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Minimum Operational Performance Standards (MOPS) for Airborne Weather and Ground Mapping Pulsed Radars

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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 sets forth Minimum Operational Performance Standards (MOPS) for Airborne Weather and Ground Mapping Pulsed Radars. In addition to updating and expanding the scope of RTCA DO-134 (Minimum Performance Standards - Airborne Weather and Ground Mapping Pulsed Radars) to incorporate the provisions of new radar technology, this document is also intended to serve as a standard for both air carrier or large aircraft-type radar systems. It takes into account those requirements and technologies pertinent to general aviation, where limitations on space and/or weight may apply.

Compliance with these standards by manufacturers, installers and users is recommended as a means of assuring that the equipment will perform its intended function under all conditions normally encountered in routine aeronautical operations. It is recognized that any regulatory application of these standards is the responsibility of appropriate governmental agencies.

The word "equipment" as used herein includes all components or units necessary (as determined by the manufacturer or installer) for the equipment to properly perform its function. For example, the airborne radar "equipment" may include an antenna, antenna mounting, transmission line, a receiver/transmitter unit, a control/display unit, shock mount, etc. In the case of this illustrative example, all of the foregoing components or units comprise the "equipment." It should not be inferred from this example that every equipment configuration will necessarily include (or be limited to) all of the foregoing components or units. This will depend on the design chosen by the equipment manufacturer.

Some system designs, as an example, may not include a dedicated radar display unit, per se, but rather may share a multipurpose display such as an EFIS (Electronic Flight Indicator System). For airborne radar systems of such architecture, the shared display device, when used for the purpose of displaying radar information (either weather or ground mapping), must meet the display requirements as set forth in this document.

In the establishment of airborne weather and ground mapping radar equipment requirements, the inclusion of color was not considered to be a minimum requirement for the radar display element. However, it was recognized that the state of the art of both technology and product developments is such that many radar displays may, either now or in the future, include color capability. In this regard, for those equipments that do provide color displays as an optional but not required feature, it was considered critical that the color characteristics be precisely defined with attendant minimum performance requirements and test procedures for verification of performance. Appendix A to this document has been included to cover this situation.

1.2 Operational Goals

There are two primary operational goals that must be satisfied by the equipment described in this document, namely, weather detection and ground mapping.

In the case of weather detection, the airborne radar equipment must be capable of detecting and displaying echoes from precipitation in such a way as to permit flight crew analysis of probable turbulent areas ahead. In this regard, the radar equipment should provide the following performance features:

a. The sensed and displayed radar range goal should be to provide sufficient indication to the flight crew consistent with the speed and maneuver performance of the aircraft in which it is installed, to allow for safe avoidance maneuvers.

b. Display features (such as iso-contour and possibly color) should be provided to permit rapid pilot interpretation of precipitation levels over a wide dynamic range. These levels should be sufficient to permit the detection of the high precipitation gradients which are associated with turbulence.

1.3 Operational Applications

The operational goals of Section 1.2 relate directly to the current and projected applications of airborne weather and ground mapping radar equipment. These applications pertain to both large air carrier aircraft and smaller general aviation aircraft. These general applications include:

a. The use of such equipment to permit the safe passage of an aircraft in the vicinity of turbulent weather conditions.