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Minimum Aviation System Performance Standards (MASPS) for an Enhanced Flight Vision System to Enable All-Weather Approach, Landing, and Roll-Out to a Safe Taxi Speed

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Prepared by: SC-213

FOREWORD

This report was prepared by Special Committee 213(SC-213) and approved by the RTCA Program Management Committee on September 26, 2012.

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 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.

The organization's recommendations 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 and several advisory circulars.

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1 PURPOSE AND SCOPE

1.1 Introduction

DO-315 described Minimum Aviation System Performance Standards (MASPS) for Enhanced Vision Systems (EVS), Synthetic Vision Systems (SVS), and Combined Vision Systems (CVS) technologies. An approved combination of EVS and HUD is termed an Enhanced Flight Vision System (EFVS) by the FAA. The European Aviation Safety Agency (EASA) uses the term "EVS" as equivalent to the FAA description of EFVS. While further definitions are in Appendix A, it is important to understand this distinction before reading this document.

Under DO-315A, MASPS have been established for systems used for approach to touchdown in visibility as low as 1000 ft Runway Visual Range (RVR) (or 300 m if applicable) by use of an approved EFVS. Under DO-315B, MASPS have been established for systems that could be used on an instrument approach with lower decision altitude/height and/or possible lower visibility minima, by use of an approved SVS.

In the U.S., the approving regulation to use Enhanced Flight Vision System technology is established under Title 14 of the Code of Federal Regulations (CFR) §91.175 (l) and (m) which states that an approved EFVS may be used in lieu of a pilot's natural vision, and a pilot may proceed with the visual segment of the approach based on the use of EFVS to 100 ft above threshold elevation. Airworthiness guidance for EFVS, EVS, SVS, and CVS can be found in AC 20-167, "Airworthiness Approval of Enhanced Vision System, Synthetic Vision System, Combined Vision System, and Enhanced Flight Vision System Equipment.

This MASPS provide the high level system requirements for EFVS when installed in aircraft with the express purpose of enabling specified straight-in instrument approaches with published vertical guidance to touchdown, landing, and roll-out to a safe taxi speed in visibility as low as 300 ft RVR (100 m) by use of an approved EFVS without need or reliance on natural vision. This MASPS follows from and expands upon the concepts and requirements established under DO-315A and the precedents established under 14 CFR §91.175 (l) and (m), which identified performance standards for an enhanced flight vision systems (EFVS) to enable approach, landing, roll-out and taxi, down to 1000 ft (300 m) runway visual range (RVR). The operational concept follows a fail-operational design.

The operational scenarios used for design context and concepts discussed in this document are written to describe the intended use of the proposed systems and from this context, associated minimum performance standards are derived. They do not define current or future operational regulations or limitations of these technologies.

Section 1 provides information needed to understand the rationale for system characteristics and requirements. This section also contains typical applications and envisioned operational goals and assumptions necessary to establish a basis for the subsequent sections. It describes typical applications and operational goals, as envisioned by members of RTCA Special Committee 213 and EUROCAE Work Group 79, and establishes the basis for the standards stated in Sections 2 through 4. Definitions and assumptions essential to proper understanding of this document are also provided in this section.

Section 2 describes minimum system performance requirements.