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Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation

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FOREWORD

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- 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.

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Membership

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1.0 PURPOSE AND SCOPE

1.1 Introduction

The International Civil Aviation Organization (ICAO) has recognized a need for dramatic improvements to the existing air navigation system. An ICAO Special Committee of Future Air Navigation Systems (FANS) developed a new concept expressed in terms of communication, navigation, surveillance and air traffic management (CNS/ATM). It is intended to be an evolutionary means of achieving improvements in the global air navigation system. To obtain the benefits of the CNS/ATM concept, aircraft will need to achieve accurate, repeatable and predictable navigation performance. This is referred to as Required Navigation Performance (RNP).

This document contains Minimum Aviation System Performance Standards (MASPS) for area navigation systems operating in an RNP environment. These standards are intended for designers, manufacturers, and installers of avionics equipment, service providers and users of these systems for world-wide operations. The MASPS provides guidance for the development of airspace and operational procedures needed to obtain the benefits of improved navigation capability.

The requirements of this MASPS are intended to meet the definitions of RNP developed by the ICAO Review of the General Concept of Separation Panel (RGCSP) while providing increased integrity with repeatable and predictable navigation. In addition, barometric vertical navigation (VNAV) requirements are defined for aircraft that provide the capability to ensure accurate and predictable vertical paths. The VNAV requirements in this document are consistent with but may not be sufficient for instrument approach procedures with vertical guidance (IPV). Due to the wide disparity of climb performance of different aircraft types, this MASPS only addresses vertical path definition requirements for level flight and descent. Finally, optional requirements for estimated time of arrival (ETA) and time of arrival control (TOAC) functions are defined for systems that provide these functions.

Compliance with these standards is one means of ensuring that the system and each subsystem will perform its intended function(s) satisfactorily under conditions normally encountered in aeronautical operations. The MASPS, when applied by regulatory authorities, are expected to provide the benefits of the listed applications in section 1.3.

Section 1.0 of this document describes minimum navigation performance functions, operational goals, and applications needed to operate in RNP RNAV airspace. It also includes the assumptions made within the MASPS for defining the airborne requirements.

RNP RNAV airspace may be considered to apply to an area, route, procedure or operation using a particular RNP RNAV type. The functions are described for position estimation, path definition and steering, and user interface.

Section 2.0 describes the minimum system performance requirements.

Section 3.0 describes minimum performance standards for each subsystem/function that is a required element of minimum system performance.

Section 4.0 describes an acceptable method for demonstrating system performance compliance and subsystem performance to meet the minimum standards in Section 2.0.

The appendices in the MASPS include a glossary of terms and acronyms (A), an example of system compliance analysis (B), navigation system requirements and infrastructure characteristics