the equipment will perform its intended function(s) satisfactorily under all conditions normally encountered in routine aeronautical operation. Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

Section 1 of this document provides information needed to understand the rationale for equipment characteristics and requirements stated in the remaining sections. It describes typical equipment operations and operation goals, as envisioned by the members of RTCA Special Committee 186 (SC-186) and EUROCAE Working Group 51 (WG-51), and establishes the basis for the standards stated in Sections 2 through 3. Definitions and assumptions essential to proper understanding of this document are also provided in this section.

Section 2 contains the Minimum Performance Standards for the equipment. These standards specify the required performance under standard environmental conditions.

Section 3 includes recommended bench test procedures necessary to demonstrate equipment compliance with the stated minimum requirements.

Section 4 describes the performance required of installed equipment. Tests for the installed equipment are included when performance cannot be adequately determined through bench testing.

This document considers requirements for the functions consisting of: Airborne Surveillance and Separation Assurance Processing (ASSAP) and Cockpit Display of Traffic Information (CDTI) as described in the Safety, Performance and Interoperability Requirements (SPR) documents for the applications developed by RTCA SC-186 and EUROCAE WG-51:

- ATSA-AIRB (DO-319/EUROCAE DOCUMENT ED-164),
- ATSA-VSA (DO-314/ED-160),
- ATSA-ITP (DO-312/ED-159),
- ATSA-SURF (DO-322/ED-165),
- TSAA (DO-348/ED-232),
- CAVS (DO-354/ED-233), and
- Flight-deck Interval Management (FIM) MOPS (DO-361A/ED-236A).

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Note: The FIM MOPS (DO-361A/ED-236A) is based on the FIM SPR (DO-328B/ ED-195B).

Operational performance standards for functions or components that exceed the stated minimum requirements are identified as optional features.

Note: In this document, ADS-B Traffic Advisory System (ATAS) is used to refer to the Traffic Situation Awareness and Alerts (TSAA) application. ATAS is consistent with the name used in the TSO for this application. The TSAA SPR (DO-348/ED-232) will not be updated with ATAS and will continue to use TSAA.

The word "function" as used in this document includes all components and units necessary for the system to properly perform as intended. The functional requirements are allocated so that most input and output between the ASA System and the aircraft interacts with the ASSAP functional block. Functions that display data to the flight crew or accept input from the flight crew are allocated to the CDTI functional block. ASSAP and CDTI should not be misinterpreted to be synonymous to hardware architecture. ASSAP and CDTI functions may be allocated to a hardware architecture as the manufacturer desires, not considering approval processes.

If the functional implementation includes a computer software package, the guidelines contained in DO-178C/ED-12C, *Software Consideration in Airborne Systems and Equipment Certification*, should be considered.

The Automatic Dependent Surveillance – Broadcast (ADS-B) implementations on aircraft are expected to be a mixture of:

- DO-260/ED-102 (Version 0),
- DO-260A (Version 1),
- DO-260B/ED-102A (Version 2),
- DO-260C/ED-102B (Version 3),
- DO-282A (Version 1),
- DO-282B (Version 2), and
- ED-108A.

ADS-B receivers may make use of Version 0 and Version 1 transmissions for the advisory applications as described in this document. Applications may require more rigorous parameter validation either via certification approval or real-time validation.

Note: Documents referenced with empty parentheses, such as DO-260()/ED-102() or DO-282(), refer to all versions of the document. References to specific document versions include an indication of the revision.

1.1.1 Revisions to Previous Version

Revisions to the previous version of this document (DO-317B/ED-194A) include:

- Removal of the Airborne Collision Avoidance System (ACAS) traffic designation support and referenced RTCA DO-385/ED-256 Volume I and II - Minimum Operational Performance Standards for Airborne Collision Avoidance System X (ACAS X) (ACAS Xa and ACAS Xo), which contain the CDTI and ASSAP requirements for this functionality.

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- Update to the ADS-B Traffic Advisory System (ATAS) test vectors.
- Changes to CAVS to (i) rename the "CAVS Minimum Range" alert to CAVS Surveillance Alert to better reflect the purpose of the alert and (ii) add requirements that allow CAVS to be used at closer horizontal ranges for Ownship and traffic with better position accuracy and integrity. The closer ranges could support future procedures, such as a CAVS procedure to closely spaced parallel runways.
- Update requiring that the previously optional requirements for Geometric Altitude be implemented.
- Update to include requirements on coasting surveillance quality and data validity metrics.
- Update to include an interface between ASSAP and the ADS-B/ADS-R/TIS-B Receiver for the traffic prioritization.

Note: The ADS-B Traffic Advisory System (ATAS) was referred to as the Traffic Situation Awareness with Alerts (TSAA) application in previous versions of this document.

1.2 System Overview

The ASA System provides the avionics for the surveillance processing and display of aircraft-to-aircraft applications. The avionics support the performance of the applications in these documents as developed by RTCA/EUROCAE: ATSA-AIRB (DO-319/ED-164), ATSA-VSA (DO-314/ED-160), ATSA-ITP (DO-312/ED-159), ATSA-SURF (DO-322/ED-165), TSAA (DO-348/ED-232), CAVS (DO-354/ED-233), and FIM (DO-361A/ED-236A).

Note: In this document, ADS-B Traffic Advisory System (ATAS) is used to refer to the Traffic Situation Awareness and Alerts (TSAA) application. ATAS is consistent with the name used in the TSO for this application. The TSAA SPR (DO-348/ED-232) will not be updated with ATAS and will continue to use TSAA.

1.2.1 Aircraft Surveillance Applications

Figure 1-1 provides an overview of the standard ASA architecture and depicts the interfaces between functional elements for an ASA aircraft participant. Note that the ADS-B transmit and receive subsystems are specified in DO-260()/ED-102(), DO-282(), and ED-108() for the 1090 MHz, Universal Access Transceiver (UAT), and Very High Frequency Data Link Mode 4 (VDL4) systems respectively.

This ASA System MOPS specifies the two standard subsystems for the ASA Receive Participant:

- Surveillance data processing subsystem: ASSAP.
- Display and control subsystem: CDTI.

The blocks in Figure 1-1 labeled ASSAP and CDTI collectively are referred to as the ASA System and are the scope of this document. The ASA System also interfaces with other aircraft systems.

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