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MINIMUM OPERATIONAL PERFORMANCE STANDARDS FOR AIRBORNE AUTOMATIC DEPENDENT SURVEILLANCE (ADS) EQUIPMENT

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FOREWORD

This document was prepared by RTCA Special Committee 170 (SC-170). It was approved by RTCA on October 26, 1992.

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1.0 PURPOSE AND SCOPE

1.1 Introduction

This document contains minimum operational performance standards for airborne equipment required for the automatic dependent surveillance (ADS) function (ADSF). The supporting hardware can be a stand-alone ADS unit (ADSU) or alternatively, the ADS function may be installed within other on-board equipment.

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

Portions of the communications environment are described in RTCA/DO-205, *Design Guidelines and Recommended Standards to Support Open Systems Interconnection for Aeronautical Mobile Digital Communications. Part 1 — Internetworking*. The ADSF is considered to be an application within the context of the Open Systems Interconnection (OSI) reference model and relies on two supporting elements: the hardware and the communication system.

Since the equipment implementation includes a computer software package, RTCA/DO-178B, *Software Considerations in Airborne Systems and Equipment Certification*, is applicable.

When determining the level of software requirements, as defined in RTCA/DO-178B, the equipment manufacturer should consider the criticality appropriate for the installation certification, equipment failure analysis, and the fault monitoring being accomplished.

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.

Section 1.0 of this document provides information and assumptions needed to understand the rationale for equipment characteristics and requirements stated in the remaining sections. It describes typical equipment applications and operational goals, and forms the basis for the standards stated in Sections 2.0 and 3.0.

Section 2.0 contains the minimum operational performance standards for the equipment. These standards define required performance under standard operating conditions and stressed physical environmental conditions. Also included are recommended bench test procedures necessary to demonstrate equipment compliance with the stated minimum requirements. This includes, but is not limited to, the ADS application and OSI communication software.

Section 3.0 describes the performance required of the installed equipment. Tests for the installed equipment are included when performance cannot be adequately determined through bench testing.

1.2 Operational Goals

The purpose of the ADSF is to provide aircraft surveillance data for maintaining safe separation of aircraft and to allow improved airspace capacity and more efficient utilization. This will be accomplished by providing information to the ground-based peer of the ADSF, the ADS processor (ADSP), which will enable it to estimate aircraft position, and to make short term and long term predictions of where the aircraft will be at a specific future time. The aircraft avionics will provide information on its present position, short term and long term intent, local meteorological data, and occurrence of certain events.

1.3 Operational Applications

ADS is intended to provide automatic periodic position and event-driven reports to the ADSP at ground-specified intervals. Aircraft avionics should be installed and/or modified to generate these ADS reports. The ADSP will subsequently process the information to validate and correlate the ADS position reports with the flight plan.

1.4 ADS System Overview

ADS is a service for use by air traffic services (ATS) in which aircraft automatically transmit, via a data link, data derived from on-board navigation systems. As a minimum, the data include three-dimensional position, the corresponding time of the position data, and a Figure of Merit (FOM) that characterizes the accuracy of the position data. Additional data may be provided as appropriate. [Adapted from the Future Air Navigation Systems (FANS)/4 Report, Document 9524.]

1.4.1 Principle of Operation

The ADS concept is based on the use of aircraft-derived position, transmitted over data link, for controllers to use in providing separation assurance. It can be used in remote areas where radar is impractical, or as a low-cost alternative to a global range radar system. Early operational use of the system will be primarily for oceanic position reporting, but future applications may include domestic reporting, terminal area and ground movement surveillance.

The initial airspace environment may contain special routes reserved for ADS-equipped users: Air traffic authorities may take advantage of ADS and data link capabilities to reduce separations between aircraft using such routes. Separation requirements should be based on several factors, including the performance of the communication and navigation systems employed.