



Standard Specification for Design and Performance of an Airborne Sense-and-Avoid System¹

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1. Scope

1.1 This specification covers requirements for the design and performance of airborne sense-and-avoid (S&A) systems. This specification includes requirements to support detection of, and safe separation from, airborne objects such as manned or unmanned aircraft and air vehicles.

1.2 This specification applies to the manufacturer of an appliance seeking civil aviation authority approval, in the form of flight certificates, flight permits, or other like documentation, as providing an equivalent level of safety to the see-and-avoid capability of a human pilot.

1.3 This specification is not intended to apply to the design and performance of cooperative S&A systems. Existing standards and guidance should be referenced for specifications describing these transponder or broadcast-based systems (examples of existing guidance and standards for cooperative S&A systems include **FAA 20-131A**, **RTCA DO-289**, and **TSO-C119B**).

1.4 This specification does not apply to appliances on-board one or more airborne objects flying in formation flight.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 Code of Federal Regulations (CFR):²

14 CFR 91.1 General Operating and Flight Rules—Applicability

14 CFR 91.113 General Operating and Flight Rules—Right-of-Way Rules: Except Water Operations

14 CFR 91.123 General Operating and Flight Rules—Compliance with ATC Clearances and Instructions

2.2 *Federal Aviation Administration (FAA) Publications:*³

FAA 8700.1 General Aviation Operations Inspector's Handbook

FAA P-8740-51 How to Avoid a Midair Collision

FAA 90.48C Advisory Circular—Pilots' Role in Collision Avoidance

FAA 20-131A Advisory Circular—Airworthiness Approval of Traffic Alert and Collision Avoidance Systems (TCAS II) and Mode S Transponders

TSO-C119B Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment

TSO-C153 Integrated Modular Avionics Hardware Elements

AC 21-33 Quality Assurance of Software used in Aircraft of Related Products

AC 20-145 Guidance for Integrated Modular Avionics (IMA) that Implement TSO-C153 Authorized Hardware Elements

2.3 *ICAO Publications:*⁴

ICAO Rules of the Air—Annex 2

2.4 *RTCA Publications:*⁵

DO-289 Minimum Aviation System Performance Standards (MASPS) for Aircraft Surveillance Applications (ASA)

3. Terminology

3.1 Definitions:

3.1.1 *airborne object, n*—any object that is operating in the airspace to include manned or unmanned aircraft or air vehicles.

3.1.2 *airspace of operations, n*—all classes of airspace in which a system is intended to operate.

3.1.3 *closing velocity, n*—rate of change of the decreasing distance between two objects.

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² Available from U.S. Government Printing Office Superintendent of Documents, 732 N. Capitol St., NW, Mail Stop: SDE, Washington, DC 20401, <http://www.access.gpo.gov>.

³ Available from Federal Aviation Administration (FAA), 800 Independence Ave., SW, Washington, DC 20591, <http://www.faa.gov>.

⁴ Available from International Civil Aviation Organization (ICAO), 999 University St., Montreal, Quebec H3C 5H7, Canada.

⁵ Available from RTCA, Inc., 1828 L Street, NW, Suite 805, Washington, DC 20036.