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Minimum Aviation System Performance Standards (MASPS) for Aircraft State Awareness Synthetic Vision Systems

RTCA DO-371
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Prepared by: SC-213
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FOREWORD

This document was prepared by Special Committee 213 (SC-213) and approved by the RTCA Program Management Committee (PMC) on January 9, 2018.

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EXECUTIVE SUMMARY

RTCA/DO-371 was originally prepared by RTCA Special Committee 213 (SC-213). It was approved by the RTCA Program Management Committee on January 9, 2018. This document expands the previously defined DO-315A intended function of an SVS beyond that of supplemental view of the external scene to include enhanced aircraft attitude and energy state awareness and defines a system that is intended to be presented full-time on the pilots' full color Primary Flight Displays (PFD). This document has been harmonized with EUROCAE Working Group 79 (WG-79). This document is technically equivalent to ED-249.

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1 PURPOSE AND SCOPE

1.1 Introduction

DO-315A addressed Enhanced Vision Systems (EVS), Synthetic Vision Systems (SVS), and Combined Vision Systems (CVS) technologies. This document identifies system and sub-system performance, safety and equipage requirements for the use of this technology under 14 CFR Part 25. These Minimum Aviation System Performance Standards (MASPS) may, in fact, also be applicable to non-Part 25 aircraft, but specific installation and operational deployment issues associated with these other vehicles have not been considered at this time. The performance standards for this SVS-only expanded functionality are updated from DO-315A. This document does not address EVS, CVS or Enhanced Fight Vision Systems (EFVS) or Synthetic Vision Guidance Systems (SVGS).

1.1.1 Purpose

This MASPS provides high level system requirements for an Aircraft State Awareness SVS (ASA SVS). This document expands the previously defined DO-315A intended function of an SVS beyond that of supplemental view of the external scene to include enhanced aircraft attitude and energy state awareness. This document defines a system that is intended to be presented full-time on the pilots' full color Primary Flight Displays (PFD).

Features of an ASA SVS may also be implemented on a Head-Up Display (HUD) or equivalent and standards for this are defined herein. If a HUD replaces the requirement for an HD PFD, this document may not contain all the appropriate requirements to perform the intended function and an additional assessment will need to be performed for compliance. Wherever the term HUD is used in this document, it is meant to be inclusive of a HUD equivalent type device such as a head worn display (HWD).

ASA SVS is intended to prevent the occurrence of spatial disorientation by supporting the pilots' continuous awareness of attitude, altitude, topography and energy state (speed, acceleration and altitude) related to the flight path and perceived motion of the aircraft. In addition to reducing the risk of controlled flight into terrain (CFIT) it is intended that an SVS meeting this MASPS will reduce the risk of loss-of-control inflight (LOC-I) accidents by preventing the attainment of any unusual (i.e., not normal) attitude and/or energy states that could result in a LOC-I.

> ***Note:*** *The Commercial Aviation Safety Team (CAST) chartered the ASA Joint Safety Analysis Team in 2010 to investigate LOC-I accidents and incidents in which the flightcrew lost awareness of the airplane's attitude and/or energy state. 274 intervention strategies (IS) were identified as mitigations to the standard problems observed in the LOC-I accident analysis. The CAST ASA Joint Safety Intervention Team reviewed the IS and developed 11 new safety enhancements (SE) including training, operations and design implementations. This MASPS was created in support of the desire to provide an industry standard for SE-200: Virtual day visual meteorological condition (VMC) displays (such as synthetic vision or an equivalent system) with energy state symbology cues. While SE-200 was identified as the highest rated design intervention in terms of risk reduction percentage. it is recognized that there exist many other impactful design interventions for reducing LOC-I that are not covered in this MASPS, e.g., Bank Alerting with Recovery Guidance (SE-201), Bank Angle Protection (SE-202), and Low Speed Alerting (SE-192).*

1.1.2 Structure of the Document

Section 1 provides an explanation of the scope and purpose of this document and introduces the ASA SVS.

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