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Minimum Operational Performance Standards for Airborne ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328.6-335.4 Megahertz

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F O R E W O R D

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1.0 PURPOSE AND SCOPE

1.1 Introduction

This document contains minimum operational performance standards for airborne glide slope receiving equipment. These standards specify system characteristics that should be useful to designers, manufacturers, installers and users of the equipment.

Compliance with these standards is recommended as one means of assuring that the equipment will perform its intended function satisfactorily under all conditions normally encountered in routine operations.

Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

Section 1.0 provides information needed to understand the rationale for equipment characteristics and requirements stated in the remaining sections. It describes typical equipment applications and operational goals and establishes the basis for the standards stated in Sections 2.0 through 4.0. Definitions and assumptions essential to proper understanding of this document are also provided in Section 1.0.

Section 2.0 contains the minimum performance standards for the equipment. These standards specify the required performance under standard and environmental conditions. Also included are recommended bench test procedures necessary to demonstrate equipment compliance with the stated minimum requirements.

Section 3.0 describes the performance required of the installed equipment. Tests for the installed equipment are included when performance cannot be adequately determined through bench testing.

Section 4.0 describes the operational performance characteristics for equipment installations and defines conditions that will assure the equipment user that operations can be conducted safely and reliably in the expected operational environment.

This document considers an equipment configuration consisting of: Antenna system(s), transmission lines, radio receiver, converter and a course deviation indication display. Additional functions and components that refer to expanded equipment capabilities are identified as optional features.

The word "system" as used in this document refers to the ILS glide slope system. It includes all portions of both the ILS glide slope ground transmitter and the glide slope airborne equipment.

The word "equipment" as used in this document includes all components and units necessary for the system to properly perform its intended function. For example, the "equipment" may include an

antenna, a receiver unit, converter, course deviation indicator, a shock mount, etc. In the case of this example, all of the foregoing components and units comprise the "equipment." It should not be inferred from this example that each airborne glide slope receiving equipment design will necessarily include all of the foregoing components or units. This will depend on the specific design chosen by the manufacturer.

If the equipment implementation includes a computer software package, the guidelines contained in RTCA/DO-178A, "Software Considerations in Airborne Systems and Equipment Certification," should be considered.

1.2 System Overview

The ILS glide slope system consists of the glide slope airborne equipment and ILS glide slope ground station transmitter operating in the range of 329.15 to 335.0 MHz.

The ground station transmits beams consisting of: 1) an RF carrier amplitude modulated by 90 and 150 Hz tones, and 2) 90 and 150 Hz carrier sidebands only. The resultant RF phase of the signal received at any approach angle determines the relative amplitude of the demodulated 90 and 150 Hz tones at that angle. The pattern of the antenna is such that when an aircraft is on glide path, equal amounts of 90 and 150 Hz tones are received.

1.3 Operational Applications

The ILS glide slope system provides vertical steering information. It is used with an associated ILS localizer system. Together, these two systems make up a precision landing system and give both vertical and horizontal guidance to an aircraft.

Typically, the ILS system is used with a VOR, ADF or marker beacon to identify a point in space from which it is safe to descend to a landing.

1.4 Operational Goals

Operational goals of the glide slope equipment are described in the following subparagraphs. Only general operational goals are identified. Detailed operational requirements for the equipment are contained in Sections 2.0, 3.0 and 4.0.

1.4.1 Sensitivity

The RF sensitivity of the installed glide slope equipment should be such that its performance meets the overall requirements of the remaining sections of this document in the presence of a standard glide slope signal having a power density of -95 dBW/m2 (350 microvolts per meter) or greater.