RTCA, Inc.
1828 L Street, NW, Suite 805
Washington, DC 20036-5133 USA

# Minimum Operational Performance Standards (MOPS) for GPS Local Area Augmentation System (LAAS) Airborne Equipment

RTCA DO-253C
December 16, 2008

Prepared by: SC-159

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RTCA, Inc.

Telephone: 202-833-9339
Facsimile: 202-833-9434
Internet: www.rtca.org

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## Foreword

This document was prepared by RTCA Special Committee 159 (SC-159) and approved by the RTCA Program Management Committee (PMC) on December 16, 2008.

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 Federal Advisory Committee 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 Operation Performance Standards (MOPS) 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) and the International Telecommunication Union (ITU) and other appropriate international organizations can be based.

The recommendations of RTCA 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 (TSO).

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# 1 PURPOSE AND SCOPE

## 1.1 Introduction

This document contains minimum operational performance standards (MOPS) for airborne navigation equipment using the Global Positioning System (GPS) augmented by the Local Area Augmentation System (LAAS). These standards are partially derived from the requirements specified in RTCA DO-245(), *Minimum Aviation System Performance Standards (MASPS) for the Local Area Augmentation System (LAAS)*. Additional requirements have been derived by analysis of operational intent and direct allocation of performance requirements between airborne and ground systems. Throughout this document, the term "LAAS" is used as a generic reference to ground-based augmentation systems (GBAS) as defined by the International Civil Aviation Organization (ICAO), as the requirements in this standard are intended to comply with the ICAO Standards and Recommended Practices (SARPs) for the GBAS aircraft element.

Note: *At the time of this writing, the ICAO SARPs (through Amendment 82) have not been updated to include requirements for GBAS to support a type of service appropriate for conducting CAT II/III operations. Consequently, some requirements in this MOPS are beyond the requirements in the SARPs.*

The standards in this document define minimum performance requirements, functions and features for LAAS airborne equipment to support multiple types of service that are intended to support precision approach operations for all weather minimums. This standard also covers the computation and output of position, velocity, and time (PVT) to support area navigation and other applications.

Note: *The requirements for area navigation systems continue to evolve. Applicable standards include RTCA/DO-236(), RTCA/DO-229(), RTCA/DO-187() [as amended by TSO-C115()] and RTCA/DO-208() [as amended by TSO-C129()].*

Compliance with these standards by manufacturers, installers and users is recommended as a 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. In the United States, the Federal Aviation Administration (FAA) has published two Technical Standard Orders (TSO) for GPS/LAAS equipment, one for the LAAS VHF Data Broadcast (VDB) receiver function (TSO-C162) and another for the LAAS Position And Navigation (PAN) function (TSO-C161). The FAA plans to update these TSOs. These updated TSOs will continue to reflect the requirements in this MOPS consistent with supporting Category I approaches and the positioning service only. Requirements for Airborne Equipment Class D will be addressed by a subsequent TSO revision or an additional TSO after validation of these requirements.

The word "equipment", as used in this document, includes all components or units necessary (as determined by the equipment manufacturer or installer) to properly perform its intended function.