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**Minimum Operational Performance Standards
for GPS Ground-Based Regional Augmentation
System Airborne Equipment**

RTCA DO-310
March 13, 2008

Prepared by: SC-159
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Foreward

This document was prepared by RTCA Special Committee 159 (SC-159) and approved by the RTCA Program Management Committee (PMC) on March 13, 2008.

Airservices Australia sponsored the development of this standard to support the concurrent development, design, specification and commercialization of the ground portion of the Ground based Regional Augmentation System.

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This document was based on DO-253B, DO-229D and ICAO SARPS.

If a requirement from DO-253B is completely applicable, the section/subsection in this document will contain the statement "The equipment shall [GRAS-470] meet the requirements of (Applicable Standard such as DO-253B, Section 2.3.2, 'Design Assurance')." Note that the requirements numbering sequence in this document starts at 401 and corresponds to 001 for DO-253B which currently has requirements from 001 to 317. This document will have requirements running from 401 to 717, less any DO-253B requirements which do not apply plus any new requirements which will start at 801. Thus [GRAS-470] corresponds to DO-253B requirement [LAAS-070]. DO-229D 'shall' requirements were not numbered so when a section from DO-229D is referenced, it will be indicated together with requirement numbers starting at 801.

A new Test Cross Reference Matrix that includes all the minimum performance requirement 'shalls' was created using the one in DO-253B as the starting point. It has a column added between the Requirement Section reference and the DO-253B requirement number that shows the new requirements numbers [i.e. 401 etc]. When a DO-229D or other requirement is added, as noted above, it will have a requirement number in the range of 801-1495 and no corresponding DO-253B requirement number. The Test Cross Reference Matrix – Table 2-12 captures the minimum performance requirement shalls in Sections 2.1 through 2.5. Shalls in Sections 2.6 & 2.7 are test requirements and are not included in Table 2-12.

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1 PURPOSE AND SCOPE

1.1 Introduction

This document contains minimum operational performance standards (MOPS) for airborne navigation equipment using signals from the Global Navigation Satellite System (GNSS) augmented by a Ground-Based Regional Augmentation System (GRAS). These standards are derived from the requirements specified in RTCA DO-253B, *Minimum Operational Performance Standards (MOPS) for the Local Area Augmentation System (LAAS)*, RTCA DO-229D *Minimum Operational Performance Standards for GPS/WAAS Airborne Equipment*, and ICAO Annex 10, Volume 1, GNSS SARPS (Amendment 81 to the ICAO Annex 10 Volume 1).

Rather than repeat verbatim the words from the above Standards, this Standard references the source Standard. Where no change in wording is necessary to the source Standard, this Standard simply refers to the source by Document Number i.e. DO-253B and Section number and Name. For example,

Section 2.1.4 General Human Factors Requirements and Applicable Documents

The GRAS equipment shall [GRAS-404] meet the requirements of DO-253B, Section 2.1.4, ‘General Human Factors Requirements and Applicable Documents’.

If the referred Section in DO-253B contains the word LAAS, for the purposes of this Document, LAAS shall be interpreted as meaning GBAS or GRAS as appropriate.

If a minor change was necessary, the reference was either modified with a description of the exception or the requirement modified by saying for example, “except that “PAN” is deleted”.

Requirements are described as “shalls” and are followed by a reference number e.g. [GRAS-437] which is listed in a matrix of test requirements elsewhere in this Standard. To eliminate any possible confusion with the test reference numbering, the GRAS test reference numbers in this document start at 401. The LAAS [DO-253B] numbers start at 001 and currently end at 317. The test reference numbers in this document between 401 and 717 are the DO-253B number plus 400. Additional requirements either new or from other Standards begin at 801.

Throughout this document, the term “GRAS” is used as a generic reference to Ground-Based Augmentation Systems (GBAS) as defined by the International Civil Aviation Organization (ICAO) in Annex 10, Volume 1, Chapter 3. The requirements in this standard are intended to meet the ICAO Standards and Recommended Practices (SARPs) for the GBAS aircraft element.

The standards in this document define minimum performance requirements, functions and features for GRAS airborne equipment to support all phases of flight including en-route, terminal, LNAV (Lateral NAVigation), LNAV/VNAV (Lateral NAVigation/Vertical NAVigation), LP (Localizer Approach with FAS data but without vertical guidance), LPV (Localizer Precision with Vertical guidance) (but not CAT-I/II/III). It is also intended that GRAS will support guided missed approach, departure with vertical guidance, surface guidance and other operational needs as they evolve in the future. GRAS equipment will be compatible with GBAS and will be able to use the signal in space for approved approach operations.