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MOPS for GNSS Airborne Active Antenna Equipment for the L1/E1 and L5/E5a Frequency Bands

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FOREWORD

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EXECUTIVE SUMMARY

The purpose of this MOPS is to specify performance requirements for an active integrated dual frequency GNSS Aviation Antenna. This includes requirements that address reception of GNSS signals that support safety of life aviation applications in the L1/E1 (centered at 1575.42 MHz) and L5/E5a (centered at 1176.45 MHz) bands. The requirements developed in this antenna MOPS support a range of flight phases including enroute, terminal, approach, precision landing and surface operations. In comparison to RTCA/DO-301, this antenna MOPS specifies better needed performance in the L1/E1 band for parameters including (but not limited to) G/T, group delay differential, axial ratio and boresight frequency response. In comparison to DO-373, this DO-373A version primarily updates the Axial ratio, out of band compression point and antenna relative frequency response specifications.

Inclusion of details regarding antennas that receive GLONASS signals in Appendix B is for informational purposes alone. These are not part of the requirements basis in this MOPS and are not intended to be part of a TSO that may reference this MOPS. Appendix B has not undergone any further revisions as part of the DO-373A update (as compared to the original DO-373 document).

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1 PURPOSE AND SCOPE

1.1 Introduction

This document contains minimum operational performance standards (MOPS) for GNSS airborne active antenna equipment designed to use GNSS signals centered at L1 (1575.42 MHz) and L5 (1176.45 MHz) frequencies with a double-sided bandwidth as indicated in Table 2-1. These signals may be augmented by other systems/equipment/techniques as appropriate to meet the performance requirements for enroute, terminal, non-precision, and precision approach phases of flight and surface operations. An active antenna is one integrated with a preamplifier.

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 through 4.0.

Section 2.0 contains the minimum performance standards for the equipment. These standards define required performance under standard operating conditions and stressed physical environmental conditions. It also details the recommended bench test procedures necessary to demonstrate compliance.

Section 3.0 provides information regarding the performance required of the installed equipment.

Section 4.0 provides information on the operational performance evaluation for the GNSS Antenna

Compliance with these standards by manufacturers, installers, and users is recommended as one means of assuring that the equipment will satisfactorily perform its intended function(s) under conditions normally encountered in routine aeronautical operations.

The word "equipment" as used in this document includes all components or units necessary (as determined by the equipment manufacturer or installer) for the equipment to properly perform its intended function. It is recognized that any regulatory application of these standards is the responsibility of appropriate government agencies.

As 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.

1.2 System Overview

The GNSS is a world-wide position, velocity, and time determination system that includes one or more satellite constellations, receivers, and system integrity monitoring, augmented as necessary to support the required navigation performance for the actual phase of operation. The GNSS includes ground control and monitoring stations, satellites, and avionics including antenna(s), and currently consists of the United States Global Positioning System (GPS), the European Galileo, the Russian Federation Global Orbiting Navigation Satellite System (GLONASS), the Chinese Beidou system and others. The GNSS also includes ICAO SARPS compliant Satellite Based Augmentation Systems (SBAS) and Ground Based Augmentation Systems (GBAS).

This antenna MOPS is applicable to the GPS L1 and L5 frequencies [RD2, RD3] as well as the Galileo E1 and E5a [RD1] frequencies. Details on multiband antennas that receive

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