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Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)

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Foreword

This document was prepared by Special Committee 186 (SC-186) and approved by the RTCA Program Management Committee (PMC) on December 17, 2020.

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 Standards Development Organization (SDO) 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 (ICAO), the International Telecommunications Union (ITU) 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 PURPOSE AND SCOPE

1.1 Introduction

This document contains Minimum Operational Performance Standards (MOPS) for airborne equipment for Automatic Dependent Surveillance-Broadcast (ADS-B) and Traffic Information Service – Broadcast (TIS-B) utilizing 1090 MHz Mode S Extended Squitter (1090ES). The supporting hardware can be incorporated within other on-board equipment, or alternatively, the ADS-B equipment may be a separate avionics unit.

Note: Definitions of acronyms (e.g., MOPS, ADS-B, 1090ES) and of many other terms (e.g., "Extended Squitter") can be found in Appendix B of these MOPS.

Compliance with these standards by manufacturers, installers and users is recommended as one means of assuring that the equipment will satisfactorily perform its intended functions under conditions encountered in routine aeronautical operations. The regulatory application of these standards is the responsibility of appropriate government agencies. For example, in the United States, the Federal Aviation Administration (FAA) publishes and maintains a Technical Standard Order (TSO-C166) for 1090ES ADS-B equipment to reference the requirements and bench test procedures in Section 2 of this document. In the European Union, the European Aviation Safety Agency (EASA) publishes and maintains a European Technical Standard Order (ETSO-C166) for 1090ES ADS-B equipment to the same reference in this document.

Since the equipment implementation includes a computer software package, the most recent version of the *Software Considerations in Airborne Systems and Equipment Certification*, (RTCA DO-178C/EUROCAE ED-12C) is applicable. When determining the level of software requirements, as defined in RTCA DO-178C/EUROCAE ED-12C, or subsequent versions, the equipment manufacturer should consider the criticality level appropriate for the installation certification, equipment failure analysis, and the fault monitoring being accomplished.

In addition, since the measured values of equipment performance characteristics may be a function of the measurement method, standard test conditions and methods of test are recommended in this document.

1090ES is documented and standardized internationally at ICAO. Relevant ICAO documents include Annex 10 Volume IV Standards and Recommended Practices (SARPs) as well as ICAO Document 9871 (Technical Provisions for Mode S Services and Extended Squitter).

Throughout this document, the term CAS is used to mean a generic collision avoidance system, applicable to any of the existing airborne collision avoidance implementations. Rarely, the terms TCAS (RTCA DO-185A/B / EUROCAE ED-143), ACAS Xa (RTCA DO-385 / EUROCAE ED-256), ACAS Xu (RTCA DO-386 / EUROCAE ED-275), or ACAS II (ICAO SARPs) are used when the associated text applies to a specific implementation. The full descriptor ACAS Xa/Xo is shortened to ACAS Xa, and TCAS II is shortened to TCAS. In this document, the term ACAS X is used when text applies equally to ACAS Xa and ACAS Xu. Original RF message names, e.g., TCAS Resolution Message, are retained.

