IEEE Recommended Practice for Radar Cross-Section Test Procedures

IEEE Antennas and Propagation Society

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Abstract: This recommended practice describes the process of the measurement of the radar cross section of objects using a test range. The term “radar cross section” is defined, and the characteristics of different types of test ranges are given. The responsibilities of the test range operators are shown to involve test and calibration of the measurement range systems as well as accurately carrying out the measurements. Techniques are described for each stage of this process.

Keywords: radar cross section (RCS), radar test range

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Introduction

This introduction is not part of IEEE Std 1502-2007, IEEE Recommended Practice for Radar Cross-Section Test Procedures.

The measurement of radar cross section began to be a very important science in the 1960s and 1970s. Many test ranges were designed and built during that time. In the 1980s and 1990s, radar cross-section test ranges and the procedures to test, calibrate, and use them remained individualized. The operators of each test range used practices developed by the scientists and engineers that designed the test ranges. This recommended practice for radar cross-section test procedures is an attempt to provide a standard of practice across this community. It is developed for the test range operator, manager, and user of test range data.

The IEEE Standards Board first approved this recommended practice as a new project on 20 March, 1997.

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IEEE Recommended Practice for Radar Cross-Section Test Procedures

1. Overview

1.1 Scope

This recommended practice establishes processes for the measurement of the electromagnetic scattering from objects. It is written for the personnel responsible for the operation of test ranges, and not for the design of such ranges. It recommends procedures for testing and documenting the quality of the measurement system, for calibrating the measurement system, for carrying out the radar scattering measurements, and for delivering the measurement data in a useful format to the end user.

The document defines radar cross section (RCS), describes different types of test ranges, and reviews methods of characterizing and operating radar scattering measurement ranges. Issues related to test object support systems, types of test ranges, instrumentation, signal polarization, calibration, data analysis, and range uncertainty are also discussed.

1.2 Purpose

Most radar scattering measurement ranges are built for a specific localized purpose. Methods of characterizing the ranges and performing the measurements are developed for the specific needs of each particular test range. This recommended practice is intended to establish guidelines so that operators and users of such ranges can provide results that are useful across the larger community of users.

2. The radar cross-section measurement process

2.1 Introduction

Radar scattering is typically represented as the RCS of the test object. This term evolved from the basic metric for radar scattering as the ratio of the power scattered from an object in units