List of Available Documents

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New Document

DO-230J, Standards for Airport Security Access Control Systems

FOREWORD

RTCA, Inc. is a not-for-profit corporation formed to advance the art and science of aviation and aviation electronic systems for the benefit of the public. The organization develops consensus-based recommendations on contemporary aviation issues. RTCA's objectives include, but are not limited to:

- Coalescing aviation system user and provider technical requirements, knowledge and practices in a manner that helps government and industry meet their mutual objectives and responsibilities.

- Analyzing and recommending solutions to system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency.

- Developing consensus on the application of pertinent technology to fulfill user and provider requirements, including development of minimum operational performance standards for electronic systems and equipment that support aviation.

- Assisting in developing the appropriate technical material upon which positions for the International Civil Aviation Organization, the International Telecommunication Union, and other appropriate international organizations can be based.

The organization's recommendations are often used as the basis for government and private sector decisions, as well as the foundation for many Federal Aviation Administration Technical Standard Orders.

RTCA is not an official agency of the U.S. Government; its recommendations may not be regarded as statements of official government policy unless so enunciated by the U.S. Government organization or agency having statutory jurisdiction over any matters to which the recommendations relate.

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Index to RTCA Documents

December 2019

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DO-385 Change 1, Minimum Operational Performance Standards for Airborne Collision Avoidance System X (ACAS X) (ACAS Xa and ACAS Xo)

Issued 09-12-2019 Prepared by SC-147

This document, DO-385/ED-256 Change 1, is limited to changes which correct or clarify the ACAS Xa/Xo MOPS, RTCA DO-385/EUROCAE ED-256, Volume I. The changes embodied in this document went through the SC-147/WG-75 Change Proposal/Change Management Process.

DO-385 Supplements

Issued 09-20-18 Prepared by SC-147

Look-up Tables and Test Suite files. Part of FRAC process and required to implement ACAS X and validate that implementation.

FAA Program Office Documents used as justification for final performance of ACAS X system and tools implementers may want to use in their development. These materials are not required to decipher the MOPS or implement the system and were not part of the FRAC/Open Consultation process.

DO-385 Volume I and II, Minimum Operational Performance Standards for Airborne Collision Avoidance System X (ACAS X) ACAS Xa and ACAS Xo)

Issued 09-20-18 Prepared by SC-147

The ACAS X MOPS: Specifies minimum requirements for a collision avoidance system including surveillance, tracking and threat resolution functionalities. These MOPS specify the optimized logic methodologies used by the collision avoidance logic and its performance, as well as providing testing of all requirements.

DO-379, Internet Protocol Suite Profiles

Issued 09-12-2019 Prepared by SC-223

This Internet Protocol Suite (IPS) Profiles document specifies the unique adaptations required to enable the current Internet Engineering Task Force (IETF) Request for Comment (RFC) documents to specify technical requirements for Aeronautical data communications between an aircraft system and its corresponding peer host systems on the ground. It should be noted that these Profiles may be applied to support ground-ground aeronautical communications as well as command and control communication of Remotely Piloted Aircraft Systems (RPAS) or Unmanned Aircraft Systems (UAS). Additional provisions would be required to support air-ground digital voice. Voice communication may be supported using these Profiles. However, no special provisions have been made in these Profiles for digital voice or ground-ground communications. The Profiles document was developed under collaboration between the RTCA Special Committee 223 (SC-223) and the European Organization for Civil Aviation Equipment EUROCAE Working Group-108.

The “purpose and scope” section concentrates on introducing the technology and describes the Terms of Reference (ToR) agreement for IPS profiles development. It defines the bounds of the investigation, the required cooperation between RTCA and EUROCAE and provides a clear scope prescribing guidelines for profiles development. In this section, various glossary terms used in the document are described.

The background section provides an overview of system characteristics including concept of operations and principal users of IPS. The operational concepts illustrate the different operational environments and requirements this technology is required to meet. A description of assumptions is provided in the IPS Minimum Aviation System Performance Standards (MASPS) along with verification procedures necessary to validate profile parameter selection.

The technical profiles section describes technical parameter selection required to meet aviation communication requirements. The objective of the parameter and specific requirement selection is to ensure deterministic behavior of IPS system and to ensure interoperability of various IPS sub-systems supporting safety of flight services. As IPS encompasses a variety of hosts and routers, a set of device classes has been defined for IPS and parameters are assigned to each device class to meet the operational uses for different environments supporting different aeronautical safety services.

DO-378, Minimum Aviation System Performance Standard (MASPS) for Coexistence of Wireless Avionics Intra-Communication Systems within 4200-4400 MHz

Issued 06-27-19 Prepared by SC-236

EUROCAE and RTCA have defined this Minimum Aviation System Performance Standard (MASPS) that applies to Wireless Avionics Intra-Communications (WAIC) systems utilizing the frequency band 4 200 4 400 MHz as allocated by the World Radiocommunication Conference (WRC) in 2015. Key criteria for allocation of the band by

the WRC were (i) coexistence between WAIC systems and (ii) coexistence between WAIC systems and Radio Altimeters (RA), both on board neighboring aircraft.

This MASPS defines two Performance Requirements (PR) that ensure WAIC systems meet the above coexistence criteria. The first PR specifies the aggregate power spectral flux density allowed to be emitted by WAIC systems on board an aircraft. The second PR specifies tolerance of WAIC systems to Radio Frequency (RF) emissions from RA and WAIC systems from neighboring aircraft. Both PRs were derived after significant work by the Aerospace Vehicle Systems Institute (AVSI), EUROCAE and RTCA organizations to understand and characterize the worst-case conditions that may be experienced during the normal course of operation of the worldwide aircraft fleet.

This MASPS then specifies metrics to verify the aggregate power spectral flux density and interference susceptibility of WAIC systems.

Finally, this MASPS provides an acceptable means to demonstrate compliance along with corresponding pass/fail criteria.

DO-377, Minimum Aviation System Performance Standards for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems in U.S. Airspace

Issued 03-21-19 Prepared by SC-228

This document contains the Minimum Aviation System Performance Standards (MASPS) for a C2 Link System connecting a Control Station (CS) and an Unmanned Aircraft (UA). It covers UA operations requiring a C2 Link System3 that allows the UA to operate within line of sight (LOS) and beyond the line-of-sight (BLOS) of a Control Statrion. This MASPS contains the standards which specify system characteristics, i.e., it is design independent, that should be useful to UAS operators, Original Equipment Manufacturers 701 (OEM), and equipment manufacturers1 plus the FAA, as UAS operate within the U.S. airspace.

DO-375, Minimum Aviation System Performance Standards (MASPS) for a Combined Vision Systems for Helicopter Operations

Issued 01-16-2019 Prepared by SC-213

This document addresses Combined Vision Systems (CVS) technologies applied to helicopter operations. While RTCA DO-315() / EUROCAE ED-179() and DO-371 / EUROCAE ED-249 documents are not specialized for a particular type of platform or mission, they were mostly written with fixed-wing platforms and operations in mind. The present document is oriented specifically towards helicopter platforms and operations. It defines performance standards for CVS over head down and transparent displays, which intended function is to provide a supplemental view of the external scene and visual references to the pilot. Such a CVS does not provide “additional operational credit’ and is not intended to change the helicopter’s existing operational capability or

certification basis. The pilot(s) is expected to follow the existing operational procedures and adhere to all published minimums. This document is technically equivalent to EUROCAE ED-255.

DO-374, Safety, Performance and Interoperability Requirements Document Defining Takeoff Minima by Use of Enhanced Flight Vision Systems

Issued 09-20-18 – Prepared by SC-213

This document provides the minimum operational, safety, and performance requirements (SPR) and interoperability requirements by which takeoff operations using an Enhanced Flight Vision System (EFVS) can be safely conducted in natural visibilities lower than currently authorized. These takeoff minima and associated SPRs are established for the use of EFVS, treated as subsystems, which together with other subsystems including navigational aids and airport lighting and markings, meet the operational goal/intended function and achieve the levels of reliability, availability, and integrity consistent with other systems and subsystems used for the similar intended function and phase of flight. In this document, recommendations for EFVS takeoff minima are defined with various associated aircraft equipage, operational and interoperability requirements, and airport infrastructure. The visibility minima are defined in terms of natural visibility since, in the event of a failure or failures, the PF uses a combination of the remaining functional elements, other aircraft subsystems, and available out-the-window natural vision cues (e.g., lights and/or markings of the runway) to mitigate the failure effects and conduct a safe, successful takeoff or rejected takeoff.

DO-373, MOPS for GNSS Airborne Active Antenna Equipment for the L1/E1 and L5/E5a Frequency Bands

Issued 06-21-18 – Prepared by SC-159

The purpose of this MOPS is to specify performance requirements for an active integrated dual frequency GNSS Aviation Antenna. This includes requirements that address reception of GNSS signals that support safety of life aviation applications in the L1/E1 (centered at 1575.42 MHz) and L5/E5a (centered at 1176.45 MHz) bands. The requirements developed in this antenna MOPS support a range of flight phases including enroute, terminal, approach, precision landing and surface operations. In comparison to RTCA/DO-301, this antenna MOPS specifies better needed performance in the L1/E1 band for parameters including (but not limited to) G/T, group delay differential, axial ratio and boresight frequency response.

DO-372, Addressing Human Factors/Pilot Interface Issues for Avionics

Issued 12-19-17 Prepared by SC-233

The objective of this document is to increase human factors awareness by the individuals who are responsible for the design and certification of systems and equipment and related interfaces designed for use by the flightcrew. This applies to systems and equipment that are certified at the box level or installation level. The FAA documented this information previously in expired FAA Notice 8110.98, Addressing Human Factors/Pilot Interface Issues of Complex, Integrated Avionics as Part of the Technical Standard Order (TSO) Process. The original notice only addressed the TSO process, however human factors issues were being regularly identified late in the Type Certificate (TC), Supplemental Type Certificate (STC), and Amended Type Certificate (ATC) processes with installed avionics. This document outlines a process for identifying the flightcrew interface aspects of a system as part of the engineering design and certification process and provides previously approved design examples of how human factors issues have been addressed.

The first section of this document is based on the original steps in expired FAA Notice 8110.98 but extends the process to include TC, STC, and ATC. The second section provides the types of human factors issues previously identified in certification programs and approved design examples. Not every human factors issue encountered is covered. The focus remained on two core principles: (1) identifying human factors aspects in a generic evaluation process that could be scaled as appropriate to the scope and size of the project, and used by avionics manufacturers, Original Equipment Manufacturers (OEMs), and certification authorities alike, and (2) including only those human factors issues that were recurring in the certification process and had a clear human factors basis.

Neither the process nor the examples are meant to be prescriptive. Good practices and lessons learned are provided as a means to inform the development and certification process in an effort to avoid common pitfalls that have been observed in past certification efforts. This document is not intended as a means of compliance for certification. Regulatory requirements and guidance take precedence over the content of this document. More information on FAA human factors in aviation safety can be found at: http://www.faa.gov/aircraft/air_cert/design_approvals/human_factors/

DO-371, Minimum Aviation System Performance Standards (MASPS) for Aircraft State Awareness Synthetic Vision Systems

Issued 01-09-18 Prepared by SC-213

DO-371 was originally prepared by RTCA Special Committee 213 and EUROCAE Working Group 79. This document expands the previously defined DO-315A intended function of an SVS beyond that of supplemental view of the external scene for CFIT reduction risk 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 is technically equivalent with EUROCAE ED-249.

DO-370, Guidelines for In Situ Eddy Dissipation Rate (EDR) Algorithm Performance

Issued 12-19-17 | Prepared by SC-206

This document defines the minimum user performance requirements applicable to in situ Eddy Dissipation Rate (EDR) turbulence computational algorithms (hereafter referred to as "the EDR algorithm"). In situ, as used herein, refers to calculations that use aircraft derived observations, obtained through direct contact with the atmosphere or aircraft, as input (as opposed to remote sensing observations, such as Radio Detection and Ranging (RADAR) or Light Detection and Ranging (LIDAR)).

DO-369, Guidance for the Usage of Data Linked Forecast and Current Wind Information in Air Traffic Management (ATM) Operations

Issued 07-13-17 | Prepared by SC-206

Advances in aircraft equipment combined with satellite-based navigation and other supporting technologies provide the basis for more precise aircraft scheduling and spacing in Air Traffic Management (ATM) operations. Based on the opportunity for more precise aircraft scheduling and spacing, new and upgraded ATM concepts are being developed and implemented. The objective of these new concepts is to increase airspace capacity and lower energy consumption and emissions while maintaining and promoting aviation safety.

The degree of accuracy of a predicted aircraft flight path relative to its actual flight path is based on many factors including the impact of the forecast and current winds and temperatures. The dynamic nature of the atmosphere, however, causes inaccuracies and uncertainty in the quality of wind and temperature information (both forecast and current) used in support of ATM operations. Without quality forecasts and current wind information, the precision in predicting flight path scheduling and spacing will be reduced and the achievable throughput in capacity-constrained airspace will be less than what could be attained. Therefore, newly developed Next Generation Air Transportation System tools and procedures would be less effective or even not used during periods of congested air traffic.

This document examines the impact of wind information on three ATM operations: wake mitigation, Required Time of Arrival (RTA), and Interval Management (IM); and provides guidance in the form of findings and recommendations on the use of wind information and related airspace procedure impacts based on previously and newly completed studies. The guidance covers the reporting and recommended quality of wind information determined necessary to support the three ATM operations. The findings and recommendations provide initial considerations for trade-offs and compromises by industry and the Federal Aviation

Administration (and potentially other Air Navigation Service Providers) when developing the concepts and procedures for implementing (or upgrading) wake mitigation, RTA, and IM operations.

This document also provides an overview of and findings related to the use of current sources of wind information used by the aircraft and ground systems in supporting the three ATM operations. In addition, recommendations for future work are included to cover additional factors impacting the quality of wind and temperature information used in supporting these ATM operations as well as other operations not covered such as Dynamic Required Navigation Performance and Traffic Aware Strategic Aircrew Requests.

DO-368, Minimum Operational Performance Standards for GPS/GLONASS (FDMA + antenna) L1-only Airborne Equipment

Issued 07-13-17 | Prepared by SC-159

This MOPS defines performance and testing requirements for a combined GPS/GLONASS receiver capable of using GPS and GLONASS L1 signals with Aircraft –Based Augmentation System. The document is primarily based upon RTCA document DO-316 "Minimum Operational Performance Standards for Global Positioning System /Aircraft-Based Augmentation System Airborne Equipment" and defines minimum performance for GPS/GLONASS sensors that provide position information to a multi-sensor system or separate navigation system to be used for en route, terminal and non-precision approach (NPA) phases of flight. It also includes GPS/GLONASS antenna specifications using as a basis document RTCA DO-301 “Minimum Operational Performance Standards for Global Navigation Satellite System (GNSS) Airborne Active Antenna Equipment for the L1 Frequency Band”.

DO-367, Minimum Operational Performance Standards (MOPS) for Terrain Awareness and Warning Systems (TAWS) Airborne Equipment

Issued 05-31-17 | Prepared by SC-231

This MOPS defines a Terrain Awareness and Warning System (TAWS). TAWS is an alerting system. It is intended to provide alerts to the pilot when a terrain threat is detected. Additionally, Class A systems and other systems that include a Terrain Display are intended to provide awareness to the flight crew regarding the aircraft’s proximity to terrain. The operational goal of TAWS is to reduce the occurrence of CFIT accidents.

FAA Technical Standard Order (TSO) C151d references this document.

DO-367, TAWS MOPS Supplement

Issued 05-31-17 | Prepared by SC-231

This supplement to DO-XYX is in the form of a single zip archive. The information in this supplement can be used to define test cases required by DO-XYZ. This supplement provides detailed information about historic Controlled Flight into Terrain (CFIT) accidents. The supplement consists of four files. "Supplement Description.doc" provides a summary of the contents of this supplement as well as textual and graphical descriptions of certain CFIT accidents. "Accident Profiles.xls" provides tabular information for certain CFIT accidents. "Birmingham.kml" and "Buga (Cali) Columbia.kml" provide Google Earth trajectories of particular CFIT accidents.

DO-366, Minimum Operational Performance Standards (MOPS) for Air-to-Air Radar for Traffic Surveillance

Issued 05-31-17 | Prepared by SC-228

This document contains Phase 1 Minimum Operational Performance Standards (MOPS) for the air-to-air radar for traffic surveillance. The intended application is supporting Detect and Avoid (DAA) operations for aircraft transitioning to and from Class A or special use airspace, traversing Class D, E, and G airspace in the National Airspace System (NAS). It does not apply to small Unmanned Aircraft Systems (sUAS) operating in low-level environments (below 500') or other segmented areas. These standards specify the radar system characteristics that should be useful for designers, manufacturers, installers and users of the equipment.

The intended function of the radar is to detect and generate tracks for all airborne traffic within the radar detection volume. The onboard radar complements other airborne surveillance sensors by providing detection of non-cooperative traffic. The track should be established at sufficient range and with sufficient accuracy to enable the system to plan and execute a maneuver to keep the UAS well clear of other traffic and avoid collisions.

This document has the detailed performance and environmental requirements of the radar along with their verification methods. Verification includes bench tests, flight tests and environmental tests. Recommendations and flight tests for installed performance are also provided.

DO-365, Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems

Issued 05-31-17 | Prepared by SC-228

The Detect and Avoid (DAA) system for Unmanned Aircraft Systems (UAS) flight was developed to assist the Pilot-in-Command (PIC) with his/her duties of operating an aircraft safely in the NAS. All aircraft flying in the National Airspace System (NAS) must comply with the operating rules of Title 14 of the Code of Federal Regulations (14 CFR). Specifically, Part 91, §§.3, .111, .113(b), .115, .123 and .181(b), which address see and avoid, collision avoidance, and right-of-way rules. These operating regulations assumed that a pilot would be onboard the aircraft, so he/she would be able to exercise his/her authority to fully comply with these rules.

SC 228 has been tasked to develop Minimum Operational Performance Standards (MOPS) in two separate phases. This document contains Phase 1 Minimum Operational Performance Standards (MOPS) for DAA systems used in aircraft transitioning to and from Class A or special use airspace (higher than 500' Above Ground Level (AGL)), traversing Class D, E, and G airspace in the NAS. It does not apply to small UAS operating in low-level environments (below 500') or other segmented areas. Likewise, it does not apply to operations in the Visual Flight Rules (VFR) traffic pattern of an airport. Future revisions of this document are expected to address other operational scenarios and sensors better suited to meet smaller aircraft needs, as well as other DAA architectures, including ground-based sensors.

DO-365, Test Vectors

Issued 05-31-17 | Prepared by SC-228

The files contained in this repository are the test vectors and encounter characterization files called out the test procedures of DO-365, Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems. Appendix P of DO-365 provides a description for each test vector and file type included here.

DO-364, Minimum Aviation System Performance Standards (MASPS) for Aeronautical Information/Meteorological Data Link Services

Issued 12-15-16 Prepared by SC-206

The purpose of this document is to provide Minimum Aviation System Performance Standards (MASPS) for Aeronautical Information (AI) and Meteorological (MET) Data Link Services systems. It provides guidance on system characteristics and allocation of requirements that support data link services. This guidance material recommends minimum acceptable criteria for authorizing/approving the use of AI and MET Data Link Services systems when authorization/approvals are required to show compliance to civil regulations. This guidance is intended to be useful to designers, manufacturers, installers, service providers, regulators, and users of AI and MET Data Link Services systems.

The requirements contained in this document are necessary to provide adequate assurance that AI and MET Data Link Services systems will function in an acceptable manner. Compliance with this standard is recommended as one means of assuring that AI and MET Data Link Services systems perform satisfactorily under all conditions normally encountered in aeronautical operations.

DO-363 Change 1, Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft

Issued 04-1-19 Prepared by SC-234

DO-363 Change 1 includes a technical amendment clarifying the description of low powered technologies. This change is applied to DO-363 to replace section 6.2.2 item 1 with the new text

DO-363, Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft

Issued 12-15-16 Prepared by SC-234

Previous RTCA reports on aircraft interference from PEDs have emphasized risk assessments and then recommended restrictions on the use of PEDs on board the aircraft. This report departs from the earlier RTCA reports and is directed to aircraft design recommendations that lead to aircraft tolerance to both intentional RF transmissions and spurious RF emissions from PEDs.

There are two aspects to the aircraft design recommendations in this report. One aspect defines aircraft system and equipment RF susceptibility qualification recommendations that provide tolerance to RF from intentionally transmitting PEDs. This is commonly referred to as protection from PED back door coupling. The recommendations closely follow existing practices for aircraft system high intensity radiated field (HIRF) protection. Acceptable test approaches for verifying the aircraft system RF susceptibility qualification are defined.

The second aspect defines acceptable interference path loss (IPL) between aircraft radio receivers and PEDs that emit spurious RF. This is commonly referred to as protection from PED front door coupling. Extensive analysis of measured PED spurious emissions was performed previously so that the interference path loss targets are based on statistics of actual PED emissions rather than regulatory specifications. Interference path loss test methods are defined.

This report also defines recommended approaches for demonstrating tolerance with aircraft design to meet regulatory requirements including aspects of aircraft alteration and continued airworthiness.

This report is intended to supersede previous applicable guideline documents RTCA DO-294 and EUROCAE ED-130. All propositions define are intended to be in line with the Revision of RTCA DO-307A/ED-239.

DO-362, Command and Control (C2) Data Link Minimum Operational Performance Standards (MOPS) (Terrestrial)I

Issued 09-22-16 ♦ Prepared by SC-228

The Command and Control (C2) Data Link Minimum Operating Performance Standard (MOPS) (Terrestrial) provides performance requirements for a safety-of-flight Command and Non-Payload Communication (CNPC) function that enables an Unmanned Aircraft System (UAS) pilot to safely maneuver the aircraft from the ground.

The main focus of this MOPS is the technical standards describing how CNPC Data Link Systems can compatibly share the spectrum that has been allocated for their use, yet remain waveform agnostic (i.e., unspecified). There are no interoperability requirements, as these are internal UAS interfaces. Rather, this MOPS provides required electromagnetic compatibility that permits simultaneous operation of federated designs in common spectrum.

The International Telecommunications Union (ITU) has identified multiple spectrum bands as candidates for use for this C2 Data Link. These include:

- L-Band Terrestrial
- C-Band Terrestrial
- SATCOM in multiple bands

The UAS C2 Data Link MOPS establishes the performance requirements for both L-Band and C-Band terrestrial networks. This will also include recommendations for a Verification and Validation test program

The completed MOPS contain equipment performance requirements under standard conditions for the following

- Common characteristics
- The baseline system that was used for verification and validation efforts
- Manufacturer-specific requirements for designs that vary from the baseline system described within.

The environment performance section provides requirements for both airborne and ground equipment, since both are needed for the complete link.

As there was no Minimum Aviation System Performance Standard (MASPS) that preceded this MOPS, there are over a dozen appendices that provide assumptions and derived flow-down requirements that would have historically come from a MASPS.

DO-361, Minimum Operational Performance Standards (MOPS) for the Flight-deck Interval Management (FIM)

Issued 09-22-15 ♦ Prepared by SC-186

This document contains the Minimum Operational Performance Standards (MOPS) for the Flight-deck Interval Management (FIM) application building upon the MOPS for the *Aircraft Surveillance Applications (ASA) System*, RTCA DO-317B/EUROCAE ED-194A. Because of the length and complexity of the additional requirements for the FIM application, they are included in this separate document. The FIM application requirements in this

document are assumed to be integrated in an ASA System that is compliant with all requirements related to the Basic Airborne Situational Awareness (AIRB) application, which is defined in the ASA MOPS, DO-317B / ED-194A, unless explicitly stated otherwise. The document was prepared jointly by RTCA SC-186 & EUROCAE WD-51.

Note: Since the FIM operational concept is still in development and trials, the FAA is not intending to recognize this document under the Technical Standard Order (TSO) program at this time. However, the FAA may consider citing this MOPS for use by legacy (e.g. non-integrated) aircraft in the future.

DO-360, Standards Development Activities for using Near Real-Time Aircraft-Derived Data in Future Applications

Issued 09-22-15 ♦ Prepared by Wake Vortex Tiger Team

This document contains recommendations for standards development activities for current and future applications that could make use of aircraft-derived data. Near real-time data from aircraft, particularly weather observations, may enable many new capabilities both in ground-based automation systems and airborne systems. The document describes wake vortex, air traffic management, and weather applications, and how they could make use of near real-time data from aircraft. It recommends standards development and research activities necessary to move forward with implementing near, mid, and far-term applications using near real-time data from aircraft. The document also includes, for reference, a summary of many wake vortex research activities across the globe.

DO-359, Minimum Aviation System Performance Standard (MASPS) for Synthetic Vision Guidance Systems

Issued 05-18-15 ♦ Prepared by SC-213

This document contains Minimum Aviation System Performance Standards for a Synthetic Vision Guidance System. A Synthetic Vision Guidance System (SVGS) as defined in this MASPS is a new airborne flight instrument and guidance system designed to enable operations to a decision altitude/decision height (DH) as low as 150 ft height above touchdown. Minimum visibility will be determined in part by the SVGS display modality, head down display (HDD) or head up display (HUD). The system will be used during certain instrument approach procedures with operational minima that are less than the minima for current Category I Instrument Landing System (ILS) approach, RNAV (GPS) to the Localizer Performance with Vertical Guidance (LPV) line of minima, or a Category I GLS approach. For convenience, in the balance of this document the RNAV (GPS) approach to the LPV line of minima will be referred to as an LPV approach.

DO-358A, Supplement

Issued 06-27-19 Prepared by SC-206

The data "Supplement to DO-358A" is a zip file archive that contains test group files described in Section 2.4 of DO-358A, Minimum Operational Performance Standards for Flight Information Services Broadcast-System (FIS-B) with Universal Access Transceiver (UAT). The archive includes 24 sets of test group zip files. Each test group zip file includes a test procedures document, test stimulus timing information, and binary data input files for conducting the tests. This supplement is available only by electronic download.

DO-358A, Minimum Operational Performance Standards (MOPS) for Flight Information Services - Broadcast (FIS-B) with Universal Access Transceiver (UAT)

Issued 06-27-19 ♦ Prepared by SC-206

This document contains Minimum Operational Performance Standards for Flight Information Services Broadcast-System (FIS-B) with Universal Access Transceiver (UAT). These standards specify system characteristics that should be useful to designers, manufacturers, installers and users of the equipment. This document considers an equipment configuration consisting of the airborne processing and cockpit display of aeronautical and meteorological data known as FIS-B provided by the Federal Aviation Administration (FAA). Functions or components that refer to equipment capabilities that exceed the stated minimum requirements are identified as optional features. This document supersedes DO-358.

The data "Supplement to DO-358A" is a zip file archive that contains test group files described in Section 2.4. The archive includes 24 sets of test group zip files. Each test group zip file includes a test procedures document, test stimulus timing information, and binary data input files for conducting the tests. This supplement is available only by electronic download.

DO-358, Minimum Operational Performance Standards (MOPS) for Flight Information Services - Broadcast (FIS-B) with Universal Access Transceiver (UAT)

Issued 03-24-15 ♦ Prepared by SC-206

This document contains Minimum Operational Performance Standards for Flight Information Services Broadcast-System (FIS-B) with Universal Access Transceiver (UAT). These standards specify system characteristics that should be useful to designers, manufacturers, installers and users of the equipment. This document considers an equipment configuration consisting of: the airborne processing and cockpit display of aeronautical and meteorological data known as FIS-B provided by the Federal Aviation Administration (FAA).

Functions or components that refer to equipment capabilities that exceed the stated minimum requirements are identified as optional features.

The data "Supplement to DO-358" is a zip file archive that contains test group files described in Section 2.4. The archive includes 18 sets of test group zip files. Each test group zip file includes a test procedures document, test stimulus timing information, and binary data input files for conducting the tests. This supplement is available only by electronic download

Supplement to DO-358, Minimum Operational Performance Standards (MOPS) for Flight Information Services - Broadcast (FIS-B) with Universal Access Transceiver (UAT)

Issued 03-24-15 ♦ Prepared by SC-206

This data supplement to DO-358 is a zip file archive that contains test group files described in Section 2.4. The archive includes 18 sets of test group zip files. Each test group zip file includes a test procedures document, test stimulus timing information, and binary data input files for conducting the tests. This supplement is available only by electronic download.

DO-357, User Guide: Supplement to DO-160G

Issued 12-16-14 ♦ Prepared by SC-135

This document provides users of DO-160G additional background information for the associated test procedures and requirements in DO-160G. The information includes rationale for requirements, guidance in applying the requirements, commentary, possible trouble shooting techniques, and lessons learned from laboratory experience. It is intended to help users understand the objective and rationale behind the requirements, and to help users develop detailed test procedures based on the general test procedures in this document. DO-357 replaces the User Guides previously included in DO-160G. DO-160G Change 1 has been published to remove all User Guides previously included in DO-160G to avoid any confusion.

DO-356A, Airworthiness Security Methods and Considerations

Issued 06-21-18 ♦ Prepared by SC-216

This document is the joint product of two industry committees: the EUROCAE Working Group WG-72, titled “Aeronautical Systems Security” and the RTCA Special Committee SC-216, also titled “Aeronautical Systems Security”.

This document provides a set of methods and guidelines that may be used within the airworthiness security process defined in RTCA DO-326A / EUROCAE ED-202A, Airworthiness Security Process Specification. It is recognized that alternative methods to the processes described or referenced in this document may be available to an organization desiring to obtain certification.

This document does not provide guidelines concerning the structure of an individual organization or how the responsibilities for certification activities are divided. No such guidance should be inferred from the descriptions provided.

DO-356, Airworthiness Security Methods and Considerations

Issued 09-23-14 ♦ Prepared by SC-216

This document was developed in the context of DO-326A "Airworthiness Security Process Specification" which addresses type certification considerations during the first three life cycle stages of an aircraft type (Initiation, Development or Acquisition, and Implementation) and DO-355, "Information Security Guidance for Continuing Airworthiness" which addresses airworthiness security for continued airworthiness.

The methods and considerations of this document address the assessment of the acceptability of the airworthiness security risk and the design and verification of the airworthiness security attributes as related to system safety and airworthiness. More specifically, this guidance addresses the following areas:

- It provides guidance for accomplishing the activities identified in DO-326A in the areas of Security Risk Assessment and Effectiveness Assurance.
- It provides specific methods for Security Risk Analysis and Network Security Domains.

The document is intended to be used in conjunction with other applicable guidance material, including SAE ARP 4754A, SAE ARP 4761, DO-178C, and DO-254 and with the advisory material associated with FAA AC

25.1309-1A and EASA AMC 25.1309, in the context of Part 25 for Transport Category Airplanes which include an approved passenger seating configuration of more than 19 passenger seats. This guidance is not intended for CFR Parts 23, 27, 29, 33.28, and 35.15, normal, utility, acrobatic, and commuter category airplanes, normal category rotorcraft, transport category rotorcraft, engines, and propellers.

DO-355, Information Security Guidance for Continuing Airworthiness

Issued 06-17-14 ♦ Prepared by SC-216

This document is a resource for civil aviation authorities and the aviation industry when the operation and maintenance of aircraft and the effects of information security threats can affect aircraft safety. It deals with the activities that need to be performed in operation and maintenance of the aircraft related to information security threats.

This document also gives guidance that is related to operational and commercial effects (i.e. guidance that exceeds the safety-only effects). Thus, it also supports harmonizing security guidance documents among Design Approval Holders (DAH), which is deemed beneficial to DAHs, operators and civil aviation authorities. It is a companion document to DO-326A that supports security in the development and modification part of the airworthiness process.

DO-354, Safety and Performance Requirements Document for CDTI Assisted Visual Separation (CAVS)

Issued 06-17-14 ♦ Prepared by SC-186

This document provides the minimum operational, Safety and Performance Requirements (SPR) for the implementation of the "CDTI (Cockpit Display of Traffic Information) Assisted Visual Separation" (CAVS) application. This document does not provide any Interoperability Requirements (INTEROP) as they are identical to those defined for the "Enhanced Visual Separation on Approach" (VSA) application (DO-314). To increase runway capacity, operations at some airports are based on a flight crew maintaining own separation from the Preceding Aircraft. The "Enhanced Visual Separation on Approach" application (VSA) has been developed and standardized to enhance this type of operation. CAVS is intended to further enhance the VSA application.

The requirements contained in this document are necessary to provide adequate assurance that the appropriate aspects of the relevant Communication Navigation Surveillance and Air Traffic Management (CNS/ATM) system, when operating together, will perform their intended function in an acceptably safe manner for the operations defined in the OSED. This SPR document is also written to support system-specific standards (e.g. MOPS, TSOs, etc.) which will be required for many airspace regulators. In addition, this document also provides guidance to determine the levels of design assurance and performance that are needed for each element (aircraft, operator, and Air Navigation Service Provider - ANSP) to support the CAVS application. The CAVS SPR is also envisaged to be used along with those from other surveillance applications

based on Automatic Dependent Surveillance-Broadcast (ADS-B) to develop minimum standards for avionic systems to assure that all subsystems perform their intended functions adequately for these applications.

DO-353A, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)

Issued 03-17-16 • Prepared by SC-214

This standard defines the backward compatibility interoperability requirements on air and ground systems compliant with the ATS Interoperability Standard in order to support the CDR, IER, ACM and AMC services when talking to Baseline 1 (B1) ground and air implementations. This document provides interoperability requirements for the Baseline 2 (B2) ground systems to interoperate with known B1 compliant airborne implementations and interoperability requirements for the B2 aircraft system to interoperate with known B1 compliant ground implementations. It provides also a separated set of requirements for each of these two capabilities, which can be implemented and qualified independently.

This revision modifies the B1 backward compatibility rules for the CPDLC messages that have been added or modified in DO-351A/ED-229A.

DO-353, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation, Initial Release (ATN Baseline 1 - Baseline 2 Interop Standard)

Issued 03-18-14 • Prepared by SC-214

This standard defines the backward compatibility interoperability requirements on air and ground systems compliant with the ATS Interoperability Standard in order to support the CDR, IER, ACM and AMC services when talking to Baseline 1 (B1) ground and air implementations. This document provides interoperability requirements for the Baseline 2 (B2) ground systems to interoperate with known B1 compliant airborne implementations and interoperability requirements for the B2 aircraft system to interoperate with known B1 compliant ground implementations. It provides also a separated set of requirements for each of these two capabilities, which can be implemented and qualified independently.

DO-352A, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation, (FANS 1/A - Baseline 2 Interop Standard)

Issued 03-17-16 • Prepared by SC-214

This standard provides the interoperability requirements for an aeronautical telecommunication network for Baseline 2 ATS data communication services (B2) ground system that provides B2 air traffic data link services to future air navigation system 1/A (FANS 1/A) aircraft in oceanic and continental airspaces. This document provides interoperability requirements for the B2 ATN ground system to provide FANS 1/A aircraft with B2 data link services, and interoperability requirements to ensure seamless transition of ATS communications for bilingual aircraft (i.e., aircraft equipped with FANS 1/A and ATN data link technologies transitions from a FANS 1/A ground system to a B2 ATN ground system and vice versa).

This revision modifies the accommodation rules for the CPDLC messages that have been added or modified in DO-351A/ED-229A

DO-352, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation, Initial Release (FANS 1/A - Baseline 2 Interop Standard) Initial Release

Issued 03-18-14 • Prepared by SC-214

This standard provides the interoperability requirements for an aeronautical telecommunication network for Baseline 2 ATS data communication services (B2) ground system that provides B2 air traffic data link services to future air navigation system 1/A (FANS 1/A) aircraft in oceanic and continental airspaces. This document provides interoperability requirements for the B2 ATN ground system to provide FANS 1/A aircraft with B2 data link services, and interoperability requirements to ensure seamless transition of ATS communications for bilingual aircraft (i.e., aircraft equipped with FANS 1/A and ATN data link technologies transitions from a FANS 1/A ground system to a B2 ATN ground system and vice versa).

DO-351A Volume I and II, Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)

Issued 03-17-16 • Prepared by SC-214

This standard provides the interoperability requirements (INTEROP) standard for the implementation of the Air Traffic Service (ATS) applications supporting the Baseline 2 data link services as specified in the Baseline 2 Safety and Performance Requirements (SPR) document DO-350. This document addresses the

interoperability of the ATS applications using the Aeronautical Telecommunication Network (ATN). It represents the minimum set of interoperability requirements and allocations necessary to provide adequate assurance that the elements of the communication, navigation, and surveillance / air traffic management (CNS/ATM) system are compatible with each other and when operating together will perform their intended function. These elements comprise the aircraft system, the Air Traffic Service Provider (ATSP) system, and the operators' provisions to use the air traffic services.

This revision includes, among other things, the addition of the Interval Management (IM) and Dynamic Required Navigation Performance (DRNP) data link services and associated CPDLC messages, ADS-C reports, and the supporting operational, safety, and performance requirements to support IM and DRNP Operations.

DO-351 Volume I and II, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, Initial Release (Baseline 2 Interop Standard)

Issued 03-18-14 • Prepared by SC-214

This standard provides the interoperability requirements (INTEROP) standard for the implementation of the Air Traffic Service (ATS) applications supporting the Baseline 2 data link services as specified in the Baseline 2 Safety and Performance Requirements (SPR) document DO-XXX. This document addresses the interoperability of the ATS applications using the Aeronautical Telecommunication Network (ATN). It represents the minimum set of interoperability requirements and allocations necessary to provide adequate assurance that the elements of the communication, navigation, and surveillance / air traffic management (CNS/ATM) system are compatible with each other and when operating together will perform their intended function. These elements comprise the aircraft system, the Air Traffic Service Provider (ATSP) system, and the operator's provisions to use the air traffic services.

DO-350A Volume I and II, Safety and Performance Standard for Baseline 2 ATS Data Communications, Initial Release ((Baseline 2 SPR Standard)

Issued 03-17-16 • Prepared by SC-214

This standard provides the operational, safety, and performance requirements (SPR) for the implementation of data communication services that support air traffic services (ATS). It provides with provision of data communications in all operational environments e.g., continental, oceanic, and surface. It is intended to support the communication element of the implementation of communication, navigation, and surveillance / air traffic management (CNS/ATM) systems in worldwide application. Data link communications are expected to be used for routine or frequent types of transactions, as well as for communication functions in which the use of voice communication is considered inefficient or unnecessary, thereby reducing voice-channel use and, where resulting controller workload reduction allows increases in sector size, reduction in the number of required voice channels. This SPR standard is intended for use with interoperability requirements (INTEROP)

standards, and the guidelines described in RTCA DO-264/EUROCAE ED-78A.This revision includes, among other things, the addition of the Interval Management (IM) and Dynamic Required Navigation Performance (DRNP) data link services and the associated CPDLC messages, ADS-C reports, and the supporting operational, safety, and performance requirements to support IM and DRNP Operations.

DO-350 Volume I and II, Safety and Performance Standard for Baseline 2 ATS Data Communications, Initial Release ((Baseline 2 SPR Standard)

Issued 03-18-14 • Prepared by SC-214

This standard provides the operational, safety, and performance requirements (SPR) for the implementation of data communication services that support air traffic services (ATS). It provides with provision of data communications in all operational environments e.g., continental, oceanic, and surface. It is intended to support the communication element of the implementation of communication, navigation, and surveillance / air traffic management (CNS/ATM) systems in worldwide application. Data link communications are expected to be used for routine or frequent types of transactions, as well as for communication functions in which the use of voice communication is considered inefficient or unnecessary, thereby reducing voice-channel use and, where resulting controller workload reduction allows increases in sector size, reduction in the number of required voice channels. This SPR standard is intended for use with interoperability requirements (INTEROP) standards, and the guidelines described in RTCA DO-264/EUROCAE ED-78A.

DO-349, Architecture Recommendations for Aeronautical Information (AI) and Meteorological (MET) Data Link Services

Issued 03-18-14 • Prepared by SC-206

This standard document contains an initial set of industry supported delivery method recommendations for those applications and uses described in RTCA document DO-340, Concept of Use (ConUse) for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services. A further service defined in RTCA DO-339, Aircraft Derived Meteorological Data via Data Link for Wake Vortex, Air Traffic Management and Weather Applications Operational Services and Environmental Definition (OSED) is included in the recommendations. These recommendations cover architectural, information sourcing, security, and allocation processes. This document supports the data communications needs of future Air Traffic Management (ATM) concepts (e.g., Next Generation Air Transportation System (NextGen) and potentially provides input for future efforts by the Single European Sky Air Traffic Management Research (SESAR) initiatives). A key objective of these future ATM concepts is to establish the aircraft as a primary participant in collaborative decision making (CDM), and in some cases, establish airspace regions for autonomous operations where the aircraft is primarily responsible for safe separation from other traffic, wake turbulence, weather, and designated/restricted airspace. Timely availability of high quality and reliable electronic AIS and MET information services are necessary to support these global ATM concepts.

DO-348, Safety, Performance and Interoperability Requirements Document for Traffic Situation Awareness with Alerts (TSAA)

Issued 03-18-14 • Prepared by SC-186

This document defines and allocates the set of minimum requirements for the end-to-end operational, safety, performance, and interoperability aspects for implementations of the TSAA application. The TSAA application augments flight crew traffic situation awareness by providing alerts of traffic that is detected in conflict with ownship in support of the see-and-avoid responsibility. The TSAA application supports the out-the-window visual acquisition of traffic through voice annunciations of alerted traffic, visual cues, and additional symbology to supplement the plan-view depiction of traffic on a Traffic Display, when equipped. Visual cues of Nearby Airborne Traffic are provided by the TSAA application when equipped with a Traffic Display.

DO-347, Certification Test Guidance for Small and Medium Sized Rechargeable Lithium Batteries and Battery Systems

Issued 12-18-13 • Prepared by SC-225

This document provides test guidance and installation considerations for Small and Medium Sized Rechargeable Lithium Batteries and Battery systems that are permanently installed on aircraft. The tests defined in this document also provide a standardized method for characterization of performance of batteries and battery systems. Compliance with these standards is recommended as a means of assuring that the batteries and battery systems will perform their intended function(s) safely under conditions encountered in aeronautical operations.

DO-346, Minimum Operational Performance Standards (MOPS) for the Aeronautical Mobile Airport Communication System (AeroMACS)

Issued 02-20-14 • Prepared by SC-223

This document contains Minimum Operational Performance Standards for both the Airborne Component and Ground Based base station of the Aeronautical Mobile Airport Communication System (AeroMACS).

Compliance with these standards is recommended as one means of assuring that the equipment will perform its intended function(s) satisfactorily under all conditions normally encountered in routine aeronautical operation. Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

Section 1 of this document provides information needed to understand the rationale for equipment characteristics and requirements stated in the remaining sections.

Section 2 contains the Minimum Performance Standards for the equipment. These standards specify the required performance under standard environmental conditions.

Section 3 describes the performance required for installed equipment.

Section 4 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 AeroMACS radio and modem from antenna interface to the network interface. This MOPS addresses both Airborne Mobile Station and Ground Base Station components of the AeroMACS system.

DO-345, Aeronautical Mobile Airport Communications System (AeroMACS) Profile

Issued 12-18-13 ♦ Prepared by SC-223

This document specifies requirements for the unique adaptations to the current IEEE 802.16-2009 standard to provide wireless data communications to mobile platforms on an airport surface. It was developed jointly by RTCA Special Committee 223 (SC-223) and the European Organization for Civil Aviation Equipment EUROCAE Working Group-82. The document introduces the technology and describes the process for the AeroMACS profile development. The background section provides an overview of system characteristics including concept of operations and principal users of AeroMACS. A description of assumptions is provided along with verification procedures necessary to validate profile parameter selection. The technical profiles section describes technical parameter selection required to meet aviation communication requirements. The requirements section concentrates on different spectrum areas focusing on efficient use of channel assignments and interoperability requirements prescribed by WiMAX forum.

AeroMACS is based on the existing IEEE 802.16-2009 WiMAX standard. Within the WiMAX Forum ™, an Aviation Working Group (AWG) has been incorporated to adapt AeroMACS requirements into the WiMAX profile documents. This document has investigated the use of WiMAX Forum™ Mobile System Profile: Release 1.0 Version 0.9 (WMF-T23-001-R010v09) against avionics needs. No technical obstacles - which would make it impossible to operate this particular profile for aviation – were found. Further analysis of the AeroMACS features was performed in the context of the SESAR project P15.2.7 activities and the outcome of these activities has been injected in the finalization of the AeroMACS profile and related documents in RTCA and EUROCAE (e.g., the AeroMACS MOPS).

DO-344, Operational and Functional Requirements and Safety Objectives (OFRSO) for Unmanned Aircraft Systems (UAS) Standards

Issued 06-19-13 • Prepared by SC-203

The document, while not a MASPS, provides a framework to support development of future UAS standards. The OFRSO addresses:

- Daytime and night operations
- All phases of flight including surface operations
- Airports in Class B, C, D, E, and G airspace
- Flight in Class A, B, C, D, E, and G airspace (including US managed oceanic airspace)
- Handoff of aircraft control (Control Segment (Cseg) to Cseg or pilot-to-pilot)

- Operations under Visual Flight Rules (VFR) and Instrument Flight Rules (IFR)

Note: Volume 2-Appendices F & G are available only by electronic download. Go to RTCA Web Site www.rtca.org and click on “Store” and search for:

DO-344, Volume 2 –Appendices- F & G Operational and Functional Requirements and Safety Objectives (OFRSO) for Unmanned Aircraft Systems (UAS) Standards

Issued 06-19-13 ♦ Prepared by SC-203

Electronic download only – Volume 2-Appendices F & G – Zip file.

Appendix F - Operational Requirements and Operational Activities Tracing

This appendix provides an analysis reference tool. These operational activities were developed by charting the sequence of actions required to perform flight under different use case scenarios and ATC environments. The activity mapping to ATC environments is included in Appendix J.

Appendix G - Operational Requirements and Functions Tracing

This appendix presents a tracing matrix used both to develop and to review the UAS Operational Requirements and the System Functions. The mapping shows the allocation of the system requirements to system functions. In Volume 1, Section 3 there is a mapping of the Operational Requirements to each Functional Requirement.

DO-343B, Minimum Aviation System Performance Standard for AMS(R)S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP)

Issued 04-01-19 Prepared by SC-222

This document contains Minimum Aviation System Performance Standards (MASPS) for Aeronautic Mobile Satellite (Route) Services (AMS(R)S) that provide safety communications to aircraft in airspace where 1) procedural separation is applied or 2) ATS surveillance services are provided. The performance defined in this document is intended to provide (1) data communication services that comply to the RCP130, RCP240, RCP400/A1 or RCP400/A2 standards of Required Communications Performance (RCP) for two-way, bidirectional, Controller Pilot Data Link Communications (CPDLC) and to the RSP160, RSP180 or RSP400 standards of Required Surveillance Performance (RSP) for one-way aircraft-to-Air Navigation Service Provider surveillance-related information, and (2) voice communication services that comply to the RCP400/V standard

for two-way, bidirectional voice communications between pilots and controllers and to the RSP400/V standards for one-way voice communications between pilots and controllers. The document contains includes Technique Specific Normative Appendices for INMARSAT and Iridium. The new revision also contains more explicit language on data security.

DO-343A, Minimum Aviation System Performance Standard for AMS(R)S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP)

Issued 05-31-17 | Prepared by SC-222

This document contains Minimum Aviation System Performance Standards (MASPS) for Aeronautic Mobile Satellite (Route) Services (AMS(R)S) that provide safety communications to aircraft in airspace where 1) procedural separation is applied or 2) ATS surveillance services are provided. The performance defined in this document is intended to provide (1) data communication services that comply to the RCP130, RCP240, RCP400/A1 or RCP400/A2 standards of Required Communications Performance (RCP) for two-way, bidirectional, Controller Pilot Data Link Communications (CPDLC) and to the RSP160, RSP180 or RSP400 standards of Required Surveillance Performance (RSP) for one-way aircraft-to-Air Navigation Service Provider surveillance-related information, and (2) voice communication services that comply to the RCP400/V standard for two-way, bidirectional voice communications between pilots and controllers and to the RSP400/V standards for one-way voice communications between pilots and controllers.

This release is a joint RTCA/EUROCAE document and includes Systems Specific Appendix from INMARSAT.

DO-343, Minimum Aviation System Performance Standard for AMS(R)S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP) in Procedural Airspace.

Issued 08-21-13 | Prepared by SC-222

This document addresses Aeronautic Mobile Satellite (Route) Services (AMS(R)S) that provide safety communications to aircraft in procedural airspace. The performance requirements defined in this document is intended include:

(1) Data communication services that comply to either the RCP240 or RCP400 standards of Required Communications Performance (RCP) for two-way, bidirectional, controller-to-pilot data

communications and to the RSP180 or RSP400 standards of Required Surveillance Performance (RSP) for one-way aircraft-to-Air Traffic Service Provider surveillance-related information, and

(2) Voice communication services that comply with RCP400/V for two-way, bidirectional voice communications between pilots and controllers. Requirements for data communication services are referenced to and refined from the ICAO Global Operational Data Link Document (GOLD), and requirements for voice services are referenced to and refined from the ICAO Satellite Voice Guidance Material (SVGM) document.

DO-342- Guidelines for Verification and Validation of Aerodrome Mapping Databases (AMDB) Aerodrome Surface Routing Networks (ASRN) for Routing Applications

Issued 03-20-13 • Prepared by SC-217

This document provides guidance material on the concepts, methods, and criteria for verification and validation of Aerodrome Surface Routing Network (ASRN). The ASRN of an Aerodrome Mapping Database (AMDB) is a connected network defined by node and edge features that support taxi routing functions (e.g. D-Taxi) and other applications (e.g the ones developed within SESAR and NextGen). Such applications contribute to situational awareness as well as safety, capacity and efficiency of operations. This guidance material provides a framework for verification and validation activities of ASRN, the objective being to ensure the consistency of the ASRN for multiple users (both on the ground and onboard).

DO-341 - Minimum Aviation System Performance Standards (MASPS) for an Enhanced Flight Vision System to Enable All-Weather Approach, Landing and Roll-Out to a Safe Taxi Speed

Issued 09-26-12 • Prepared by SC-213

This document provides the high-level system requirements for EFVS when installed in aircraft with the express purpose of enabling specified straight-in instrument approaches with published vertical guidance to touchdown, landing, and roll-out to a safe taxi speed in visibility as low as 300 ft RVR (100 m) by use of an approved EFVS without need or reliance on natural vision. This MASPS follows from and expands upon the concepts and requirements established under DO-315A and the precedents established under 14 CFR

§91.175 (l) and (m), which identified performance standards for an enhanced flight vision systems (EFVS) to enable approach, landing, roll-out and taxi, down to 1000 ft (300 m) runway visual range (RVR). The operational concept follows a fail-operational design.

The operational scenarios used for design context and concepts discussed in this document are written to describe the intended use of the proposed systems and from this context, associated minimum performance standards are derived. They do not define current or future operational regulations or limitations of these technologies.

DO-340 - Concept of Use for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services

Issued 09-26-12 | Prepared by SC-206

This document provides an aviation industry view on how AIS and MET data link services would be used to support flight operations. In this ConUse, the data link services are considered as either the primary (Category

1) or useful (Category 2) means for communicating AIS and MET information, and voice becomes a secondary means for such communications. The implementation of such services will be evolutionary beginning with expected widespread use of useful (Category 2) AIS and MET data link services.

The document identifies the stakeholders, the operational needs, the justification for AIS and MET data link services, and the needed change processes. Operational scenarios and use cases are included along with examples of AIS and MET information that could be delivered by these services.

The AIS and MET data link services are expected to be used to support tactical/near-term as well as strategic/planning decisions in multiple operating environments. In addition, there are multiple applications, both ground and airborne, that can benefit from the data link transmission of aircraft derived meteorological information.

DO-339 - Aircraft Derived Meteorological Data via Data Link for Wake Vortex, Air Traffic Management and Weather Applications – Operational Services and Environmental Definition (OSED)

Issued 06-13-12 | Prepared by SC-206

This document further defines a concept of operations for transmitting aircraft-derived meteorological data to enable a wide range of Next Generation Air Transportation System (NextGen) and Single European Sky ATM Research (SESAR) applications in the areas of wake turbulence, air traffic management and meteorology.

This concept was first published as informative appendices in DO-260B and DO-282B, Appendix V and Appendix S respectively (Ref 1, Ref 2).

The OSED takes a link agnostic approach and describes the information content necessary to support a broad range of applications without constraining the data elements or rates to stay within the limits of any specific link. A number of wake turbulence, air traffic management and meteorological applications are described that can benefit from the downlink and crosslink of these aircraft-derived data. The OSED describes the specific data to be transmitted, including bit count and timing; addresses acquisition of required data from standard data labels on standard aircraft data buses as well as provisions for participation by aircraft not equipped with data buses and/or flight management systems; discusses constraints under which the proposed service must operate;

and provides an overview of potentially applicable performance standards, error handling, system safety and system security topics. Specific funded and/or planned projects and research in the areas of wake turbulence, air traffic management (ATM), weather situational awareness and meteorological applications that could benefit from the proposed data service are identified.

DO-338 - Minimum Aviation System Performance Standards (MASPS) for ADS-B Traffic Surveillance Systems and Applications (ATSSA)

Issued 06-13-12 | Prepared by SC-186

This document contains information previously provided in other MASPS: the MASPS for Aircraft Surveillance Applications (ASA) (RTCA DO-289 [48]; the MASPS for Automatic Dependent Surveillance – Broadcast (ADS-

B) (RTCA DO-242A [31]); and the MASPS for Traffic Information Service – Broadcast (TIS-B) (RTCA DO-286B [47]). The document combines those MASPS and updates requirements consistent with ADS-B Version

2. Requirements have been added and revised as necessary from ADS-B Version 1 and are reflected in this document to support the operational applications. ADS-B Version 2 is also the basis for ADS-B equipage requirements in the United States and other parts of the world to support air traffic control (ATC) separation services.

The document specifies requirements for and describes assumptions for all subsystems supporting the operational application of ATSSA, e.g., Automatic Dependent Surveillance - Broadcast (ADS-B), Traffic Information Service – Broadcast (TIS-B), Automatic Dependent Surveillance - Rebroadcast (ADS-R), Airborne Surveillance and Separation Assurance Processing (ASSAP) and Cockpit Display of Traffic Information (CDTI).

These standards specify characteristics that should be useful to designers, installers, manufacturers, service providers and users for systems intended for operational use within the United States National Airspace System (NAS). Where systems are global in nature, the system may have international applications that are taken into consideration.

DO-337 - Recommendations for Future Collision Avoidance Systems

Issued 03-21-12 | Prepared by SC-147

This document examines operational and technical performance issues observed in the current TCAS II as well as issues anticipated to emerge in the future as NextGen changes affect the airspace. It explores potential changes to address these issues and addresses their maturity. The document comments on additional

research and development that would be required, either to better characterize the issue, to develop solutions or both.

Both issues and solutions are presented in two major categories:

- Issues affecting the current TCAS II and changes that could be made to that system without substantial redesign. These are termed “near-term” changes, but their development, certification and implementation could take as long as six years.

- Issues anticipated in the future, and changes that would require either substantial redesign or that might use entirely new sources of surveillance data. These changes are termed “far-term” and would take more than 10 years. Some far- term solutions may be required to address near-term issues.

The document presents tables to help the reader map solutions to issues and recommendations are presented for the solutions deemed most promising and deserving of high research priority.

DO-336 - Guidance for Certification of Installed Automatic Flight Guidance and Control Systems (AFGCS) for Part 27/29 Rotorcraft

Issued 03-21-12 | Prepared by SC-220

This document provides recommended installation guidance for automatic flight guidance and control systems (AFGCS) for rotary wing (FAR Part 27/29). These systems allow the aircraft to be flown smoothly and precisely according to either the flight plan or to direction from air traffic controllers, while the pilots direct the rest of their attention to other cockpit duties. A full-featured AFGCS improves safety by protecting the aircraft from incursions outside the flight envelope and maintaining predictable flight path. It may also fly approach to landing and complex departure and arrival procedures more reliably and accurately than a hand-flown aircraft. This document addresses technology and feature improvements affecting the safety and performance of the AFGCS, including the recently published Minimum Operational and Performance Standards DO-325.

DO-335, Guidance for Installation of Automatic Flight Guidance and Control Systems (AFGCS) for Part 23 Airplanes

Issued 03-21-12 | Prepared by SC-220

This document provides recommended installation guidance for automatic flight guidance and control systems (AFGCS) for small fixed-wing airplanes (FAR Part 23). These systems allow the aircraft to be flown smoothly and precisely according to either the flight plan or to direction from air traffic controllers, while the pilots direct the rest of their attention to other cockpit duties. A full-featured AFGCS improves safety by protecting the aircraft from incursions outside the flight envelope and maintaining predictable flight path. It may also fly approach to landing and complex departure and arrival procedures more reliably and accurately than a hand-flown aircraft. This document addresses technology and feature improvements affecting the safety and performance of the AFGCS, including the recently published MOPS DO-325.

DO-334, Minimum Operational Performance Standards (MOPS) for Strapdown Attitude and Heading Reference Systems (AHRS)

Issued 03-21-12 | Prepared by SC-219

This document contains MOPS for Strapdown Attitude and Heading Reference Systems (AHRS). It is intended for equipment that does not use gimbaled sensors and for equipment that outputs attitude (pitch and roll). It also addresses functions of heading, turn, slip and the display of this information. This document does not specify the format of data outputs but does specify equipment characteristics that should be useful to designers, manufacturers, installers and users of the equipment

DO-333, Formal Methods Supplement to DO-178C and DO-278A

Issued 12-13-11 | Prepared by SC-205

This supplement identifies the additions, modifications and substitutions to DO-178C and DO-278A objectives when formal methods are used as part of a software life cycle, and the additional guidance required. It discusses those aspects of airworthiness certification that pertain to the production of software, using formal methods for systems approved using DO-178C.

Formal methods are mathematically based techniques for the specification, development and verification of software aspects of digital systems. The mathematical basis of formal methods consists of formal logic, discrete mathematics and computer-readable languages. The use of formal methods is motivated by the expectation that, as in other engineering disciplines, performing appropriate mathematical analyses can contribute to establishing the correctness and robustness of a design.

DO-332, Object-Oriented Technology and Related Techniques Supplement to DO-178C and DO-278A

Issued 12-13-11 | Prepared by SC-205

This supplement identifies the additions, modifications and deletions to DO-178C and DO-278A objectives when object-oriented technology or related techniques are used as part of the software development life cycle and additional guidance is required. This supplement, in conjunction with DO-178C, is intended to provide a common framework for the evaluation and acceptance of object-oriented technology (OOT) and related techniques (RT)-based systems.

OOT has been widely adopted in non-critical software development projects. The use of this technology for critical software applications in avionics has increased, but there are a number of issues that need to be considered to ensure the safety and integrity goals are met. These issues are both directly related to language features and to complications encountered with meeting well-established safety objectives.

DO-331, Model-Based Development and Verification Supplement to DO-178C and DO-278A

Issued 12-13-11 | Prepared by SC-205

This supplement contains modifications and additions to DO-178C and DO-278A objectives, activities, explanatory text and software life cycle data that should be addressed when model-based development and verification are used as part of the software life cycle. This includes the artifacts that would be expressed using models and the verification evidence that could be derived from them. Therefore, this supplement also applies to the models developed in the system process that define software requirements or software architecture.

A model is an abstract representation of a set of software aspects of a system that is used to support the software development process or the software verification process. This supplement addresses model(s) that have the following characteristics:

- The model is completely described using an explicitly identified modeling notation. The modeling notation may be graphical and/or textual.

- The model contains software requirements and/or software architecture definition.
- The model is of a form and type that is used for direct analysis or behavioral evaluation as supported by the software development process or the software verification process.

DO-330, Software Tool Qualification Considerations

Issued 12-13-11 | Prepared by SC-205

Software tools are widely used in multiple domains to assist in developing, verifying and controlling other software. In the context of this document a tool is a computer program or a functional part thereof, used to help develop, transform, test, analyze, produce or modify another program, its data or its documentation. Examples are automated code generators, compilers, test tools and modification management tools. This document explains the process and objectives for qualifying tools.

This document provides software tool qualification guidance. Additionally, clarification material is provided in the form of Frequently Asked Questions (FAQs). The document was developed for the following reasons:

- Tools are different from the software using the tools and form a unique domain; therefore, tool-specific guidance for both tool developers and tool users is needed.
- Tools are often developed by teams other than those who use the tools to develop software. These tool development teams frequently do not have software guidance background (examples of guidance include DO-178C or DO-278A). This tool-specific document benefits tool development teams and helps them avoid confusion and misinterpretation.
- It provides guidance for airborne and ground-based software. It may also be used by other domains, such as automotive, space, systems, electronic hardware, aeronautical databases and safety assessment processes.

DO-329, Aircraft Secondary Barriers and Alternative Flight Deck Security Procedures

Issued 09-28-11 | Prepared by SC-221

This document provides guidance for the use of various Secondary Barrier Systems as acceptable means of compliance with current U.S. regulations, as well as an evaluation of best practices, and other considerations to be taken into account when determining compliance with these regulations. The guidance recommended is

one means of ensuring that the equipment will perform its intended function satisfactorily under all conditions normally encountered in routine operations. Any regulatory application of these standards is the sole responsibility of the appropriate governmental agencies.

DO-328A - Safety, Performance and Interoperability Requirements Document for Airborne Spacing – Flight Deck Interval Management (ASPA-FIM)

Issued 09-22-15 | Prepared by SC-186

This document (Revision A) provides the minimum operational, Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROP) to implement Airborne Spacing (ASPA) - Flight Deck Interval Management (FIM) in support of and consistent with an identified set of operational scenarios in DO-361 - *Minimum Operational Performance Standards (MOPS) for the Flight-deck Interval Management (FIM).* ASPA-FIM is defined as the flight deck component of a larger Interval Management (IM) System. The IM System includes the ground domain's tools to plan and schedule traffic to assist the controller in determining what IM Clearances might be applicable to specific aircraft. ASPA-FIM then, based upon the IM Clearance provided by the controller and surveillance information received on the Target Aircraft, generates guidance for the flight crew to successfully and safely execute the IM Clearance. The document was prepared jointly by RTCA SC-186 & EUROCAE WD-51.

DO-328, Safety, Performance and Interoperability Requirements Document for Airborne Spacing – Flight Deck Interval Management (ASPA-FIM)

Issued 06-21-11 | Prepared by SC-186

This document provides the minimum operational, Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROP) to implement Airborne Spacing (ASPA) - Flight Deck Interval Management (FIM) in support of an identified set of operational scenarios. ASPA-FIM is defined as the flight deck component of a larger Interval Management (IM) System. It defines and allocates the set of minimum requirements for the end-to-end operational, safety, performance, and interoperability aspects for implementations of an initial set of IM Operations. The document was developed jointly by ADS-B Requirements Focus Group (RFG) within RTCA Special Committee 186 and EUROCAE Working Group 51.

DO-327, Assessment of the LightSquared Ancillary Terrestrial Component Radio Frequency Interference Impact on GNSS L1 Band Airborne Receiver Operations

Issued 06-03-11 | Prepared by SC-159

This report documents a study conducted by RTCA Special Committee 159 in response to a request from the Federal Aviation Administration to address the issue of compatibility between the operation of a terrestrial wireless broadband network in the bands 1525-1559/1626.5-1660.5 MHz by LightSquared, pursuant to its FCC license, and GPS receivers onboard aircraft. The report addresses the issues analytically based on existing domestic and international standards and includes results of tests of four certified aircraft GPS receivers.

DO-326A, Airworthiness Security Process Specification

Issued 08-06-14 | Prepared by SC-216

This updated document is issued in parallel with DO-355 to address developmental and continuing airworthiness concerns. The guidance is intended to augment current guidance for aircraft certification to handle the threat of intentional unauthorized electronic interaction to aircraft safety. It adds data requirements and compliance objectives, as organized by generic activities for aircraft development and certification. The document is the “core document” of a series of documents on Aeronautical Systems Security that together will address information security for the overall Aeronautical Information System Security (AISS) of airborne systems with related ground systems and environment. It is intended to be used in conjunction with other applicable guidance material referenced.

DO-326, Airworthiness Security Process Specification

Issued 12-08-10 | Prepared by SC-216

The guidance of this document is intended to augment current guidance for aircraft certification to handle the information security threat to aircraft safety. It adds data requirements and compliance objectives, as organized by generic activities for aircraft development and certification. The document is the first of a series of documents on Aeronautical Systems Security that together will address information security for the overall Aeronautical Information System Security (AISS) of airborne systems with related ground systems and environment. It addresses only Aircraft Type Certification. Because of the impending introduction of aircraft with significant security-related features, this document is proposed for approval in advance of the other documents in this series to address immediate industry concerns and to establish feedback on its implementation challenges.

DO-325, Minimum Operational Performance Standards (MOPS) for Automatic Flight Guidance and Control Systems and Equipment

Issued 12-08-10 | Prepared by SC-220

This document contains Minimum Operational Performance Standards (MOPS) for Automatic Flight Guidance and Control Systems (AFGCS) and applicable interfaces. These standards specify system characteristics that should be useful to designers, manufacturers, installers and users of the system and equipment. The system may also provide workload relief to pilots and provide a means to fly a flight path more accurately to support specific operational requirements. Standards are included for the automatic flight guidance and control functions consisting of four equipment classes: Class A, autopilot, Class B, yaw damper, Class C, flight director, Class D, auto-thrust/auto-throttle and two categories of aircraft: Airplanes and Rotorcraft.

DO-324, Safety and Performance Requirements (SPR) for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services

Issued 12-08-10 | Prepared by SC-206

This document specifies minimal baseline operational Safety and Performance Requirements (SPR) for the data link delivery of AIS and MET information as the primary means of communications between air and ground. The aim of the AIS and MET data link services is to provide aeronautical and meteorological information for flight efficiency and/or hazard avoidance in all flight environments. Four AIS/MET data link services are covered in this SPR: an aeronautical update service that provides current updates of aeronautical information; and three weather decision services that provide current updates of meteorological information designed to support flight crew decisions in three-time categories (planning, near term and immediate decisions). The document is based on a notional architecture and is not intended for implementation and operational use until validation activities are completed. It provides a framework and a methodology to be used as the basis for assessing implementation of new data link systems or architectures as candidates for AIS and/or MET data link services.

DO-323, Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA)

Issued 12-08-10 | Prepared by SC-186

This document provides the minimum Operational, Safety, and Performance Interoperability Requirements (SPR) for the implementation of Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA). The SURF IA application is fully defined in the Operational Services and Environment Definition (OSED) found in SPR Appendix A. The SPR can be used as a starting point for the development of Minimum Operational Performance Standards (MOPS), Technical Standard Orders (TSOs) or other material to support SURF IA system development or certification.

Supplement to DO-323, Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA)

Issued 12-08-10 | Prepared by SC-186

This supplement to DO-323 is in the form of a single zip archive.

This analysis package provides detailed information about SURF IA. The supplement consists of seven Excel flies containing the bowtie analysis and other details that are not included in the SURF IA SPR document, Appendix C (Operational Safety Analysis, OSA). These supplemental files are provided for safety analysts who want to understand the SURF IA safety analysis in more detail.

This Supplement is available only by electronic download.

DO-322, Safety, Performance and Interoperability Requirements Document for ATSA-SURF Application

Issued 12-08-10 | Prepared by SC-186

This document provides the minimum operational, Safety, and Performance Requirements (SPR) and Interoperability Requirements (INTEROP) for the implementation of enhanced Airborne Traffic Situational Awareness (ATSA) for Surface (SURF) Operations. The primary goal of the ATSA-SURF application is to reduce the potential for errors, runway and taxiway incursions, and collisions by providing enhanced

situational awareness to the flight crew operating an aircraft on the airport surface, and including final approach, landing and takeoff operations in the vicinity of the airport surface.

DO-321, Safety, Performance and Interoperability Requirements Document for ADS-B Airport Surface Surveillance Application (ADS-B-APT)

Issued 12-08-10 | Prepared by SC-186

This document provides the minimum operational, Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROP) for the implementation of the Automatic Dependent Surveillance-Broadcast Airport Surface Surveillance Application (ADS-B-APT). The ADS-B-APT application aims at enhancing aerodrome operations by adding ADS-B surveillance to a non-surveilled aerodrome and providing the controller with an appropriate graphical display to view the surveillance data.

This document is intended to support the approval of all elements of the CNS/ATM system relating to the ADS-B-APT application.

DO-320, Operational Services and Environmental Definition (OSED) for Unmanned Aircraft Systems

Issued 06-10-10 | Prepared by SC-203

This document provides a basis for assessing and establishing operational, safety, performance, and interoperability requirements for UAS operations in the US National Airspace System (NAS). An Unmanned Aircraft System is an unmanned aircraft and its associated components and persons required for operation. The OSED encompasses:

- All current and planned UAS operations that may occur prior to 2025, except those intended to operate strictly within visual line of sight
- All UAS types that are in use or in the final stages of development
- All airspace and operating environments in the current NAS (as described in the FAA NAS Enterprise Architecture, September 2007) including airport surface and off-airport operations
- The operational performance and characteristics of UAS based on known values of existing systems

DO-319, Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness during Flight Operations (ATSA-AIRB)

Issued 03-17-10 – Prepared by SC-186

The document provides the minimum operational, Safety and Performance Requirements (SPR) and Interoperability Requirements (INTEROP) for the implementation of Airborne Traffic Situational Awareness (ATSAW) for "Enhanced Traffic Situational Awareness during flight operations" (ATSA-AIRB). This application provides flight crews with a graphical display of AIRB Traffic relative to their aircraft together with supporting information on that traffic.

The requirements are necessary to provided adequate assurance that the appropriate aspects of the relevant Communication Navigation Surveillance and Air Traffic Management (CNS/ATM) system, when operating together, will perform their intended function in an acceptably safe manner for the operations defined in the Operational Services and Environment Definition (OSED).

The document is intended to support the approval of elements of the CNS/ATM system relating to the ATSA-AIRB application.

DO-318, Safety, Performance and Interoperability Requirements Document for Enhanced Air Traffic Services in Radar-Controlled Areas Using ADS-B Surveillance (ADS-B-RAD)

Issued 09-09-09 – Prepared by SC-186

This document defines and allocates a set of minimum requirements for the end-to-end operational, safety, performance and interoperability aspects for the implementations of the ADS-B-RAD application. The requirements are necessary to provide adequate assurance that the elements of the relevant Communication, Navigation, and Surveillance and Air Traffic Management (CNS/ATM) system, when operating together, will perform their intended function in an acceptably safe manner for the operations defined in the Operational Services and Environment Definition (OSED). This system includes ground and airborne elements. In addition, the document defines ADS-B requirements applicable to dense airspaces such as those found in Europe and the USA.

DO-317B, Change 1 to Appendix U

Issued 03-21-19 □ Prepared by SC-186

This document is Change 1 for DO-317B and is an Appendix (U) that describes specific aircraft track sets that are used to provide stimulus scenarios for TSAA testing. The tracks are split into two categories: 1) Must Alert and 2) Must Not Alert. Must Alert tracks test the alerting capabilities of a TSAA system for a range of aircraft encounters that have historically occurred in both airport and en route environments. Must Not Alert tracks test similar encounters as the Must Alert tracks except that the closest point of approach is modified to separate aircraft such that no alerting should occur according to pilot and industry experts. Each track set contains multiple scenarios that test a range of track data sources as well as track state variables.

DO-317B, Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System

Issued 06-17-14 ♦ Prepared by SC-186

This document considers functional requirements consisting of: airborne surveillance and separation assurance processing (ASSAP), and cockpit display of traffic information (CDTI) as described in the Aircraft Surveillance Applications (ASA) Minimum Aviation System Performance Standards (MASPS), RTCA DO 289, and in the Safety, Performance and Interoperability Requirements documents for the applications approved by RTCA SC-186 and EUROCAE WG-51: ATSA-AIRB (DO-319/EUROCAE DOCUMENT ED-164), ATSA-VSA (DO-314/ED-160), ATSA-ITP (DO-312/ED-159) ATSA-SURF (DO-322/ED-165), TSAA (DO-348/ED-232), and

CAVS (DO-354/ED-233). Operational performance standards for functions or components that exceed the stated minimum requirements are identified as optional features.

DO-317B incorporates the following “prime” differences from DO-317A:

Traffic Situation Awareness with Alerts (TSAA): Traffic Situation Awareness with Alerts (TSAA) is an application that is intended to reduce the number of mid-air collisions and near mid-air collisions involving general aviation aircraft. TSAA provides voice annunciations to flight crews to draw attention to Target Aircraft and also adds visual cues to the underlying basic traffic situation awareness. The TSAA application uses ADS-B information, and where available Automatic Dependent Surveillance-Rebroadcast (ADS-R) and Traffic Information Service-Broadcast (TIS-B) information to provide the flight crew with indications of nearby aircraft in support of their see-and-avoid responsibility.

CDTI Assisted Visual Separation (CAVS): Similar to VSA, the CDTI is used to assist the flight crew in acquiring and maintaining visual contact with a preceding aircraft (designated traffic) while performing a visual separation on approach procedure in Visual Meteorological Conditions (VMC). The fundamental difference between VSA and CAVS is that the flight crew is authorized to use the information provided by the CDTI for the preceding aircraft, after visual acquisition and cross correlation on the CDTI, as a substitute for out the window information while performing the CAVS procedure. Therefore, once the preceding aircraft has been acquired by correlating the traffic on the CDTI with a visual acquisition of the traffic out-the-window, the CAVS procedure can continue through the use of the Traffic Display when the traffic information out-the-window is no longer available (for example, lost in lights during approach at night). CAVS can be used for parallel runway operations; however, it cannot be used for designated traffic closer than the Caution "CAVS Minimum Range" Alert threshold.

Supplement to DO-317B, Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System

Issued 06-17-14 ♦ Prepared by SC-186

The data supplement to DO-317B is a single zip file archive that contains test data files for scenarios described in Sections 3.2.7 through 3.2.14 and Appendix U. Additionally, this data supplement contains sample MATLAB implementations of an airborne surveillance processor (described in Appendix C), an In-Trail Procedure (ITP) application (described in Appendix S), and a Traffic Situation Awareness with Alerts (TSAA) application (described in Appendix T). Appendix I describe the test data generation processes. The data files for any particular test scenario reflect all surveillance sources required for the test procedure (e.g., ADS-B, ADS-R, TIS-B, and TCAS). Test data files are provided separately for 1090ES, UAT, and VDL4 installations where necessary due to the differences in state vector construction for each link. Test data files are provided in Comma Separated Value (CSV) format and content represents input to end user or manufacturer systems. Additionally, in most cases "truth data" is provided for ownship and traffic aircraft in the form of Plain Text (TXT) files. Truth data represents the ideal aircraft states without the addition of surveillance errors. Truth data is provided to enable system performance comparisons.

This Supplement is available only by electronic download.

DO-317A, Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System

Issued 12-13-11 Prepared by SC-186

This document contains the recommended requirements for the processing and display of traffic Ownship information for use by the flight crew in processing airborne applications. The document considers functional

requirements consisting of Airborne Surveillance and Separation Assurance Processing (ASSAP) and Cockpit Display of Traffic Information (CDTI) as described in DO-289, *Minimum Aviation System Performance Standards (MASPS) for Aircraft Surveillance Applications (ASA).* It includes requirements to support the initial five applications included in DO-289 – Enhanced Visual Acquisition (EVAcq), Conflict Detection (CD), Airport Surface Situational Awareness (ASSA), Final Approach and Runway Occupancy Awareness (FAROA) and Enhanced Visual Approach (EVApp). Operational performance standards for functions or components that exceed the stated minimum requirements are identified as optional features.

In order to provide more complete traffic situational awareness, the Traffic Alert and Collision Avoidance System (TCAS) display should be integrated with the CDTI on aircraft equipped with TCAS. This document provides requirements and guidance for integration of TCAS with ASAS.

DO-317A incorporates the following "prime" differences from DO-317:

- Incorporation of Airborne Surveillance Application requirements for the situational awareness applications ATSA-AIRB (ED-164/DO-319), ATSA-SURF (ED-165/DO-322), ATSA-VSA (ED-160/DO-314) and ATSA-ITP (ED-159/DO-312), jointly developed and published by EUROCAE WG-51 and RTCA SC-186 within the framework of the ADS-B Requirements Focus Group (RFG). This includes the related ADS-B data quality requirements for traffic and Ownship (including relevant qualification schemes thereof) and ASA system latency requirements.

- Harmonization of application transition requirements, in particular between the surface application and the airborne applications.

- Use of the 1090 MHz Extended Squitter MOPS (ED-102A/DO-260B) as the ADS-B data transmission and receipt baseline, in line with the European and US airspace regulations with respect to ADS-B Out.

- Refinement of expected regulatory ASA system design assurance requirements and the related definition of equipment classes.

- Integration of relevant VDL Mode 4 provisions.

- Maintenance of the RTCA-defined EVAcq application as the only application originally contained in DO-317, defining the minimum set of requirements ASA systems must meet for a minimum stand-alone traffic situation awareness application in smaller aircraft.

- Provision of additional updates, including:

    - Traffic display prioritization;

    - Support of TIS-B and ADS-R services (as defined by FAA);

    - Data age requirements;

    - Test scenarios and procedures.

Supplement to DO-317A, Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System

Issued 12-13-11 – Prepared by SC-186

This supplement to DO-317A is a single zip file archive that contains test data scenarios described in Sections

2.5.7 through 2.5.9 and MATLAB implementations of sample algorithms for an airborne surveillance processor and In-Trail Procedure (ITP) application. Appendix I describes the test data generation processes. The data files for any particular scenario reflect all appropriate surveillance sources (e.g., ADS-B, ADS-R, TIS-B, and TCAS) and are provided separately for 1090ES, UAT, and VDL4 installations where necessary due to the differences in state vector construction for each. Test data files are provided in Comma Separated Value (CSV) format and content represents input to end user or manufacturer systems. The zip file archive will extract into two subdirectories: “ASSAP test data” which includes Application processing test data and Surveillance processing test data. Sample implementations include ASA sample 1090ES implementation and ITP sample implementation.

DO-317, Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications System (ASAS)

Issued 04-14-09 – Prepared by SC-186

This document contains the recommended requirements for the processing and display of traffic Ownship information for use by the flight crew in processing airborne applications. The document considers functional requirements consisting of: Airborne Surveillance and Separation Assurance Processing (ASSAP), and Cockpit Display of Traffic Information (CDTI) as described in DO-289, *Minimum Aviation System Performance Standards (MASPS) for Aircraft Surveillance Applications (ASA).* It includes requirements to support the initial five applications included in DO-289: Enhanced Visual Acquisition (EVAcq), Conflict Detection (CD), Airport Surface Situational Awareness (ASSA), Final Approach and Runway Occupancy Awareness (FAROA) and Enhanced Visual Approach (EVApp). Operational performance standards for functions or components that exceed the stated minimum requirements are identified as optional features.

In order to provide more complete traffic situational awareness, the Traffic Alert and Collision Avoidance System (TCAS) display should be integrated with the CDTI on aircraft equipped with TCAS. This document provides requirements and guidance for integration of TCAS with ASAS.

Supplement to DO-317, Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications System (ASAS)

Issued 04-14-09 – Prepared by SC-186

This supplement to DO-317 is in the form of a single zip archive. One portion of this archive decompresses into the stimulus test data described in Section 2.5.7 of this MOPS. The stimulus scenarios reflect all the appropriate surveillance sources for the scenario (i.e., ADS-B, ADS-R, TIS-B and TCAS) are provided separately for 1090ES and UAT implementations (due to the difference in State Vector construction for each). Appendix C of this MOPS describes an example implementation of the ASSAP algorithms. A MATLAB implementation of these algorithms (oriented to a 1090ES split state vector implementation) was developed in support of this MOPS. The other portion of the archive contains the MATLAB files that constitute this ASSAP implementation.

This zip file will extract into two subdirectories: “ASSAP_test_data” which includes the stimulus scenarios and "ASAS_simulation_1090ES_implementation" which includes the MATLAB files.

This Supplement is available only by electronic download.

DO-316, Minimum Operational Performance Standards (MOPS) for Global Positioning System/Aircraft Based Augmentation System Airborne Equipment

Issued 04-14-09 – Prepared by SC-159

This document contains Minimum Operational Performance Standards for single-frequency airborne navigation sensor equipment not augmented by ground or space-based systems. The standards define minimum performance, functions and features for GPS sensors that provide position information to a multi-sensor system or separate navigation system. They also address Area Navigation (RNAV) equipment to be used for the en route, terminal, and Lateral Navigation (LNAV) phases of flight.

The basis for this document is RTCA/DO-229D - MOPS for GPS/WAAS Airborne Equipment, Class Beta 1 receiver without SBAS requirements.

In comparison with the older GPS MOPS - RTCA/DO-208… the document reflects:

1) An updated signal operating environment (updated interference environment),

2) The absence of Selective Availability (SA) (which was turned off on May 1st, 2001 as a result of a Presidential Directive),

3)

4) Updated RAIM (Receiver Autonomous Integrity Monitoring) for GPS and,

5) Optional GPS receiver velocity accuracy and velocity FOM (Figure of Merit) computation.

Note:

WAAS*: Wide Area Augmentation Systems*

ABAS*: Aircraft Based Augmentation System*

DO-315B, Minimum Aviation System Performance Standards (MASPS) for Enhanced Vision Systems, Synthetic Vision Systems, Combined Vision Systems and Enhanced Flight Vision Systems

Issued 06-21-11 Prepared by SC-213

This document addresses Enhanced Vision Systems (EVS), Synthetic Vision Systems (SVS) and Combined Vision Systems (CVS) technologies. DO-315B adds system design criteria for use of SVS for lower-than-standard Category I ILS minima. Specific features include SVS with system performance, database, alertspilot controls, and display and symbology requirements. Respective flight test and rationale appendices were added.

For the FAA, EVS for operational credit is called an Enhanced Flight Vision System (EFVS), and the term "EFVS" is used in this document. The EFVS subsections of this MASPS provide the high-level system requirements for Enhanced Flight Vision Systems when installed in aircraft with the express purpose of gaining additional operational credit under FAA Order 8400.13. EFVS performance requirements were not changed but updates are planned for in future revisions.

The European Aviation Safety Agency (EASA) uses the term “EVS” as equivalent to the FAA description of EFVS.

DO-315A, Minimum Aviation System Performance Standards (MASPS) for Enhanced Vision Systems, Synthetic Vision Systems, Combined Vision Systems and Enhanced Flight Vision Systems

Issued 09-15-10 ♦ Prepared by SC-213

DO-315A adds system design criteria for use of EFVS to landing with reported visibility as low as 1000ft RVR (or 300 meters). Specific features with DO-315A include a touchdown zone requirement and use of a radio altimeter and flare prompt. The flight test matrix was expanded, and a transport aircraft appendix was added. Vertical flight path guidance, flare guidance, pilot monitoring display requirements, and design assurance requirements were also addressed. Synthetic vision performance requirements were not changed but are planned for next revision.

The document addresses Enhanced Vision Systems (EVS), Synthetic Vision Systems (SVS), and Combined Vision Systems (CVS) technologies. The MASPS provides the high-level system requirements for Enhanced, Synthetic, and Combined Vision Systems when installed in aircraft with the express purpose of gaining no additional operational credit. Currently, only EVS technology incorporating an approved Head-Up Display (HUD) is eligible for operational credit under Title 14 US Code of Federal Regulations (CFR) Â§91.175 with the Federal Aviation Administration (FAA). An approved combination of EVS and HUD is termed an Enhanced Flight Vision System (EFVS) by the FAA.

For the FAA, EVS for operational credit is called "EFVS", and the term "EFVS" is used in this document. The EFVS subsections of this MASPS provide the high-level system requirements for Enhanced Flight Vision Systems when installed in aircraft with the express purpose of gaining additional operational credit.

The European Aviation Safety Agency (EASA) uses the term "EVS"Â as equivalent to the FAA description of EFVS.

DO-314, Safety, Performance and Interoperability Requirements Document for Enhanced Visual Separation on Approach (ATSA-VSA)

Issued 12-16-08 Prepared by SC-186

This document provides the minimum operational, Safety, and Performance Requirements (SPR) and Interoperability Requirements (INTEROP) for the implementation of Airborne Traffic Situational Awareness (ATSA) for “Enhanced Visual Separation on Approach” (VSA). The ATSA-VSA application is fully defined. The document defines and allocates the set of minimum requirements for the end-to-end operational, safety, performance, and interoperability aspects for implementations of the ATSA-VSA application.

The requirements contained in this document are necessary to provide adequate assurance that the appropriate aspects of the relevant Communication Navigation Surveillance and Air Traffic Management (CNS/ATM) system, when operating together, will perform their intended function in an acceptably safe manner for the operations defined in the OSED. The system here includes ground and airborne elements.

The document was developed jointly by RTCA Special Committee 186 and EUROCAE Working Group 51 - within the group commonly referred to as the "ADS-B Requirements Focus Group" (RFG).

DO-313, Certification Guidance for Installation of Non-Essential, Non-Required Aircraft Cabin Systems and Equipment

Issued 10-02-08 Prepared by SC-210

This document provides certification guidance on how to meet the airworthiness requirements for the installation of non-essential, non-required aircraft Cabin Systems and Equipment (CS&E) and in doing so enable a standardized approach across equipment manufacturers and installers. The information contained herein is applicable to installation methodologies of aircraft CS&E approved under 14 CFR parts 23, 25, 27 and 29. Both aerospace manufactured equipment and commercial off the shelf (COTS) equipment is considered.

Supplement to DO-312, Safety, Performance and Interoperability Requirements Document for the In-Trail Procedure in Oceanic Airspace (ATSA-ITP) Application

Issued 03-21-12 Prepared by SC-186

After DO-312 was issued on June 19, 2008, work on the ITP application continued within ICAO. This Supplement contains a summary of the three parameter changes from the additional development of the ATSA-ITP undertaken by ICAO. These changes have been adopted by FAA and are used for the incorporation of ITP into the ASA System MOPS (DO-317A).

DO-312, Safety, Performance and Interoperability Requirements Document for the In-Trail Procedure in Oceanic Airspace (ATSA-ITP) Application

Issued 06-19-08 – Prepared by SC-186

This document provides the minimum operational, safety, and performance requirements (SPR) and interoperability requirements (INTEROP) for the implementation of enhanced Airborne Traffic Situational Awareness (ATSA) for "In-Trail Procedure" (ITP). The objective of the In-Trail Procedure (ITP) is to enable aircraft that desire Flight Level changes in Procedural Airspace to achieve these changes on a more frequent basis, thus improving flight efficiency while maintaining safe separation from other aircraft. The requirements contained in the document are necessary to provide adequate assurance that the appropriate aspects of the relevant Communication Navigation Surveillance and Air Traffic Management (CNS/ATM) system, when operating together, will perform their intended function in an acceptable safe manner for the defined operations. The requirements can be used for approval processes including aircraft type design approval, aircraft operator operational approval, and Air Traffic Services provider operational approval.

DO-311A, Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems

Issued 12-19-2017 – Prepared by SC-211

This standard is intended for designers and manufacturers of rechargeable lithium batteries and battery systems, aircraft manufacturers, aircraft equipment installers, and users within the aviation community. Meeting the requirements of this standard provides a means of assuring that the batteries and battery systems will perform their intended function(s) safely under conditions encountered in aeronautical operations. To ensure safe operation on the aircraft, it is imperative that users of this standard thoroughly understand the aircraft performance requirements and the capabilities and limitations of the batteries and battery systems. It is the equipment installers' responsibility to ensure that the batteries and battery systems meet the certification and installation requirements of the aircraft. Any regulatory application of this standard is the responsibility of the applicable government agency.

This standard provides design, testing, and installation guidance for rechargeable lithium battery systems that are permanently installed on aircraft including standalone and embedded batteries. It addresses all sizes of rechargeable lithium battery systems regardless of energy content (watt-hours). Batteries or battery systems that are less than two watt-hours are exempt from this standard if they have met the requirements of applicable UL or IEC standards. Otherwise, the requirements of this standard apply.

DO-311, Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems

Issued 03-13-08 | Prepared by SC-211

This document contains Minimum Operational Performance Standards (MOPS) for rechargeable Lithium battery systems to be used as permanently installed power sources on aircraft. Compliance with these standards is recommended as a means of assuring that the Lithium battery will perform its intended function(s) safely, under conditions normally encountered in aeronautical operations. These standards apply to the chemical composition, cell size, cell construction, cell interconnection methods within batteries, venting provisions, operational and storage environments, packaging, handling, test, storage and disposal of rechargeable Lithium batteries, installed separately or in avionics equipment aboard aircraft.

DO-310, Minimum Operational Performance Standards for GPS Ground-based Regional Augmentation System Airborne Equipment

Issued 03-13-08 | Prepared by SC-159

The document contains Minimum Operational Performance Standards (MOPS) for airborne navigation equipment using signals from the Global Navigation Satellite System (GNSS) augmented by a Ground-based Regional Augmentation System (GRAS). The document defines minimum performance requirements, functions and features for GRAS airborne equipment to support all phases of flight including en-route, terminal, LNAV (Lateral NAVigation), LNAV/VNAV (Lateral NAVigation/Vertical NAVigation), LP (Localizer Approach with FAS data but without vertical guidance), LPV (Localizer Precision with Vertical guidance) (but not CAT-I/II/III). GRAS equipment will be compatible with the Ground Based Augmentation System (GBAS) and will be able to use the signal in space for approved approach operations. Compliance with these standards by manufacturers, installers and users is recommended as a means of assuring that the equipment will satisfactorily perform its intended functions under conditions encountered in routine aeronautical operations.

DO-309, Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and Warning System (HTAWS) Airborne Equipment

Issued 03-13-08 | Prepared by SC-212

This MOPS defines a Helicopter Terrain Awareness and Warning System (HTAWS), Airborne System. The HTAWS is an alerting system intended to provide terrain and obstacle aural and visual alerts. It is designed to reduce the risk of Controlled Flight into Terrain (CFIT) accidents by providing increased situational awareness

of the surrounding terrain and obstacles, mainly during the cruise phase in Visual Meteorological Condition (VMC) and in Instrument Meteorological Condition (IMC) under Instrument Flight Rules (IFR). HTAWS is not intended to be used as an aid for navigation.

DO-308, Operational Services and Environment Definition (OSED) for Aeronautical Informational Services (AIS) and Meteorological (MET) Data Link Services

Issued 12-06-07 | Prepared by SC-206

The document presents the AIS and MET data link services that are envisaged to be implemented within the next decade in both the USA and Europe. It is presented in an Operational Service and Environment Definition (OSED) form, which is based on the criteria set forth in RTCA DO-264 / EUROCAE ED-78A - *Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications*. The OSED describes the intended AIS and MET data link services and the assumptions about the environment in which they operate. It intends to provide the aeronautical information for pilot decision support and Collaborative Decision Making (CDM) between ground services, the flight deck, Air

Traffic Control (ATC) and, as appropriate, Airline Operations Centers (AOCs) in all flight environments for flight efficiency and/or hazard avoidance.

DO-307A, Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance

Issued 12-15-16 | Prepared by SC-234

This report addresses aircraft design and certification to tolerate operation of PEDs. Previous RTCA reports on aircraft interference from PEDs have emphasized risk assessments and then recommended restrictions on the use of PEDs on aircraft. This report departs from the earlier RTCA reports and is directed to aircraft design recommendations that lead to aircraft tolerance to both intentional RF transmissions and spurious RF emissions from PEDs.

There are two aspects to the aircraft design recommendations in this report. One aspect defines aircraft system and equipment RF susceptibility qualification recommendations that provide tolerance to RF from intentionally transmitting PEDs. This is commonly referred to as protection from PED back door coupling. The recommendations closely follow existing practices for aircraft system high intensity radiated field (HIRF) protection. Acceptable test approaches for verifying the aircraft system RF susceptibility qualification are defined.

The second aspect defines acceptable interference path loss between aircraft radio receivers and PEDs that emit spurious RF. This is commonly referred to as protection from PED front door coupling. Extensive analysis of measured PED spurious emissions was performed so that the interference path loss targets are based on

statistics of actual PED emissions rather than regulatory specifications. Interference path loss test methods are defined.

This report also defines recommended approaches for demonstrating compliance with aircraft design certification regulations.

DO-307, Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance

Issued 10-11-07 Prepared by SC-202

This document recommends aircraft design and certification criteria to tolerate the operation of PEDs. These aircraft design and certification recommendations, when implemented in an aircraft design, would reduce the need for restricting the use of PEDs

Change 1 to DO-307

Issued 12-16-08

Change 1 to DO-307 - *Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance* corrects typographical errors, clarifies document language in several places, and aligns calculated values for Target IPL with the values in DO-294C.

DO-306, Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard)

Issued 10-11-07 Prepared by SC-189

This document provides the operational, safety, and performance requirements (SPR) for the implementation of air traffic data link services in oceanic and remote airspace, referred to as Oceanic SPR Standard. It is intended to support the implementation of communication, navigation, and surveillance/air traffic management (CNS/ATM) systems in worldwide application. It provides the minimum operational, safety, and performance requirements and allocations based on the results of a coordinated requirements determination process, which included operational services and environment information capture, operational safety assessment (OSA), and an operational performance assessment (OPA).

Change 1 to DO-306

Issued 03-17-11 – Prepared by SC-214

Change 1 to DO-306 - *Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard)* provides unambiguous Controller-Pilot Datalink Communications (CPDLC) Message definitions that will be used by FANS 1/A Datalink systems in support of In-Trail Procedures (ITP) operations. It includes changes resulting from work on Advanced ATS Datalink services definition. The Sections and Tables affected are provided.

DO-305A, Future Air Navigation System 1/A – Aeronautical Telecommunication Network Interoperability Standard (FANS 1/A – ATN B1 Interop Standard)

Issued 03-21-12 – Prepared by SC-214

This document provides interoperability requirements to enable FANS 1/A aircraft and ATN aircraft to co-exist in the same operational environment. The standard was developed to enable air traffic service providers (ATSPs) to interoperate with datalink equipped aircraft, regardless of which technology is installed on the aircraft. The standard is intended for the convergence of oceanic and continental datalink applications. It provides the interoperability requirements for an aeronautical telecommunication network baseline 1 (ATN B1) ground system that provides air traffic data link services to future air navigation system 1/A (FANS 1/A) aircraft in continental airspace.

This revision includes the new requirements for Seamless ATS communications transition between different datalink technologies.

DO-305, Future Air Navigation System 1/A (FANS 1/A) - Aeronautical Telecommunications Network (ATN) Interoperability Standard

Issued 06-26-07 – Prepared by SC-189

This document provides interoperability requirements to enable FANS 1/A aircraft and ATN aircraft to co-exist in the same operational environment. The standard was developed to enable air traffic service providers (ATSPs) to interoperate with data link equipped aircraft, regardless of which technology is installed on the aircraft. The standard is intended for the convergence of oceanic and continental data link applications. It provides the interoperability requirements for an aeronautical telecommunication network

baseline 1 (ATN B1) ground system that provides air traffic data link services to future air navigation system 1/A (FANS 1/A) aircraft in continental airspace.

DO-304, Guidance Material and Considerations for Unmanned Aircraft Systems

Issued 03-22-07 | Prepared by SC-203

This document addresses all Unmanned Aircraft Systems (UAS) and UAS operations being considered for realistic implementation in the US National Airspace System (NAS) in the foreseeable future. It is intended to educate the community and be used to facilitate future discussions on UAS standards. It provides the aviation community a definition of UAS, a description of the operational environment, and a top-level functional break down. The guidance material provides a framework for developing standards through RTCA Special Committee 203.

DO-303, Safety, Performance and Interoperability Requirements Document for the ADS-B Non-Radar-Airspace (NRA) Application

Issued 12-13-06 | Prepared by SC-186

This document addresses the operational concept and minimum requirements for the use of ADS-B Surveillance for ATS services in Non-Radar Areas (ADS-B-NRA). Annexes of the document contain the Operational Services and Environment Definition (OSED), a comparative Operational Performance Assessment (OPA), an Operational Safety Assessment (OHA), and a summary of a published comparative risk assessment. The results of these assessments have been compiled into Section 3 of the main body which specifies the minimum operational safety and performance requirements (SPR). Interoperability requirements specifying the needed transfer of data between transmitting aircraft and ground domains is provided in section 4 (INTEROP). This INTEROP specification is presented at a link-neutral (i.e. MASPS) level. Annex H provides traceability of Section 4 to specific 1090MHz Extended Squitter interoperability requirements. It was developed jointly with EUROCAE.

DO-302, Minimum Operational Performance Standards (MOPS) for Surveillance Transmit Processing (STP)

Issued 12-13-06 Prepared by SC-186

This document contains requirements for interfacing ADS-B avionics to on-board position sources such as GPS and Flight Management Systems. Proper integration and installation of ADS-B equipment into aircraft is essential to successful implementation of ADS-B air-to-ground and air-to-air applications. The Surveillance Transmit Processing (STP) subsystem prepares the required surveillance information from on-board aircraft sensors for the ADS-B Transmit Subsystem. STP is a critical subsystem of the end-to-end system defined in the Minimum Aviation System Performance Standards (MASPS) for Aircraft Surveillance Application (ASA), (RTCA DO-289). The standards defined in this version of the STP MOPS have been scoped to support parameters required for five applications defined in the ASA MASPS:

- Enhanced Visual Acquisition (EVAcq)
- Conflict Detection (CD)
- Airport Surface Situational Awareness (ASSA)
- Final Approach and Runway Occupancy Awareness (FAROA)
- Enhanced Visual Approach (EVApp)

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DO-301, Minimum Operational Performance Standards for Global Navigation Satellite System (GNSS) Airborne Active Antenna Equipment for the L1 Frequency Band

Issued 12-13-06 Prepared by SC-159

This document contains Minimum Operational Performance Standards (MOPS) for GNSS airborne active antenna equipment designed to use the GPS or Galileo L1 frequency augmented by other systems/equipment/techniques as appropriate to meet the performance requirements for primary means of navigation for en route, terminal, non-precision, and precision approach phases of flight. An active antenna is one integrated with a preamplifier. Minimum requirements for passive designs are specified in DO-228 and DO-228, Change 1. This MOPS specifies an alternative to active antenna requirements specified in DO-228 and DO-228, Change 1

Change 1 to DO-300A – Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCAS II) Hybrid Surveillance

Issued 12-15-15 | Prepared by: SC-147

The document provides additional requirements to help prevent spurious Resolution Advisories during transition from passive to active surveillance. The change includes:

- New requirements which ensure that there is no "residue" from ADS-B surveillance when a track transitions from passive to active surveillance.

- An optional requirement allowing a system to be designed to only perform hybrid surveillance for an intruder whose ADS-B OUT version is greater than or equal to 2.

- Appendix G is added demonstrating that the safety analysis in Appendix D still applies. It documents that a TA and an RA will still be generated at the same time as a TCAS II system which does not use the hybrid surveillance techniques of this specification.

- Adopt the text from FAA TSO-C119d Appendix 2. That appendix was created in response to comments received during the public comment phase for TSO-Cc119d. FAA disposition of certain comments received during that review period necessitated creation of Appendix 2 to affect changes to certain sections of DO-300A.

DO-300A, Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCASII) Hybrid Surveillance

Issued 03-20-13 • Prepared SC-147

This document provides the Minimum Operational Performance Standards for a TCAS that utilizes Hybrid Surveillance. Hybrid Surveillance specifies the judicious use of ADS-B data for surveillance of other aircraft thereby reducing TCAS utilization of the 1030 MHz and 1090 MHz air traffic control channels. TCAS compliant with this version of DO-300 will utilize a significantly smaller portion of the 1030 MHz and 1090 MHz channels than TCAS compliant to only DO-185B or to the previous version of DO-300. The motivation for this MOPS was to reduce TCAS use of the 1090 MHz channel as ADS-B utilization of this channel increases.

Change 2 to DO-300, Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCAS II) Hybrid Surveillance

Issued 12-15-15 | Prepared by: SC-147

This document provides additional requirements to help prevent spurious Resolution Advisories during transition from passive to active surveillance. The change includes:

- New requirements which ensure that there is no "residue" from ADS-B surveillance when a track transitions from passive to active surveillance.

- An optional requirement allowing a system to be designed to only perform hybrid surveillance for an intruder whose ADS-B OUT version is greater than or equal to 2.

Change 1 to DO-300, Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCASII) Hybrid Surveillance

Issued 07-01-09

Change 1 to DO-300 provides corrections to the test section and provides linkage to DO-185B.

The change corrects short comings in the test procedures and highlights the DO-185B requirements on how a DO-300 compliant TCAS II system should broadcast its hybrid surveillance capability.

DO-300, Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCAS II) Hybrid Surveillance

Issued 12-13-06 | Prepared by SC-147

This document will allow TCAS to lower the number of aircraft it actively tracks through the use of passive tracking aircraft via the Extended Squitter. (Active tracking is used intermittently to validate the ADS-B

data.) This will allow TCAS to increase its operational range as it will not need to initiate interference limiting since the number of actively tracked aircraft will be lower. Hybrid Surveillance will also decrease the overall RF environment which will bring operational benefits to ADS-B.

DO-299, Report - Assessment and Recommendations on Visual Alerts and Aural Annunciations for TCAS II

Issued 03-14-06 – Prepared by SC-147

Since the introduction of TCAS II, opposite reactions to Negative Resolution Advisories (RAs) have been regularly identified and have continued with TCAS II Version 7. Special Committee 147 was tasked to analyze the display configurations and aural alerts for Negative RAs. The purpose of this work was to determine whether problems exist with current display and annunciation requirements for this class of RA. This report documents results of SC-147's analysis and recommends an approach for resolving identified problems.

The report is structured as follows:

- Section 1 provides an introduction into the issues being investigated and a high-level overview of the work.
- Section 2 describes the implementation of various types of RA displays
- Section 3 describes the data used in developing the conclusions and recommendations.
- Section 4 presents the conclusions reached.
- Section 5 presents recommendations for corrective actions to reduce the frequency of opposite responses to Negative RAs. The section also presents recommendations for further work on other related issues.
- Appendices are also included in the report to provide additional details on related issues, data collection methodology, and data results.

DO-298, Safety Analysis of Proposed Change to TCAS RA Reversal Logic

Issued 11-08-05 – Prepared by SC-147

DO-298 is an SC-147 report which documents analyses recommending changes to the TCAS II Version 7 collision avoidance logic (Section 2.0 item 2) in accordance with SC-147 Terms of Reference guidance.

The report was developed to perform a detailed analysis of the TCAS II Version 7 Resolution Advisory (RA) sense reversal logic, investigating the safety impacts of revising the collision avoidance logic to improve the performance of RA reversals for certain encounter geometries. Some encounter geometries have been shown to exist which TCAS II Version 7 may not appropriately resolve with RA sense reversals in certain airspaces. SC-147 has studied the frequency with which these geometries are operationally

experienced and recommends the changes specified in this report to reduce collision risk in these encounter geometries.

DO-297, Integrated Modular Avionics (IMA) Development Guidance and Certification Considerations

Issued 11-08-05 | Prepared by SC-200

DO-297 contains guidance for Integrated Modular Avionics (IMA) developers, application developers, integrators, certification applicants, and those involved in the approval and continued airworthiness of IMA systems in civil certification projects. It is focused on IMA-specific aspects of design assurance.

IMA is described as a shared set of flexible, reusable, and interoperable hardware and software resources that, when integrated, form a platform that provides services, designed and verified to a defined set of requirements, to host applications performing aircraft functions. The primary industry-accepted guidance for satisfying airworthiness requirements for IMA components is included and it describes application properties as they relate to their integration with a platform.

DO-296, Safety Requirements for Aeronautical Operational Control (AOC) Datalink Messages

Issued 10-19-04 | Prepared by SC-201

This document provides minimum safety requirements for Aeronautical Operational Control (AOC) and certain Air Traffic Services (ATS) datalink messages. Approval via design assurance alone or design assurance in conjunction with risk reduction strategies are two means of addressing the hazards identified. This document recommends alternative strategies for demonstrating to a regulatory authority a composite approach to safety that is deemed equivalent to that provided solely by a design assurance solution.

DO-295, Civil Operators' Training Guidelines for Integrated Night Vision Imaging System Equipment

Issued 10-19-04 | Prepared by SC-196

This document presents training guidance that has been generated from lessons learned by agencies having many years of experience in the training and operational application of night vision imaging systems. By tapping this experience base, it is hoped that civil aircrew, through appropriate ground and flight training, will

learn how to properly use night vision imaging systems, thus enhancing the effectiveness of night operations while mitigating the potential for mishaps relating to the use of these systems.

DO-294C, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDs) on Aircraft

Issued 12-16-08 | Prepared by SC-202

DO-294C completes the work of Special Committee (SC) -202 and provides the results of work on dialog with consumer electronics manufacturers' associations on consensus recommendations for facilitating safe use of PEDs onboard aircraft. Further, the document incorporates the previously released Change 1 to DO-294B, and addresses changes to align with the work done for DO-307. Changes were made to introductory materials in Appendix 5.B, Appendix 5.C, Appendix 6.D, and Appendix 10.

The document addresses near-term T-PED technologies such as existing devices enabled with cellular technologies, wireless local area networks (WLANS), and wireless personal area networks (WPANS) as well as emerging PED technologies, for example active RF Identification (RFID) tags, transmitting medical devices, and picocells for devices enabled by cellular technologies for use on board aircraft. The document defines and recommends a process by which aircraft operators and/or manufacturers may assess the risk if interference due to a specific T-PED technology within any aircraft type and model It also provides a means for aviation authorities and others to determine acceptable and enforceable policies and processes for passenger and crew use of T-PEDs.

DO-293A, Minimum Operational Performance Standards for Nickel-Cadmium, Nickel Metal-Hydride, and Lead Acid Batteries

Issued 12-02-09 | Prepared by SC-211

This document provides guidance for avionics manufacturers developing Nickel-Cadmium, Nickel Metal-Hydride, and Lead-Acid batteries to be used as power sources for equipment installed in aircraft. Specifically, the document addresses the chemical composition, cell size, cell construction, interconnection of the cell into batteries, venting, operational and storage environments, packaging, handling, test, storage and disposal. The document includes the new Nickel Metal-Hydride guidance and the earlier Change 1 that addressed testing concerns identified by industry.

DO-292, Assessment of Radio Frequency Interference Relevant to the GNSS L5/E5A Frequency Band

Issued 07-29-04 | Prepared by SC-159

DO-292 addresses potential radio frequency interference (RFI) to the future GNSS L5 signal when used for aeronautical radio navigation and where feasible includes RFI considerations relating to the Galileo E5A signal as well. The report also evaluates the potential effects of external and on-board signal environment on the performance of an L5 receiver.

Supplements to DO-291C, Minimum Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data (zip file, electronic download only)

Issued 09-22-15 | Prepared by SC-217

RTCA DO-291C/EUROCAE ED-119C uses a UML representation of the AMDB and an XML Schema representation of the AMDB. Together they form the Aerodrome Mapping Database Exchange Model (AMXM).

The AMDB UML representation is called the AMXM UML Model. The AMXM UML Model is normative and determines the encoding of data formats for AMDB data exchanges.

The AMDB XML Schema representation is called the AMXM XML Schema. The AMXM XML Schema is derived from the AMXM UML Model and is provided on an informative basis. The AMXM XML Schema is a means of compliance.

DO-291C, Minimum Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data

Issued 09-22-15 | Prepared by SC-217

This document recommends guidelines and requirements for developing a data interchange format for terrain, obstacle, and aerodrome data. A common database interchange standard is a key factor in successfully implementing digital functions in the aviation domain. Use of information contained in this document will help system designers assure a common interchange between data originators and data integrators.

DO-291C reflects all of the changes generated from the DO-272D aerodrome mapping data and DO-276C obstacle data. A new section on SWIM Considerations for AMDB is added, as well as new sections on Aerodrome Mapping Exchange Standards and Data Management.

The Aerodrome Mapping Exchange Model (AMXM), comprised of the AMXM UML Model and AMXM XML Schema, is available as a companion technical artifact.

Two related documents specify requirements for database content and quality:

- DO-272D, *User Requirements for Aerodrome Mapping Information*

- DO-276C, *User Requirements for Terrain and Obstacle Data*

DO-291B, Minimum Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data

Issued 09-28-11♦ Prepared by SC-217

This document recommends guidelines and requirements for developing a data interchange format for terrain, obstacle, and aerodrome data. A common database interchange standard is a key factor in successfully implementing digital functions in the aviation domain. Use of information contained in this document will help system designers assure a common interchange between data originators and data integrators.

DO-291B reflects all of the changes generated from the DO-272C updates to reflect Temporality, Aerodrome Surface Routing Network (ASRN) and the new data attributes. Editorial errors were also corrected.

Two related documents specify requirements for database content and quality:

- DO-272C, *User Requirements for Aerodrome Mapping Information*

- DO-276A, *User Requirements for Terrain and Obstacle Data*

DO-291A, Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data

Issued 04-14-09 Prepared by SC-217/EUROCAE WG-44

This document recommends guidelines and requirements for developing a data interchange format for terrain, obstacle, and aerodrome data. A common database interchange standard is a key factor in successfully implementing digital functions in the aviation domain. Use of information contained in this document will help

system designers assure a common interchange between data originators and data integrators. The updated version for the exchange standard is published to reflect the industry changes to the requirement document:

- Includes additional features and attributes derived from the changes contained in DO-272B
- Makes editorial corrections.

Two related documents specify requirements for database content and quality:

- DO-272B, *User Requirements for Aerodrome Mapping Information*

- DO-276A, *User Requirements for Terrain and Obstacle Data*

Change 3 to DO-290

Issued 09-12-2019 Prepared by SC-214

DO-290 Change 3 – Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace (Continental SPR Standard) prepared by SC-214 (Standards for Air Traffic Data Communications Services)

Change 3 to DO-290/ED-120 is to remove any reference to DM89 MONITORING message element as being required to support any datalink operations. This approach makes DO-290/ED-120 consistent with actual datalink procedures, in line with the approach already agreed by EUROCAE/RTCA subject matter experts when Baseline 2 Datalink standards were developed.

This change allows both existing ATN B1 interoperability standards (DO-280B/ED-110B) and B2 interoperability standards (DO-353A/ED-231A) being recognized as acceptable means of compliance with DO-290/ED-120.

Change 2 to DO-290

Issued 06-26-07 Prepared by SC-189

Change 2 includes clarification and additional guidance for:

1) A Continental Controller Pilot Data Link Communications (CPDLC) message set

2) Specifying CPDLC [level] parameter as a vertical range

3) Mimicking ICAO Doc 4444 message elements using free text

4) Establishing CPDLC

5) CPDLC emergency messages

Change 1 to DO-290

Issued 12-13-06 – Prepared by SC-189

This change minimizes nuisance error messages being sent to the aircraft when the flight crew initiates a request to the receiving ATSU prior to the connection being enabled. The current system provides indication of when the connection has been established but not when the CPDLC connection has been enabled. The change minimizes nuisance error messages to the flight crew by providing them indication of the CPDLC connection being enabled when the R-ATSU sends a CPDLC message to the aircraft containing the facility designation, facility name, and facility function. Correct errors: This change corrects an error in the safety requirement SR 11 for ACL, DCL, and DSC. The corresponding latency requirement ETRESPONDER is associated with the time needed to "send" the message, not "receive the message".

DO-290, Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace (Continental SPR Standard)

Issued 04-29-04 – Prepared by SC-189

The document provides the operational, safety, and performance requirements (SPR) for the implementation of data link services that support air traffic services (ATS) in continental airspace. It is intended to support the implementation of communication, navigation, and surveillance / air traffic management (CNS/ATM) systems in worldwide application.

The SPR standard is intended for use with interoperability requirements (INTEROP) standards, and the guidelines described in RTCA DO-264 "Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications." These requirements are necessary to provide adequate assurance that the elements of the CNS/ATM system, when operating together, will perform their intended function in an acceptably safe manner.

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

Issued 12-09-03 – Prepared by SC-186

This document contains minimum performance standards for airborne equipment to support Airborne Surveillance Applications. Requirements for five applications are specified in detail; these are Enhanced Visual Acquisition, Conflict Detection, Enhanced Visual Approach, Airport Surface Situational Awareness, and Final Approach and Runway Occupancy Awareness. Preliminary requirements are provided for three applications; these are Approach Spacing for Instrument Approaches, Independent Closely Spaced Parallel Runways, and Airborne Conflict Management.

Section 1 contains background and introductory material, Section 2 contains system level requirements, and Section 3 contains subsystem requirements. There are 11 appendices including eight application appendices that describe the applications in detail and explain the analysis that resulted in the requirements in the body of the document.

Change 1 to DO-289

Issued 12-13-06 – Prepared by SC-186

This change to DO-289 mainly clarifies the definitions of several parameters transmitted by aircraft in ADS-B messages. These parameters provide information to the recipient of the ADS-B message about the quality of the transmitted aircraft position. The change has been developed in a manner that reflects typically available aircraft position sources and should not impact ADS-B equipment previously certified using RTCA DO-260A for 1090 MHz Extended Squitter or RTCA DO-282A for the Universal Access Transceiver (UAT).

DO-288, Next Generation Air/Ground Communication System (NEXCOM) Implementation Considerations: Factors and Issues to be considered in Planning for the Transition to Air/Ground, ICAO, VDL Mode 3 Based Integrated Voice Data Communications in the U.S. National Airspace System

Issued 10-28-03 – Prepared by SC-198

The document describes the current situation as well as goals and objectives for transition from analog Air/Ground (A/G) telecommunications to A/G Very High Frequency (VHF) Digital Link Mode 3 (VDL Mode 3) based integrated voice and data communications. It includes a transition strategy from analog voice to VDL

Mode 3 digital voice and Aeronautical Telecommunications Network (ATN) based data communications via VHF Digital Link Mode 2 and VDL Mode 3.

DO-287, Plans and Principles for the Implementation of Aeronautical Data Link System (ADLS) Edition

1. Aeronautical Telecommunication Network (ATN) Baseline 1 Implementation and ADSL Build IIA & IIB

Issued 6-25-03 Prepared by SC-194

This document addresses the phased implementation process of the ADLS beyond Build 1A in all operational domains and phases of flight. It focuses on Build IIA for domestic en route and Build IIB for terminal area operations. Issues addressed include accommodation, transition and the development of new operational services using data link and integration with ATS decision support tools. It also describes the aviation community consensus regarding the evolution and implementation path for the provision of ATS over ATN in the NAS.

DO-286B, Minimum Aviation System Performance Standards (MASPS) for Traffic Information Service – Broadcast (TIS-B)

Issued 10-11-07 Prepared by SC-186 *Supersedes DO-286A*

This revision to DO-286A separates Automatic Dependent Surveillance - Rebroadcast (ADS-R) from the TIS-B MASPS. The basic TIS-B services described in DO-286A remain fundamentally unchanged. The revision includes changes related to those previously made to RTCA DO-242 - *MASPS for Automatic Dependent Surveillance - Broadcast (ADS-B)* and DO-289 - *MASPS for Aircraft Surveillance Applications (ASA)*. The revision should not impact equipment previously certified using DO-260A - *MOPS for 1090 MHz Extended Squitter (ADS-B) and TIS-B or* DO-286A.

DO-285, Next Generation Air/Ground Communications (NEXCOM) VDL Mode 3 Interoperability

Issued 4-10-03 Prepared by SC-198

This document provides the interoperability requirements for Air Traffic Services (ATS) supported by N E X C O M Very High Frequency (VHF) Digital Link (VDL) Mode 3. It identifies NEXCOM interoperability

requirements for ATS supported by digital voice communications in the U.S. National Airspace System (NAS). Interoperability requirements are the minimum technical and functional requirements that provide the basis for ensuring compatibility between the aircraft system, the ATS Provider system, and the operator's provisions to use the air traffic services.DO-284, Next Generation Air/Ground Communication System (NEXCOM) Safety and Performance Requirements (SPR)

Issued 1-23-03 Prepared by SC-198

This NEXCOM SPR document defines the operational safety hazards and performance requirements of the NEXCOM system (both airborne and ground subsystems). The SPR will be used to coordinate safety objectives and to allocate performance requirements for the system. It has been developed using the NEXCOM Operational Safety Assessment (OSA) and the NEXCOM Operational Performance Assessment (OPA). These two assessments define the safety functions, performance expectations, and characteristics of the operational environments needed to support the Air Traffic Services (ATS) identified in the NEXCOM Operational Services and Environment Definition (OSED). The SPR document identifies the objectives and allocated requirements (including substantiation) for a specific operation.

Change 1 to DO-284

Issued 6-25-03 Prepared by SC-198

Change 1 adds new safety requirements to DO-284. The bit error rate (BER) is now indicated in the integrity value and this update is included throughout the document.

The number of operational hazards are increased in the Operational Hazard Assessment as outlined below:

- Hazard Class 2 (must be extremely remote) 4 hazards
- Hazard Class 3 (must be remote) 20 hazards
- Hazard Class 4 (may be probable) 5 hazards

Safety goal requirements now total 33. In Appendix B1, Operational Safety Assessment, several tables are updated with new information regarding loss of communication hazards related to interference caused by an analog transmission.

Numerous other minor changes are also included.

DO-283B, Minimum Operational Performance Standards for Required Navigation Performance for Area Navigation

Issued 12-15-15 | Prepared by SC-227

This document supersedes RTCA DO-283A, Minimum Operational Performance Standards for Required Navigation Performance for Area Navigation, published in October 2003. The document provides guidance to enable the implementation of RNP equipment containing navigation capabilities and functions defined in the RNP RNAV MASPS, DO-236C and Change 1 to DO-236C. Updated and new requirements included are those for Vertical Navigation, Temperature Compensation, and Time of Arrival Control. Also new to this version are the specifications for two equipment classes for RNP. Class A equipment has the advanced functions consistent with Advanced RNP operations as described in the ICAO PBN Manual. Class B equipment is consistent with RNP APCH operations and radius to fix leg capability described in the ICAO PBN Manual.

DO-283A, Minimum Operational Performance Standards for Required Navigation Performance for Area Navigation

Issued 10-28-03 | Prepared by SC-181 Supersedes *DO-283*

This document supersedes RTCA DO-283, *Minimum Operational Performance Standards for Required Navigation Performance for Area Navigation*, published in October 2002. The document provides guidance to support the graphic depiction of navigation data on an electronic map display and is consistent with the implementation of navigation functions defined in the RNP MASPS, DO-236B. DO-283A provides map display information in Appendix K, which is new in this version

Corrigendum 1, DO-282B, Minimum Operational Performance Standards for Universal Access Transceiver (UAT) Automatic Dependent Surveillance - Broadcast

Issued 12-13-11 | Prepared by SC-186

This document is a supplement to DO-282B. It contains corrections to typographical errors, corrections to test procedures and notes added to clarify existing text. These changes represent feedback from industry use of the published version of DO-282B. This supplement does not alter any existing requirements and does not affect the compliance of any equipment designed to meet the original published document.

(Note: Those that have previously purchased DO-282B, issued December 2, 2009, need only this Corrigendum to have complete information.)

DO-282B with Corrigendum 1, Minimum Operational Performance Standards for Universal Access Transceiver (UAT) Automatic Dependent Surveillance - Broadcast

Issued 12-13-11 Prepared by SC-186

This document is DO-282B issued December 2, 2009 with Corrigendum 1 (described above) issued December 13, 2011 included as Appendix T. The Corrigendum is also incorporated throughout the document.

The document contains Minimum Operational Performance Standards for airborne equipment to support Automatic Dependent Surveillance – Broadcast utilizing the Universal Access Transceiver (UAT). UAT is a multi-purpose aeronautical data link intended to support not only ADS-B, but also Flight Information Service – Broadcast (FIS-B), Traffic Information Service – Broadcast (TIS-B) and, if required in the future, supplementary ranging and positioning capabilities.

The document was developed in parallel with DO-260B.

DO-282B, Minimum Operational Performance Standards for Universal Access Transceiver (UAT) Automatic Dependent Surveillance - Broadcast

Issued 12-02-09 Prepared by SC-186

The document contains Minimum Operational Performance Standards for airborne equipment to support Automatic Dependent Surveillance – Broadcast utilizing the Universal Access Transceiver (UAT). UAT is a multi-purpose aeronautical data link intended to support not only ADS-B, but also Flight Information Service – Broadcast (FIS-B), Traffic Information Service – Broadcast (TIS-B) and, if required in the future, supplementary ranging and positioning capabilities.

The document was developed in parallel with DO-260B.

DO-281C, Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer

Issued 09-20-2018 | Prepared by SC-214

The material in this document highlights the minimum procedures for the physical link and network layer of the VDL Mode 2 subnetwork.

The test procedures used in this document have been coordinated with EUROCAE Working Group 92 during the preparation of EUROCAE Document ED-92C. Appendix E provides a differences table between RTCA DO-281C and EUROCAE ED-92C.

This document includes four other appendices, with Appendix B should be considered a normative appendix.

Change 1 to DO-281B, Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer

Issued 03-18-14 | Prepared by SC-214

Change 1 to DO-281B provides multi-frequency refinements for the VDL Mode 2 Minimum Operational Performance Standards (MOPS) and test procedures to be taken into account when determining compliance and certifying aircraft VDL Mode 2 equipment.

DO-281B, Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer

Issued 03-21-12 | Prepared by SC-214

This document presents MOPS and test procedures for Aircraft Very High Frequency (VHF) Digital Link (VDL) Mode 2 physical link and network layer protocol components of an avionics transmitter/receiver (transceiver). These transceivers are intended for air-ground (A-G) data communications. Equipment certified to standards in this MOPS will be compatible with the relevant Minimum Aviation System Performance Standards (MASPS) in RTCA DO-224C, *Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques*, and with the International Civil Aviation Organization (ICAO) *VDL Mode 2 Technical Manual*. Compliance with this MOPS is one means of assuring that the VDL Mode 2 equipment will function satisfactorily under all conditions normally encountered in the air traffic control A-G operations and that data formats will be compatible with the Aeronautical Telecommunication Network (ATN).

The key improvements provided in this revision are the addition of test procedures for multi-frequency related operations that are required in DO-224C. Some of these test procedure additions include frequency support list tests, ground requested aircraft-initiated handoff tests, aircraft-initiated handoff tests and ground-initiated handoff tests.

DO-281A, Minimum Operational Performance Standards for Aircraft VDL Mode 2 Physical, Link and Network Layer

Issued 11-08-05 – Prepared by SC-172

The changes in DO-281A were made to maintain requirement traceability and harmonization with the updated ICAO VDL Mode 2 Technical Manual as well as AEEC 631 implementation characteristics.

This document presents Minimum Operational Performance Standards (MOPS) and test procedures for Aircraft Very High Frequency (VHF) Digital Link (VDL) Mode 2 physical link and network layer protocol components of an avionics transmitter/receiver (transceiver). These transceivers are intended for air-ground (A/G) data communications. Equipment certified to standards in this MOPS will be compatible with the relevant Minimum Aviation System Performance Standards (MASPS) in RTCA DO-224B, *Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques*, and with the International Civil Aviation Organization (ICAO) VDL Mode 2 Technical Manual. Compliance with this MOPS is one means of assuring that the VDL Mode 2 equipment will function satisfactorily under all conditions normally encountered in the air traffic control A/G operations and that data formats will be compatible with the Aeronautical Telecommunication Network (ATN).

Change 1 to DO-280B, Interoperability Requirements Standard for Aeronautical Telecommunication Network Baseline 1 (ATN B1 Interop Standards)

Issued 03-18-14 – Prepared by SC-214

Change 1 to DO-280B addresses three different improvements; to permit the selection and acceptance of CPDLC messages, containing HF, SAT and UHF frequencies by ANSPs at the Oceanic/Continental boundaries, to optimize the transfer of CPDLC connections and to optimize the transfer of voice communications within the same ATSU.

DO-280B, Interoperability Requirements Standard for ATN Baseline 1 (INTEROP ATN B1)

Issued 06-26-07 – Prepared by SC-189

This update to DO-280, initially issued in June 2002, includes:

1) The Controller Pilot Data Link Communications (CPDLC) protected mode feature

2) Revisions to the ACM Service

3) An update CPDLC message set per ICAO Doc 4444 & DO-290 – Ch. 2/ED-120 – Ch. 2

4) Aircraft timer (tts) made optional

5) Corrections to the DO-280 "A" version.

DO-280B provides interoperability requirements for ATN B1 ground systems providing continental data link services to ATN B1 aircraft.

This document is compiled in two volumes which are not sold separately:

- Volume 1, Sections 1 – 4
- Volume 2, Annexes A – C; Appendices A - C

DO-279, Next Generation Air/Ground Communications (NEXCOM) Principles of Operation VDL Mode 3

Issued 3-5-02 – Prepared by SC-198

This document characterizes the operational use of VDL Mode 3 integrated voice and data systems for air/ground communications in the U.S. National Airspace System. The principles defined are for Air Traffic

Control related air/ ground communications services that apply to both voice and data operations.

DO-278A, Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems

Issued 12-13-11 | Prepared by SC-205

This document provides guidelines for the assurance of software contained in non-airborne CNS/ATM systems and provides recommendations for the production of that software commensurate with a level of confidence in safety. DO-278A defines a set of objectives recommended to establish assurance that the developed CNS/ATM software has the integrity needed for use in a safety-related application.

DO-278, Guidelines for Communications, Navigation, Surveillance, and Air Traffic Management (CNS/ATM) Systems Software Integrity Assurance

Issued 3-5-02 | Prepared by SC-190

This document provides guidelines for the assurance of software contained in non-airborne CNS/ATM systems. It is intended to be an interpretive guide for the application of DO-178B/ED-12B, Software Considerations in Airborne Systems and Equipment Certification, to non-airborne CNS/ATM systems. DO-178B/ED-12B defines a set of objectives that are recommended to establish assurance that airborne software has the integrity needed for use in a safety-related application. These objectives have been reviewed, and in some cases, modified for application to non-airborne CNS/ATM systems.

DO-277, Minimum Aviation System Performance Standards (MASPS) for the High Frequency Data Link Operating in the Aeronautical Mobile (Route) Service (AM(R)S)

Issued 3-5-02 | Prepared by SC-188

This document contains Minimum Aviation System Performance Standards (MASPS) for communications utilizing High Frequency Data Link systems for the air-ground communications sub-network in an Aeronautical Telecommunications Network (ATN) environment. The FANS 1/A data link environment is also addressed.

Where systems are global in nature, the system may have international applications that are taken into consideration. Compliance with these standards is recommended as one means of assuring that the system and each subsystem will perform its intended functions(s) satisfactorily.

DO-276C, User Requirements for Terrain and Obstacle Data

Issued 09-22-15 | Prepared by SC-217

This document defines the minimum user requirements applicable to the origination and publication of terrain and obstacle data from creation through the entire life cycle of the data. It provides guidance for data gathering by data originators, for data processing by data integrators, for implementation by system designers, and for end use by the aviation community (e.g., air carriers, air traffic services, procedure designers). It is supplemental to the data processing requirements included in RTCA DO-200B and to the exchange of data included in RTCA DO-291C.

It provides a minimum list of attributes associated with the terrain and obstacle data and a description of associated errors that may need to be addressed. Four areas of applicability are defined: Area 1 – The State; Area 2 – The Terminal Area (vicinity of aerodrome), Area 3 – Aerodrome Movement Area, and Area 4 – the CAT II or III Operation Area. The requirements for accuracy, integrity and resolution are tailored to meet these needs. This tailoring includes addressing the specific requirements of Helicopter Operations for Area 1. This update incorporates a new rule numbering scheme for requirements and recommendations. It provides obstacle segmentation guidance. A new Appendix is available on Terrain Post-Spacing and Terrain in Polar Regions. Guidance for certification or approval of systems or procedures that use terrain and obstacle databases is also provided. The requirements stated in this document address the areas viewed by industry to be of most importance to certification.

DO-276B, User Requirements for Terrain and Obstacle Data

Issued 9-26-12 | Prepared by SC-217

This document defines the minimum user requirements applicable to the origination and publication of terrain and obstacle data from creation through the entire life cycle of the data. It provides guidance for data gathering by data originators, for data processing by data integrators, for implementation by system designers, and for end use by the aviation community (e.g., air carriers, air traffic services, procedure designers). It is supplemental to the data processing requirements included in RTCA DO-200A and the exchange of data included in RTCA DO-291B.

It provides a minimum list of attributes associated with the terrain and obstacle data and a description of associated errors that may need to be addressed. Four areas of applicability have been defined: Area 1 – The State; Area 2 – The Terminal Area (vicinity of aerodrome), Area 3 – Aerodrome Movement Area, and Area 4 – the CAT II or III Operation Area. The requirements for accuracy, integrity and resolution have been tailored to meet these needs. Guidance for certification or approval of systems or procedures that use terrain and obstacle databases is also provided. The requirements stated in this document address the areas viewed by industry to be of most importance to certification.

DO-276A, User Requirements for Terrain and Obstacle Data

Issued 8-3-05 Prepared by SC-193

The document is harmonized with ICAO SARPS and establishes EGM-96 as the required gravity model for vertical reference systems. It accommodates ICAO Annex 15, Aeronautical Information Services, Amendment 33, and harmonizes the glossary with the latest ICAO annexes. Definitions, features, and attribute names are now harmonized with DO-291, Interchange Standards for Terrain, Obstacle, and Aerodrome Mapping Data. It simplifies the definition of obstacles and terrain and mandated geographical coordinates. New additional data as well as time stamps, effectivity, lighting, and marking attributes accommodate user requirements and insure compliance with the ISO 19000 series. User feedback is added to the list of verification and validation methods.

DO-275, Minimum Operational Performance Standards for Integrated Night Vision Imaging System Equipment

Issued 10-12-01 Prepared by SC-196

This document contains Minimum Operational Performance Standards (MOPS) for the aviation night vision imaging system (NVIS) used to supplement night VFR operations. NVIS consists of the night vision goggle, interior and exterior lighting, cockpit transparencies and crew station design and components. Performance and test procedures are provided for the night vision goggle and lighting. A section on continued airworthiness contains guidance to ensure the integrated NVIS equipment installation continues to meet the minimum performance standard once in operational use.

DO-274, Next Generation Air/Ground Communications (NEXCOM) Principles of Operation

Issued 10-12-01 Prepared by SC-198

This document characterizes the principles of operational use of integrated digital air/ground voice and data systems in the domestic National Airspace System (NAS). Ideas presented are intended to provide a framework for NAS communications subsequent to 2010. NEXCOM operational objectives, intentions and capabilities are found in section three and form the basis for success criteria used to determine system acceptability. Section four describes the operational communications services to be used for Air Traffic operations. Operational Scenarios are included that describe how air traffic operations are supported. Section five characterizes the environment within which NEXCOM is expected to operate.

DO-273, Response to the Report of the RTCA Chairman's Committee on NEXCOM

Issued 10-12-01 | Prepared by SC-198

In response to a request from the FAA, the RTCA Chairman's Committee produced a NEXCOM report that identifies issues attendant with transitioning Air Traffic Control communications to a digital voice and data communications system. The Chairman's Report, completed in August 2000, and provides observations and recommendations that highlight the need for a systems approach in addressing issues of spectrum, policy, procedure, acquisition, certification, training, facilities, and maintenance. This document reports the actions being taken by the FAA, SC-198, and the NEXCOM Aviation Rulemaking Committee that address these observations and recommendations.

DO-272D, User Requirements for Aerodrome Mapping Information

Issued 09-22-15 | Prepared by SC-217

This document provides industry requirements for aerodrome mapping databases for aeronautical use. It identifies aeronautical applications, which may use airport-mapping databases to define airport database standards. This document attempts to state the information requirements for users. The expectation is that aerodrome mapping database (AMDB) originators and integrators would use this document when providing those data to system designers and/or the end-users.

This revision expands on the Aerodrome Surface Route Network (ASRN) concept to include Aprons, Parking Stands and De-Iceing Areas; adds new features and attributes to support Low Visibility Operations (LVO); reorders Section 4 for a better document flow; incorporates a new rule numbering scheme for requirements and recommendations; provides cross-referencing of Geometric Constraints; and incorporates SWIM Considerations in relation to AMDB standards. Definitions throughout the document were reviewed and updated to maintain compatibility other database and data processing standards

DO-272C, User Requirements for Aerodrome Mapping Information

Issued 09-28-11 | Prepared by SC-217/EUROCAE WG-44

This document provides industry requirements for airport mapping databases for aeronautical use. It identifies aeronautical applications, which may use airport-mapping databases to define airport database standards.

This document attempts to state the information requirements for users. The expectation is that aerodrome mapping database (AMDB) originators and integrators would use this document when providing those data to system designers and/or the end-users.

This revision adds new Sections and text to reflect new features and rules; definitions, attributes, and data content were revised; new text was added to cover the requirements related to the Aerodrome Surface Routing Network (ASRN). Appendix-A was re-written, numerical requirements tables were updated following harmonization with ICAO Annexes 4, 14 and 15 and editorial errors were corrected.

DO-272B, User Requirements for Aerodrome Mapping Information

Issued 04-14-09 – Prepared by SC-217/EUROCAE WG-44

There are a large number of avionics systems in use today that implement DO-272A and DO-291 requirements. Additional equipment in the design phase, including airport moving map systems, need aeronautical information in addition to the current published RTCA documents. This information includes additional data and specifications on terrain and airport information. To satisfy this need DO-272B is published to:

- Include requirements listed in ARINC 816-1.
- Include requirements listed in AIXM5.0 for Airport Data for all features & attributes, and numerical requirements that have a positive industry business impact.
- Make editorial corrections.

DO-271C, Minimum Operational Performance Standards for Aircraft VDL Mode 3 Transceiver Operating in the Frequency Range 117.975-137.000 MHz.

Issued 11-8-05 – Prepared by SC-172

DO-271C provides verification procedures for an aircraft Very High Frequency (VHF) Digital Link (VDL) Mode 3 Transceiver used for air-ground (A/G) voice and data communications. This revision includes updates based on changes to RTCA DO-224B, *Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques* and includes errata and vocoder test vectors.

This document supersedes DO-271B.

DO-270, Minimum Aviation System Performance Standards (MASPS) for the Aeronautical Mobile-Satellite (R) Service (AMS(R)S) as Used in Aeronautical Data Links

Issued 10-12-01 | Prepared by SC-165

The document provides Minimum Aviation System Performance Standards for data communications utilizing aeronautical mobile satellite systems for the air-ground communications subnetwork in an Aeronautical Telecommunications Network (ATN) environment. The document focuses on data versus voice and covers a broad range of satellite systems to include the current and next generation satellites. The FANS 1/A data link environment is also addressed. Where systems are global in nature, the system may have international applications that are taken into consideration. Communications supporting the Air Traffic Service (ATS) and Aeronautical Operational Control (AOC) may be provided by one or more satellite systems, each of which has particular operating characteristics. This document anticipates that the system-specific attachment(s) will provide one means of assessing whether a particular AMS(R)S system is appropriate for a specific operational environment. The requirements for operational environments are consistent with DO-264.

Change 1 to DO-270

Issued 04-14-09 | Prepared by SC-215

Communications supporting the Air Traffic Service (ATS) and Aeronautical Operational Control (AOC) may be provided by one or more satellite system, each of which has particular operating characteristics. Change 1 to DO-270 - *Minimum Aviation System Performance Standards (MASPS) for the Aeronautical Mobile-Satellite*

(R) Service (AMS(R)S) as Used in Aeronautical Data Links provides a system specific description of the Iridium Satellite communication system configuration including Ground Sub-networks; Iridium Satellite Sub-networks, of which the Aircraft Earth Station (AES) is one part; and Aircraft Sub-networks. The minimum system performance standards in Change 1 address only the Satellite Sub-network.

DO-269, Concepts for Services Integrating Flight Operations and Air Traffic Management Using Addressed Data Link

Issued 6-12-01 | Prepared by SC-194

This document proposes nine integrated service concepts identified from a wide list of potential services. The integrated service concepts were selected as those that may yield attractive benefits to all stakeholders through integration of Aeronautical Data Link System (ADLS) with airborne systems and/or ground automation. The services are Basic Information Exchange: 1) FMS-ATM-AOC Calibration; 2) NAS Status Information; 3) UPT Flight Planning/ Re-planning; 4) Flexible Arrival and Departure Routing; 5) Surface

Movement; Reduced Separation; 6) Non-radar Environment; 7) Radar Environment; Communications Management; 8) Automatic Voice Frequency Change; and 9) Emergency Notification.

DO-268, Concept of Operations, Night Vision Imaging System for Civil Operators

Issued 3-27-01 | Prepared by SC-196

This document describes the concept of operations supporting the implementation of aviation night vision imaging system (NVIS) technology into the National Airspace System by civilian aviation operators.

Terminology, capabilities, limitations and operations for NVIS are discussed as well as training and supporting agencies. The focus of the document is the safe and efficient implementation of NVIS during various phases of flight.

DO-267A, Minimum Aviation System Performance Standards (MASPS) for Flight Information Services-Broadcast (FIS-B) Data Link

Issued 04-29-04 | Prepared by SC-195 Supersedes *DO-267*

The revised MASPS removes the binary test data sets and establishes a publicly accessible FIS-B Product Registry that facilitates coordination and publication of specifications for Application Protocol Data Unit Payload encoding of new FIS products.

The document contains the MASPS for FIS-B, an automated, digital data link system that provides timely access to data link updates of non-control, advisory information needed by pilots to operate safely and efficiently in the National Airspace System and in international airspace.

It supports interoperability between providers of ground and airborne FIS processing systems by defining a broadcast protocol that may be used in any broadcast medium (i.e., VHF, satellite). The FIS-B broadcast network organization consists of a physical layer, an International Standards Organization (ISO) standard-based Data Link Services (DLS) layer, a Network layer, a FIS-B Application Service Element (ASE), and a

FIS-B Application. The physical layer is supplied by the manufacturer with all the other layers and/or elements defined in the MASPS.

DO-266, Government and Industry Guidelines and Concepts for NAS Analysis and Redesign

Issued 12-14-00 Prepared by SC-192

This document consists of three volumes. “Volume I: User Priorities for the National Airspace Redesign” is a summary of user comments from six recent meetings held throughout the United States. “Volume II: High Altitude Airspace Concept” defines how one segment of the NAS could provide more of the freedoms described in the Free Flight Concept while permitting transparent operation for aircraft entering from and leaving to adjacent airspace. “Volume III: Recommendations on Special Use Airspace in National Airspace Redesign” identifies known types of airspace users and describes how each of the current and future users is affected by special use airspace. It includes a vision of the future airspace system and the role special use airspace will play in the future NAS.

DO-265, Minimum Operational Performance Standards for Aeronautical Mobile High Frequency Data Link (HFDL)

Issued 12-14-00 Prepared by SC-188

This document encompasses standards and descriptions of a system configuration including Ground Sub-networks; HF Data Link Sub-networks, of which the aircraft is one part; and aircraft Sub-networks. However, the specified MOPS in this document address only the aircraft HF Data Link Sub-network function.

DO-264, Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications

Issued 12-14-00 Prepared by SC-189

This document provides guidance material intended for stakeholders and approval authorities involved in the operational implementation of the provision and use of air traffic services (ATS) supported by data communications. These communication services include those such as communication management and clearances; navigation services such as flight planning, required navigation performance (RNP) monitoring and gross navigation error (GNE) prevention and detection; surveillance services such as position and intent reporting; and services that support ATM automation.

DO-263, Application of Airborne Conflict Management: Detection, Prevention, & Resolution

Issued 12-14-00 Prepared by SC-186

This document presents an operational concept for the Application of Airborne Conflict Management (ACM) using Automatic Dependent Surveillance-Broadcast (ADS-B). The ACM concept includes detecting conflicts, monitoring for potential conflicts and suggesting resolutions to prevent a violation of airspace separation criteria against all other properly equipped aircraft/vehicles. ACM is a core enabling function for the global implementation of the Free Flight concept, as it will aid pilots to fly user-preferred trajectories while avoiding conflicts with other aircraft.

DO-262D, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 04-01-19 Prepared by SC-222

This document contains minimum operational performance standards (MOPS) for avionics that provide Aeronautical Mobile Satellite (R) Services (AMS(R)S) by means of satellite communications technologies scheduled to become operational in context of the global and regional ATM and CNS modernization (e.g. ICAO/Global Air Navigation Plan, Europe/SESAR, US/NextGen). Each of these technologies is individually and collectively referred to as a "Next Generation Satellite System" (NGSS), and the NGSS nomenclature will be used throughout this document. This release is a joint RTCA/EUROCAE document and includes Technique Specific Normative Appendices for INMARSAT Swift Broadband and Iridium Block 1. The new revision also contains more explicit language on data security.

DO-262C, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 05-31-17 Prepared by SC-222

This document contains minimum operational performance standards (MOPS) for avionics that provide Aeronautical Mobile Satellite (R) Services (AMS(R)S) by means of satellite communications technologies scheduled to become operational in context of the global and regional ATM and CNS modernization (e.g. ICAO/Global Air Navigation Plan, Europe/SESAR, US/NextGen). Each of these technologies is individually and collectively referred to as a "Next Generation Satellite System" (NGSS), and the NGSS nomenclature will be used throughout this document.

This release is a joint RTCA/EUROCAE document and includes Technique Specific Normative Appendix from INMARSAT.

DO-262B Change 1 to Appendix D, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 12-15-15 | Prepared by SC-222

Change 1 to DO-262B Iridium Appendix D - Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS) corrects typographical errors, clarifies document language in several places, and updates test requirements and test procedures in support of AMS(R)S safety services.

This updated appendix to DO-262 provides information and requirements specific to an Aircraft Earth Station (AES) using the Iridium communication system for the purpose of providing Aeronautical Mobile Satellite (Route) service (AMS(R)S). The International Civil Aviation Organization and the International Telecommunications Union reserve the designation "(Route)" for services related to the "priority and regularity of flights along national and international air routes". This document represents a significant update to the Iridium-specific minimum operational performance standards currently published in DO-262B. The document contains provision for identifying and potentially certifying several configurations of Iridium AES equipment.

DO-262B, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 06-17-14 | Prepared by SC-222

REQUIREMENTS FOR INMARSAT SWIFTBROADBAND AMS(R)S EQUIPMENT Appendix E to DO-262(B)

This new appendix to DO-262 provides information and requirements specific to an Aircraft Earth Station (AES) using the Inmarsat SwiftBroadband system for the purpose of providing Aeronautical Mobile Satellite (Route) service (AMS(R)S). The International Civil Aviation Organization and the International Telecommunications Union reserve the designation "(Route)" for services related to the "priority and regularity of flights along national and international air routes". This document forms a technique-specific appendix to DO-262 containing the minimum operational performance standards for AES equipment that provides SwiftBroadband communications. The document contains provision for identifying and potentially certifying specific subclasses of Inmarsat AES equipment that perform identifiable and quantifiable elements of the AES functions, e.g., antenna, transceiver, high power amplifier, etc.

This updated appendix to DO-262 provides information and requirements specific to an Aircraft Earth Station (AES) using the Iridium communication system for the purpose of providing Aeronautical Mobile Satellite (Route) service (AMS(R)S). The International Civil Aviation Organization and the International Telecommunications Union reserve the designation "(Route)" for services related to the "priority and regularity of flights along national and international air routes". This document represents a significant update to the Iridium-specific minimum operational performance standards currently published in DO-262A. The document contains provision for identifying and potentially certifying several configurations of Iridium AES equipment.

DO-262A, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 12-16-08 – Prepared by SC-215

This document contains Minimum Operational Performance Standards (MOPS) for avionics that provide Aeronautical Mobile Satellite (R) Services (AMS(R)S) by means of satellite communications technologies. Each of these technologies is individually and collectively referred to as a "Next Generation Satellite System" (NGSS).

Iridium Satellite Normative Appendix: This normative appendix provides Iridium-specific technical requirements and information regarding the technical characteristics of an Aircraft Earth Station (AES) operating over the Iridium satellite network for the purpose of providing Aeronautical Mobile Satellite (Route) Service or AMS(R)S. The International Civil Aviation Organization (ICAO) and International Telecommunications Union (ITU) reserve the designation "(Route)" for services related to the "safety and regularity of flight along national and international air routes."

DO-261, NAVSTAR GPS L5 Signal Specification

Issued 12-14-00 – Prepared by SC-159

This Specification defines the requirements related to the signal interface between the Space Segment (SS) of the Global Positioning System (GPS) and the GPS Navigation Users for the L5 Navigation Signal.

Corrigendum 1, DO-260B, Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)

Issued 12-13-11 ♦ Prepared by SC-186

This document is a supplement to DO-260B. It contains corrections to typographical errors, corrections to test procedures and notes added to clarify existing text. These changes represent feedback from industry use of the published version of DO-260B. This supplement does not alter any existing requirements and does not affect the compliance of any equipment designed to meet the original published document.

DO-260B with Corrigendum 1, Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services – Broadcast (TIS-B)

Issued 12-13-11♦ Prepared by SC-186

This document is DO-260B issued December 2, 2009 with Corrigendum 1 (described above) issued December 13, 2011 included as Appendix W. The Corrigendum is also incorporated throughout the document.

This document contains Minimum Operational Performance Standards (MOPS) for airborne equipment for Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Service – Broadcast (TIS-B) utilizing 1090 MHz Mode-S Extended Squitter (1090ES). Compliance with these standards by manufacturers, installers and users is recommended as one means of assuring that the equipment will satisfactorily perform its intended functions under conditions encountered in routine aeronautical operations.

This revision supersedes DO-260A and incorporates the earlier Changes 1 and 2. FAA Technical Standard Order (TSO) C-166b references this document.

The document was developed in parallel with DO-282B.

DO-260, Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance – Broadcast (ADS-B)

Issued 09-13-00 ♦ Prepared by SC-186

This document contains the Minimum Operational Performance Standards (MOPS) for airborne equipment for Automatic Dependent Surveillance-Broadcast (ADS-B) utilizing 1090MHz Mode-S extended squitter. ADS-B is a system for aircraft or surface vehicles, operating within the airport surface movement area that periodically transmits its state vector (horizontal and vertical position, horizontal and vertical velocity) and other information.

This MOPS describes typical equipment applications and operational goals and along with DO-242, *Minimum Aviation System Performance Standards for ADS-B,* forms the basis for the recommended performance standards and test procedures.

Change 1 to DO-260, Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance – Broadcast (ADS-B)

Issued 06-27-06 ♦ Prepared by SC-186

Change 1 prescribes the changes to DO-260 required for those manufacturers that produce 1090 MHz equipment for broadcast-only that comply only with DO-260. It provides additional changes to the changes which first appeared in Section 1 of the Appendix of FAA TSO C166, which has been removed from the draft of TSO C166A. Manufacturers that produce 1090 MHz equipment which will include the ADS-B receive capability must comply with DO-260A, Change 1 and the latest available version of FAA TSO C166. Change 1 provides changes for the Air/Ground Determination and its recommended test procedures, and for the definition of how to encode Navigation Uncertainty Category (NUC) if the Horizontal Protection Limit (HPL) is not available. Direction is provided for deleting the Aircraft Trajectory Intent Massages and Aircraft Operational Coordination Messages. The requirements for the optional transmission of the ADS-B TEST Message (TYPE Code =23) for transmitting the Mode 3/A (4096) Code in the USA is defined and the test procedures are added.

DO-259, Applications Descriptions for Initial Cockpit Display of Traffic Information (CDTI) Applications

Issued 9-13-00 ♦ Prepared by SC-186

This document provides a preliminary description of four potential applications utilizing a CDTI that may enhance current air traffic operations, describes underlying pilot and controller tasks and responsibilities, and derives required CDTI capabilities that enable the pilot to perform these tasks. The application definitions

provide sufficient detail to allow a specification of required CDTI capabilities, so when the applications are fully developed, tested and evaluated, and certified for use, the equipment may be capable of facilitating the implementation.

DO-258A, Interoperability Requirements for ATS Applications Using ARINC 622 Data Communications

Issued 4-07-05 | Prepared by SC-189 Supersedes *DO-258* | Errata Issued 01-11-08

This update aligns the scope of interoperability requirements for the FANS 1/A technology with the Continental SPR Standard (DO-290) to include interoperability for interface with HF Data Link (HFDL). The document, initially issued in September 2000, defines interoperability requirements for communication services and Air Traffic Services (ATS) applications and allocates these requirements to stakeholders. It covers: the ATS Facilities Notification (ATN) application, the Automatic Dependent Surveillance (ADS) application, the Controller Pilot Data Link Communication (CPDLC) application and the ARINC data communication.

DO-257B, Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Maps

Issued 03-22-18 | Prepared by SC-227

This document supersedes RTCA DO-257A, Minimum Operational Performance Standards (MOPS) for the Depiction of Navigational Information on Electronic Maps, published on June 25, 2003. This MOPS update supports new requirements for electronic display outputs in DO-236C/ED-75D and DO-283B; reflects the most current human factors standards and guidelines for electronic displays; and embraces display system technology updates. DO-236C/ED-75D contains the MASPS for Required Navigation Performance (RNP) equipment, while DO-283B defines the RNP equipment MOPS; and SC-227 completed the recent updates to both these standards to better support worldwide implementation RNP operations. DO-257B supports the RNP MASPS and MOPS by directly incorporating and reflecting the display output requirements of both documents. The updates to DO-257A also ensure installed RNP equipment meets the requirements for today's RNP operations via presentation of essential navigation information on the electronic displays the flight crew uses. This includes new, updated specifications for a plan view map (i.e. the aircraft's "navigation display"). Likewise, the new electronic display MOPS reflect updates in human factors guidelines for cockpit displays, revisions to the standards for an airport moving map display and robust standards for presentation of a vertical situation display a flight crew can use inflight.

DO-257A, Minimum Operational Performance Standards for the Depiction of Navigation Information on Electronic Maps

Issued 6-25-03 Prepared by SC-181 *Supersedes DO-257*

DO-257A supports the electronic depiction of airport surface situation awareness (SA) maps and vertical situation awareness displays. The revision includes requirements and guidelines for the electronic depiction of airport surface diagrams, ownship, ground path and vertical profile aspects of the display and associated controls. Two new Sections were added: Section 2.3 - Aerodrome Moving Map Display (AMMD) and Section

2.4 - Vertical Situation Awareness Displays (VSAD). Consensus was reached on hazard classifications by removing the Major hazard classification for airborne display from the document. It is understood that a FAA Technical Standard Order referencing DO-257A will further address hazard classifications.

DO-256, Minimum Human Factors Standards for Air Traffic Services Provided Via Data Communications Utilizing the ATN, Builds I and IA

Issued 6-20-00 Prepared by SC-194

DO-256 defines minimum human factors requirements and guidelines for air traffic services (ATS) data link communications between air traffic specialist and a pilot utilizing Aeronautical Telecommunications Network (ATN). The scope is the initial Controller-Pilot Data Link Communications (CPDLC) capabilities, which comprise the Build I and Build IA phases of the United States implementation path. CPDLC initial communications capabilities will generally encompass the transition and cruise phases of flight and be implemented in Air Route Traffic Control Centers (ARTCCs).

DO-255, Requirements Specification for Avionics Computer Resource (ACR)

Issued 6-20-00 Prepared by SC-182

DO-255 provides the Requirements Specifications for the Avionics Computer Resource (ACR) intended to facilitate certification efficiency and economy of scale for the computer platform. These Requirements Specifications define a computer platform suitable for hosting multiple, independent software applications and are seen as an enabling step towards standardized, re-usable avionics software applications.

DO-254, Design Assurance Guidance for Airborne Electronic Hardware

Issued 4-19-00 | Prepared by SC-180

This document is intended to help aircraft manufacturers and the suppliers of aircraft electronic systems assure that electronic airborne equipment safely performs its intended function. The document identifies design life cycle processes for hardware that includes line replaceable units, circuit board assemblies, application specific integrated circuits (ASICs), programmable logic devices, etc. It also characterizes the objective of the design life cycle processes and offers a means of complying with certification requirements.

DO-253D Change 1, Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 06-27-19 | Prepared by SC-159

This document is the complementary avionics standard to the International Civil Aviation Organization Annex 10 Volume I Ground Based Augmentation System standards and recommended practices (SARPs) for Ground based augment system Approach Service Types C (GAST C) and D (GAST D) as well as the differentially corrected positioning service (DCPS). Together, GAST C and GAST D support all categories of approach and landing operations with vertical and lateral guidance, as well as guided takeoff. DCPS supports horizontal positioning in local airport and terminal area environments. This change 1 of RTCA DO-253D primarily includes changes to the GBAS VHF Data Broadcast (VDB) receiver adjacent channel rejection requirements (Section 2.2.8) and the associated test procedures (Section 2.5), as well as the rationale for the VDB requirements (Appendix K) resulting from coordination of the frequency compatibility with the ICAO Navigation Systems Panel. This change 1 also includes a correction to the embedded synchronization and ambiguity resolution sequence test message (Table 2-26) contained in the VDB Training Sequence and Message Failure Rate Test (Section 2.5.2.2.5.4).

RTCA DO-253D Change 1 supersedes RTCA DO-253D.

DO-253D, Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 07-13-17 | Prepared by SC-159

RTCA/DO-253 defines the Minimum Operational Performance Standards (MOPS) for Global Navigation Satellite System (GNSS) airborne equipment augmented with the Local Area Augmentation System (LAAS). The LAAS has global application as a Ground-Based Augmentation System (GBAS) to GNSS.

RTCA/DO-253D supersedes RTCA/DO-253C. RTCA/DO-253D is complementary to the LAAS Interface Control Document (ICD) defined in RTCA/DO-246E. It is also complementary to the International Civil Aviation Organization Annex 10 Volume I GBAS standards and recommended practices (SARPs) for GBAS approach service types C (GAST C) and D (GAST D) as well as the differentially corrected positioning service (DCPS). This revision of DO-253 includes changes resulting from:

1. the final validation of GAST D (which is a service capable of supporting approach and landing in Category III conditions) and the approval of Annex 10 with GAST D by ICAO, and

2. maintenance updates for the other GBAS services including GAST C (previously referred to as "Category I precision approach") and DCPS.

DO-253C, Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 12-16-08 Prepared by SC-159

This document provides the Minimum Operational Performance Standards (MOPS) for Airborne Navigation Equipment Using the Global Positioning System (GPS) Augmented by the Local Area Augmentation System (LAAS). The standards in the document define minimum performance requirements, functions, and features for LAAS airborne equipment to support CAT I, II and III precision approach operations. Compliance with these standards by manufacturers, installers, and users is recommended as a means of assuring that the equipment will satisfactorily perform its intended functions under conditions encountered in routine aeronautical operations. DO-253A superseded DO-253 and included: 1) Recommendations harmonized with the ICAO GNSS Panel Standards and Recommended Practices (SARPs), 2) The use of LAAS differential position to support area navigation, and 3) The easing of the LAAS Ground Subsystem Siting constraints (Ephemeris Error Protection). DO-253B harmonized the LAAS MOPS with the revised WAAS MOPS - DO-229D. DO-253C includes the earlier revisions and provides the requirements / standards for LAAS to support Cat. II and III precision approaches. In addition, the revision incorporates changes to existing Cat. I and positioning service standards, and includes velocity requirements to further support ADS-B.

DO-253B, Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 06-27-07 ♦ Prepared by SC-159

This document provides the Minimum Operational Performance Standards (MOPS) for Airborne Navigation Equipment Using the Global Positioning System (GPS) Augmented by the Local Area Augmentation System (LAAS). The standards in the document define minimum performance requirements, functions, and features for LAAS airborne equipment to support CAT I precision approach operations.

Compliance with these standards by manufacturers, installers, and users is recommended as a means of assuring that the equipment will satisfactorily perform its intended functions under conditions encountered in routine aeronautical operations.

DO-253A supersedes DO-253 and includes: 1) Recommendations harmonized with the ICAO GNSS Panel Standards and Recommended Practices (SARPs), 2) The use of LAAS differential position to support area navigation, and 3) The easing of the LAAS Ground Subsystem Siting constraints (Ephemeris Error Protection). DO-253B harmonized the LAAS MOPS with the revised WAAS MOPS - DO-229D.

DO-252A, Minimum Interoperability Standards (MIS) for Automated Meteorological Transmission (AUTOMET)

Issued 09-23-14 ♦ Prepared by SC-206

This document defines the Minimum Interoperability Standards (MIS) for the uplink and downlink message formats for Automated Meteorological Transmissions (AUTOMET). This standard also specifies a set of encoding and decoding rules to apply to the message format types defined in this document. AUTOMET message formats are independent of media and protocols used to transfer encoded AUTOMET messages. Compliance with this standard is recommended as a means of assuring that avionics equipment implementing AUTOMET software will perform their intended functions satisfactorily under conditions normally encountered in routine aeronautical operations.

DO-252, Minimum Interoperability Standards (MIS) for Automated Meteorological Transmission (AUTOMET)

Issued 1-11-00 ♦ Prepared by SC-195

This document specifies a set of encoding and decoding rules to apply to the message format types found in the document. Message formats are independent of media and protocols used to transfer encoded AUTOMET messages. AUTOMET operational requirements are not explicitly specified. This standard ensures that all AUTOMET-compliant air- and ground-based systems will be able to decode and interpret AUTOMET uplink and downlink messages.

DO-251, U.S. National Airspace System (NAS) Plan for Air Traffic Services Data Link (Phase 1, En Route CONUS Implementation)

Issued 1-11-00 Prepared by SC-194

The "Plan" document captures the work of the data link issues team from which SC-194 evolved. This publication documents the aviation community's consensus on the evolution and implementation path for Air Traffic Services via data link utilizing the ATN in the U.S. National Airspace System.

DO-250, Guiding Principles for Air Traffic Services Provided via Data Communications Utilizing the ATN, Builds I and IA

Issued 1-11-00 Prepared by SC-194.

The Aeronautical Data Link System will be incrementally deployed to leverage existing and evolving technology investments and emphasize newly developed procedures in the initial steps. This publication includes sections on infrastructure, procedural requirements, data link services, and operational scenarios.

DO-249, Development and Implementation Planning Guide for Automatic Dependent Surveillance Broadcast (ADS-B) Applications

Issued 10-6-99 Prepared by SC-186

This planning Guide outlines suggested activities for the development and implementation of ADS-B applications. It documents the range of activities that need to be in place to bring an application from an initial concept to operational use.

DO-248C, Supporting Information for DO-178C and DO-278A

Issued 12-13-11♦ Prepared by SC-205

This document addresses the questions of both the industry and regulatory authorities. It contains frequently asked questions (FAQs), discussion papers (DPs) and rationale. Many of the FAQs and DPs are based on the previous version of this document, DO-248B; however, some have been modified to address the changes from DO-178B to DO-178C and to make it applicable to DO-278A. Additionally, some new FAQs and DPs have been added to provide additional clarification on DO-178C and/or DO-278A. The errata against DO-178B (which were in section 2 of DO-248B) have been incorporated into DO-178C. s also been included in DO- 248CDO-248B, Final Annual Report for Clarification of DO-178B "Software Considerations in Airborne Systems and Equipment Certification"

Issued 10-12-01 Prepared by SC-190 *Supersedes DO-248A*

DO-178B was published December 1, 1992. Since that date the aviation community has gained experience using the document and has raised a number of questions regarding the document's content and application. DO-248B includes the material from the Second Annual Report, DO-248A, and adds new

Frequently Asked Questions and Discussion Papers resulting from the committee's review of over 330 issues.

DO-247, The Role of the Global Navigation Satellite System (GNSS) in Supporting Airport Surface Operations

Issued 1-7-99 Prepared by SC-159

The report presents material on airport surface operations and relates it to the use of GNSS. It is intended that the report provide background information for airport operators/users and equipment suppliers on the role of GNSS to support airport surface operations, and to provide guidance for the further development of performance standards. The report culminates with conclusions pertaining to the use of GNSS for airport surface operations and identifies issues requiring further study.

DO-246E Change 1, GNSS-Based Precision Approach Local Area Augmentation System (LAAS) Signal-in-Space Interface Control Document (ICD)

Issued 06-27-19 – Prepared by SC-159

This document includes a few corrections to RTCA DO-246E. The content of the Interface Control Document (ICD) was maintained to be backward compatible with all LAAS MOPS compliant equipment specified in DO-253 as amended by applicable FAA TSOs.

This ICD defines the Signal-in-Space for the Global Navigation Satellite System (GNSS) based Local Area Augmentation System (LAAS). The LAAS has global application as a Ground-Based Augmentation System (GBAS) to GNSS. The GNSS/GBAS Signal-in-Space is composed of three signals:

1. the navigation signal transmitted from the GNSS satellites to the ground subsystem,

2. the navigation signal transmitted from the GNSS satellites to the airborne subsystem, and

3. the VHF Data Broadcast (VDB) transmitted from the GBAS ground subsystem to the airborne subsystem.

Please also purchase DO-246E for complete content.

DO-246E, GNSS-Based Precision Approach Local Area Augmentation System (LAAS) Signal-in-Space Interface Control Document (ICD)

Issued 07-13-17 – Prepared by SC-159

RTCA/DO-246 is the Interface Control Document (ICD) that defines the Signal-in-Space for the Global Navigation Satellite System (GNSS) augmented with the Local Area Augmentation System (LAAS). The LAAS has global application as a Ground-Based Augmentation System (GBAS) to GNSS.

RTCA/DO-246E supersedes RTCA/DO-246D, but the content of this ICD has been maintained to be backward compatible with all LAAS MOPS compliant equipment specified in RTCA/DO-253 as amended by applicable FAA Technical Standard Orders (TSOs).

RTCA/DO-246E is complementary to the LAAS MOPS avionics standard defined in RTCA/DO-253D. It is also complementary to the International Civil Aviation Organization Annex 10 Volume I GBAS standards and recommended practices (SARPs) for GBAS approach service types C (GAST C) and D (GAST D) as well as the differentially corrected positioning service (DCPS). This revision of DO-246 includes changes resulting from:

1. the final validation of GAST D (which is a service capable of supporting approach and landing in Category III conditions) and the approval of Annex 10 with GAST D by ICAO, and

2. maintenance updates for the other GBAS services including GAST C (previously referred to as "Category I precision approach") and DCPS.

DO-246D, GNSS Based Precision Approach Local Area Augmentation System (LAAS) – Signal-in-Space Interface Control Document (ICD)

Issued 12-16-08 Prepared by SC-159 *Supersedes DO-246C*

DO-246D includes the earlier document revisions and incorporates the standards for LAAS to support Cat. II and III precision approaches. DO-246C included changes to harmonize the document with DO-245A, LAAS MASPS. The three primary areas of change were:

1. Definition of additional data for supporting Cat. II/III precision approach operations [Additional data blocks 3 and 4 for Message Type 2].

2. Definition of LAAS uplinked Terminal Area Paths (TAP) data for supporting additional Terminal Area Procedures [Provisions for TAP data to be included in Message Type 4].

3. All references to pseudofiles / Ground Based Ranging Sources were removed.

DO-245A, Minimum Aviation System Performance Standards for Local Area Augmentation System (LAAS)

Issued 12-09-04 Prepared by SC-159 *Supersedes DO-245*

This document contains the Minimum Aviation System Performance Standards for the Local Area Augmentation System (LAAS), a system developed to support precision approach and landing operations and other navigation and surveillance applications, within a local area including and surrounding an airport.

This revision harmonizes the LAAS requirements for supporting Category I operations and the LAAS differential positioning service with the LAAS MOPS [DO 253A] and the ICAO Annex 10 GBAS SARPs through Amendment 79. The requirements to support LAAS Category II and III precision approach operations are added/updated as well as requirements for the LAAS when supporting complex terminal procedures through the broadcast of Terminal Area Path (TAP) data using the LAAS VHF Data Broadcast (VDB).

Note: Readers should be aware that DO-245A has not yet been updated to be consistent with the current evolution of LAAS requirements.

DO-244, Government/Industry Guidelines and Concept for National Airspace Analysis and Redesign

Issued 6-8-98 Prepared by SC-192

This document contains two volumes - Volume I, entitled *A Concept Document for the Optimization of the NAS Airspace Structure*, presents concepts for a national airspace assessment and redesign that addresses significant changes to matters pertaining to the national airspace by the year 2005. Volume II, entitled *Guidelines for Conducting Airspace Analysis*, contains the general guidelines for airspace analysis, including metrics, modeling, and data requirements.

DO-243, Guidance for Initial Implementation of Cockpit Display of Traffic Information

Issued 2-19-98 Prepared by SC-186

This document provides manufacturers a set of guidelines in the design and development of an initial set of Cockpit Display of Traffic Information (CDTI) features. CDTI is the function of presenting surveillance information about the surrounding traffic to the flight crew. This guidance document is advisory in nature and its contents are expected to be a subset of the final CDTI MOPS. That MOPS, when published, will replace this document. In order to comply with certification standards, manufacturers will be required to demonstrate that 1) CDTI meets its intended functions, and 2) CDTI does not interfere with any other aircraft systems. This interim guidance provides a description of the intended functions of CDTI and as such may aid the certification process.

DO-242A, Minimum Aviation System Performance Standards for Automatic Dependent Surveillance Broadcast (ADS-B)

Issued 6-25-02 Prepared by SC-186 *Supersedes DO-242*

This document supersedes DO-242 and provides an up-to-date view of the system-wide operational use of ADS-B. This revised ADS-B MASPS concentrates on four major areas of development: 1) Separating the accuracy and integrity components of the Navigation Uncertainty Category (NUC) into the new fields Navigation Accuracy (NAC) and Navigation Integrity Category (NIC); 2) Reorganization of the State Vector, Mode-Status, and On-condition reports; 3) Restructuring the content and manner in which intent information is broadcast; and 4) Clarification that system requirements at the MASPS level are based on operational ranges and not particular applications.

Change 1 to DO-242A

Issued 12-13-06 Prepared by SC-186

This change to DO-242A mainly clarifies the definitions of several parameters transmitted by aircraft in ADS-B messages. These parameters provide information to the recipient of the ADS-B message about the

quality of the transmitted aircraft position. The change has been developed in a manner that reflects typically available aircraft position sources and should not impact ADS-B equipment previously certified using RTCA DO-260A for 1090 MHz Extended Squitter or RTCA DO-282A for the Universal Access Transceiver (UAT).

DO-242, Minimum Aviation System Performance Standards for Automatic Dependent Surveillance Broadcast (ADS B)

Issued 02-14-98 ♦ Prepared by SC-186

This document provides a view of the system-wide operational use of ADS-B. ADS-B is a function of an aircraft or surface vehicle that periodically broadcasts its state vector and other information. Section 1 describes the ADS-B system and provides information needed to understand the rationale for system characteristics and requirements. It describes typical applications and operational goals. Section 2 describes operational requirements. It provides specific scenarios for more detailed analysis based on the applications introduced. Section 3 defines system level performance requirements, defines subsystems and allocates these requirements to subsystems. Interfaces and equipage classes are defined as well as specific ADS-B requirements. Section 4 describes minimum system test procedures. Note: Appendix D, Near-Term Applications for Initial ADS-B Implementation, provides 23 near-term cockpit applications and 14 potential near-term ADS-B ATS surveillance applications. Appendix E, Other Applications, provides 37 other applications that may be supported by ADS-B.

DO-241, Operational Concepts and Data Elements Required to Improve Air Traffic Management (ATM) Aeronautical Operational Control (AOC) Ground-Ground Information Exchange to Facilitate Collaborative Decision Making

Issued 10-6-97 Prepared by SC-169

The document identifies information to be exchanged by the ATM system and AOCs using automation and ground-ground communications. It identifies information needed for both domestic and oceanic operations.

The information presented extends beyond what is necessary for today's operation paradigm to include requirements that will facilitate more user flexibility in the future. Operational scenarios are included.

DO-240, Minimum Operational Performance Standards for Aeronautical Telecommunication Network (ATN) Avionics

Issued 7-29-97 Prepared by SC-162

This document provides standards for Aeronautical Telecommunication Network functions for aircraft systems and equipment. These standards are in the form of performance criteria for ATN functions; qualification criteria for demonstrating performance requirements; descriptions of evidence that indicate that performance objectives have been satisfied. Performance objectives, qualification and evidence are discussed as they relate to satisfying the requirements for airworthiness approval of ATN functions. The functions covered by the MOPS can be incorporated in a wide variety of hardware configurations onboard an aircraft. Section 2 of the document expresses the requirements for airborne ATN systems. Section 3 describes the means of qualification by providing an overview of the testing process and listing detailed tests.

DO-239, Minimum Operational Performance Standards for Traffic Information Service (TIS) Data Link Communications

Issued 4-2-97 Prepared by SC-169 Errata Issued 10-17-97

This document presents requirements for the aircraft equipment associated with Traffic Information Service Data Link (TISDL) communications. The TIS data link function is intended to improve the safety and efficiency of “see and avoid” flight by providing pilots with automatic display of nearby traffic and warnings of any potentially threatening conditions. The source of TIS information is the file of aircraft tracks maintained by the ground Mode S sensor providing coverage for a region of airspace. TIS generates alerts for any traffic aircraft in Mode S coverage that carry a transponder (ATCRBS or Mode S). TIS provides traffic advisories similar to those of TCAS-1 but does not provide resolution advisories. Section 1 provides information and assumptions needed to understand the rationale for equipment characteristics and requirements. Section 2 contains the minimum performance standards for the equipment. Section 3 describes the performance required of the installed equipment and Section 4 describes the operational performance characteristics for equipment installations.

NOTE: The electronic DO-239 is a pdf file but it is not in searchable format.

DO-238, Human Engineering Guidance for Data Link Systems

Issued 4-2-97 | Prepared by SC-169

This document sets forth general, functional, procedural, and design criteria and recommendations concerning human engineering of data link systems. The document focuses primarily on recommendations for data link communications between an air traffic specialist and a pilot. The document is intended as a guide for the development and evaluation of data link systems.

DO-237, Aeronautical Spectrum Planning for 1997- 2010

Issued 1-27-97 | Prepared by SC-185

The report examines aeronautical Communications, Navigation, and Surveillance (CNS) services to determine the spectrum requirements of existing and planned new systems. It represents a major effort by the aeronautical community to assess “the state of the spectrum” as requirements change, and new technologies are introduced.

DO-236C Change 1, Minimum Aviation System Performance Standards Required Navigation Performance for Area Navigation

Issued 09-23-14 | Prepared by SC-227

The Change 1 adds to the minimum standards contained in DO-236C; it contains the updates to the original Time of Arrival Control (TOAC) requirements and guidance material from DO-236B needed for initial operational applications as well as 4D Trajectory Based Operations (TBO). Change 1 builds upon the requirements and guidance that were derived by EUROCAE WG-85 from projects in the European SESAR program. This document also contains requirements for runway position monitoring and alerting when such a capability is included in a system developed to the MASPS.

DO-236C, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation

Issued 06-19-13 • Prepared by SC-227 Supersedes DO-236B

This document provides Minimum Aviation System Performance Standards (MASPS) for area navigation systems operating in an RNP environment. These standards are intended for designers, manufacturers, and installers of avionics equipment, service providers and users of these systems for world-wide operations. The MASPS provides guidance to aid in the development of airspace and operational procedures needed to obtain the benefits of improved navigation capability.

The requirements of this MASPS are consistent with the definitions of RNP developed by the ICAO Performance Based Navigation (PBN) Subgroup. The MASPS uses the term RNP RNAV for the aircraft system because it encompasses a more complete set of technical standards, definitions, considerations and requirements than is contained in any one of the individual specifications in the ICAO Manual. The MASPS represents a single, comprehensive collection of features and capabilities that can be applied in total or as feature set tailored to specific needs e.g. as in a single PBN navigation specification, but where the features all follow the common standard established by this MASPS. In addition, barometric vertical navigation (VNAV) requirements are defined for aircraft that provide this optional capability to ensure accurate and predictable vertical paths. The VNAV requirements in this document are consistent with instrument approach procedures with vertical guidance (APV). Due to the wide disparity of climb performance of different aircraft types, this MASPS only addresses vertical path definition requirements for level flight and descent. Finally, requirements for the optional estimated time of arrival (ETA) and time of arrival control (TOAC) functions are defined for systems that provide these capabilities.

DO-236B, Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation

Issued 10-28-03 Supersedes DO-236A Prepared by SC-181

This document supersedes RTCA DO-236A, M*inimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation,* published in September 2000.

Special Committee 181 added two new Appendices to DO-236B:

- Appendix H, Temperature Compensation Information
- Appendix I, RNP RNAV Less Than 0.3NM

Paragraph 3.2.8.6, Temperature Compensation, is updated with additional notes based upon the new material in Appendix H.

DO-235B, Assessment of Radio Frequency Interference Relevant to the GNSS L1 Frequency Band

Issued 03-13-08 Prepared by SC-159 *Supersedes DO-235A*

This document supersedes DO-235A. It departs from the previous assessment reports by characterizing the "external" (non-aeronautical) Radio Frequency Interference (RFI) as an aggregate effect. Terrestrial RFI sources are modeled as being distributed to the radio horizon for the Global Navigation Satellite System (GNSS) aircraft antenna. On-board non-aeronautical RFI is also characterized as an aggregate effect from multiple sources distributed throughout the passenger cabin. Explicit location-dependent GNSS inter- and intra-system RFI power spectral density values are computed based on "critical-satellite" configurations for a 30-satellite GPS constellation. RFI components for new Space Based Augmentation System (SBAS), Quasi-Zenith Satellite System (QZSS) and Galileo satellite constellations are also determined. Receiver MOPS RFI test condition modifications are proposed to better address the composite aeronautical and non-aeronautical RFI environment for certain flight phases and operations. New potential RFI sources (Mobile Satellite Service ancillary terrestrial component terminals, GPS re-radiators) are discussed. Other potential RFI sources are reviewed and a set of RFI mitigations discussed.

DO-234, Minimum Performance and Installation Standards for Runway Guard Lights (RGLs)

Issued 11-15-96 Prepared by SC-184

This document contains minimum performance and installation standards for elevated and in-pavement runway guard lights (RGLs). These standards provide guidance to designers, installers, manufacturers, service providers and users of these lights. RGLs are used to enhance the conspicuity of the runway holding position at airports and are useful for low visibility operations, situational awareness by pilots and vehicle drivers, and runway incursion prevention.

DO-233, Portable Electronic Devices Carried on Board Aircraft

Issued 8-20-96 Prepared by SC-177 Errata Issued 8-18-99

This document addresses the potential interference to installed aircraft electrical and electronic systems from Portable Electronic Devices (PEDs) carried aboard by passengers. It defines the potential interference phenomena; outlines the risk potential from interference events; provides test methods to determine whether or not a potential for interference exists for certain PEDs, aircraft and combinations thereof; and addresses acceptable levels of interference. The report also recommends modification of Federal Aviation Regulation 91.21, continued PEDs testing to identify and better define the possibility of interference to aircraft electronic systems, increased public awareness of the potential for interference from PEDs, and the development and use of devices to detect spurious PEDs emissions.

DO-232, Operations Concepts for Data Link Applications of Flight Information Services

Issued 3-13-96 Prepared by SC-169

This document provides the framework for development of future FIS data link systems and associated MOPS. The document is designed to: present the user's perspective of operational concepts and system characteristics for FIS data link applications; identify, describe, and prioritize the FIS data link products and services needed to support both current and future flight operations in the National Airspace System, including international oceanic operations; identify infrastructure barriers to successful implementation and utilization of the priority FIS products.

DO-231, Design Guidelines and Recommended Standards for the Implementation and Use of AMS(R)S Voice Services in a Data Link Environment

Issued 3-13-96 ♦ Prepared by SC-165

This document contains functional and interface requirements for the implementation and use of Aeronautical Mobile Satellite Service (AMSS) voice communications in an environment where satellite voice is a required capability. The information contained herein describes satellite voice services in the Air Traffic Management (ATM) and Aeronautical Operational Control (AOC) environments-including requirements for aircraft installations, satellite services, ground interconnection facilities, and Air Traffic Service facility capabilities. The scope of this document is focused primarily on the use of satellite voice in Oceanic and Remote airspace areas.

DO-230J, Standards for Airport Security Access Control Systems

Issued 12-19-2019 | Prepared by SC-224

These guidelines and standards are not regulatory in nature but represent the industry's derived consensus on standards and provisions to be met in achieving consistency and interoperability in an airport access control environment.

This updated document incorporates the latest technological advances with substantive changes in the biometrics, communications, credentialing, physical access control system, and video surveillance sections and minor changes throughout other sections of the document. Advances in Biometrics technology, Artificial Intelligence (AI), neural networks, and facial recognition have been included in the biometrics section including international plans and references. The physical access control section was updated to add suggested guidance on how to address the issue of general aviation (GA) pilots at commercial airports and the credentialing process for unescorted access.

DO-230I, Standards for Airport Security Access Control Systems

Issued 06-21-2018 | Prepared by SC-224

The document provides guidance on acquiring and designing for airport security access control systems, testing and evaluating system performance, and operational requirements.

It should be emphasized that these guidelines and standards are not regulatory in nature but represent the industry's derived consensus on standards and provisions to be met in achieving consistency and interoperability in an airport access control environment.

This updated document incorporates the latest technological advances in the credentialing section. The nature of the changes in available technology, and the need to enhance sub-sections pertaining to the credentialing process, identity verification enhancements with the criminal history records checks, inspection process for credential holders, and enhanced oversight outlined by the TSA. Guidance for a credentialing operational checklist were also added to this section.

DO-230H, Standards for Airport Security Access Control Systems

Issued 12-19-17 ♦ Prepared by SC-224

The document provides guidance on acquiring and designing airport security access control systems, testing and evaluating system performance, and operational requirements.

It should be emphasized that these guidelines and standards are not regulatory in nature but represent the industry's derived consensus on standards and provisions to be met in achieving consistency and interoperability in an airport access control environment.

This updated document incorporates the latest technological advances in security access control systems and identity management technologies, including smart cards and biometrics. The nature of the changes in available technology, and the need to enhance sections pertaining to perimeter security, security operation support, and identity management requirements, has led to a few changes in this document. Specifically updated are the following sections.

Introduction and Overview
Credentialing

Physical Access Control Systems (PACS)
Video Surveillance Systems
Communications Infrastructure

Following the approach adopted in previous versions of DO-230 and recognizing that both technology and regulation proceed apace and await no man, it was decided that a strict adherence to what was required by the regulations at the date of issue was pointless as it would be quickly obsolete.

This RTCA DO-230H document contains forward-thinking references to technology, processes and guidance which continue to evolve. Where applicable, the Committee has made these references in the interest of providing a complete picture of the possible direction of a standard and/or technology. An example of this is the evolution of cloud computing and the ongoing development of standards by various professional, academic and standards organizations.

DO-230G, Standards for Airport Security Access Control Systems

Issued 06-21-16 | Prepared by SC-224

The document provides guidance on acquiring and designing security systems, testing and evaluating system performance, and operational requirements for airport security access control systems. The major areas covered are:

- Introduction and Overview
- Credentialing
- Biometrics
- Physical Access Control Systems (PACS)
- Perimeter Intrusion Detection Systems (PIDS)

- Video Surveillance Systems
- Security Operations Center (SOC)
- Integration
- Communications Infrastructure
- General Acquisition-Related Considerations

This updated document incorporates the latest technological advances in security access control systems and identity management technologies, including smart cards and biometrics. The nature of the changes in available technology, and the need to enhance sections pertaining to perimeter security, security operation support, and identity management requirements, has led to a major change in the layout and content of the document. DO-230G includes the addition of checklists to the major sections covered in this document.

The document contains forward-thinking references to technology, processes and guidance as continue to evolve. Where applicable, the Special Committee has made these references in the interest of providing a complete picture of the possible direction of a standard and/or technology. As in previous releases of this document, RTCA Special Committee (SC) 224 recommends that readers of this guidance document solicit the latest information on any referenced technology, processes and procedures before moving forward with planned implementation of an airport security access control system. Finally, the document provides information on technology trends in physical access control systems (PACS), access card technology, video, wireless and physical security information management systems (PSIM) that are deemed current at the time of publication but may be obsolete or overcome by other emerging technology. Airport operators are reminded that this information provides current guidance to support well-informed appropriate decision-making in addressing particular facilities.

DO-230F, Standards for Airport Security Access Control Systems

Issued 12-15-15 ♦ Prepared by SC-224

This document provides guidance on acquiring and designing security access control systems, testing and evaluating system performance, and operational requirements. It incorporates the latest technological advances in security access control systems and identity management technologies, including smart cards and biometrics. The major areas covered are:

Introduction and Overview
Credentialing

Biometrics

Physical Access Control Systems (PACS)
Perimeter Intrusion Detection Systems (PIDS)
Video Surveillance Systems

Security Operations Center (SOC)
Integration

Communications Infrastructure

General Acquisition-Related Considerations

This revision predominately addresses the Credentialing Section and the technical criteria needed due to rapid advances in technology, trends and policy. The major items included changes such topics as potential use of an airport credential for both identification and for physical and logical access to a range of privileges; clarification of airport operator status as the ultimate responsible party for issuance of credentials; additional security measures consistent with state or local law on issuance of such credentials; and the airport credentialing process requirements specifics including background and security checks.

DO-230F is dedicated to Mr. Charles Chambers, Senior Vice President and Chief Development Officer of the National Safe Skies Alliance. Mr. Chambers was an active member of SC-224 until his untimely death in mid-October 2015. He was instrumental in increasing the distribution of DO-230 to Airport Security Officials and Security Consultants in the Aviation Domain.

DO-230E, Standard for Airport Security Access Control Systems

Issued 06-18-15 ♦ Prepared by SC-224

This document provides guidance on acquiring and designing security access control systems, testing and evaluating system performance, and operational requirements. It incorporates the latest technological advances in security access control systems and identity management technologies, including smart cards and biometrics. The major areas covered are:

- Introduction and Overview
- Credentialing
- Biometrics
- Physical Access Control Systems (PACS)
- Perimeter Intrusion Detection Systems (PIDS)
- Video Surveillance Systems
- Security Operations Center (SOC)
- Integration

- Communications Infrastructure
- General Acquisition-Related Considerations

For this revision, substitutive changes were made only to the bold areas above. The document indicates not only the current best practices and system requirements to meet the current regulatory requirements, but also provides guidance for those airport operators who wish to go beyond these requirements.

SC-224 received input from the TSA and this resulted in several forward-looking statements and inputs from the TSA Recommended Security Guidelines for Airport Planning, Design and Construction, (May 2011). It should be noted that TSA guidelines that cover passenger screening areas and checkpoint security are areas outside the scope of this document. Section inputs from airport operators and vendors relied on actual experience and operational issues faced.

DO-230D, Standard for Airport Security Access Control Systems

Issued 12-18-13 ♦ Prepared by SC-224

This document is a full revision to RTCA *DO-230C*, *Integrated Security System Standard for Airport Access Control, (2011)* providing standards and guidelines for implementing access control systems in the context of integrated security systems for airports. The document provides guidance on acquiring and designing such systems, testing and evaluating system performance, and operational requirements.

The document incorporates the latest technological advances in security access control systems and identity management technologies, including smart cards and biometrics. The nature of the changes in available technology, and the need to enhance sections pertaining to perimeter security, security operation support and identity management requirements, has led to a major change in the layout and content of the document. The major areas covered are:

- Introduction and Overview
- Credentialing
- Biometrics
- Physical Access Control Systems (PACS)
- Perimeter Intrusion Detection Systems (PIDS)
- Video Surveillance Systems

- Security Operations Center (SOC)
- Integration
- Communications Infrastructure
- General Acquisition-Related Considerations

Special Committee 224 received input from the TSA and this resulted in several forward-looking statements and inputs from the TSA *Recommended Security Guidelines for Airport Planning, Design and Construction, (May 2011)*. The TSA guidelines that cover passenger screening areas and checkpoint security were outside the scope of this document.

DO-230C, Integrated Security System Standard for Airport Access Control

Issued 06-21-11 | Prepared by SC-224

This document supersedes DO-230B published in 2008. It provides standards and guidelines for implementing access control systems in the context of an Integrated Security System for an Airport. DO-230C aligns the standard to the new version of the "Recommended Security Guidelines for Airport Planning, Design & Construction", issued by the Transportation Security Administration in 2011. The document contains the most current information regarding aviation credentialing initiatives – the introduction of new Personal Identity Verification (PIV) Interoperable (I) and Compatible (C) specifications.

DO-230B, Integrated Security System Standard for Airport Access Control

Issued 06-19-08 | Prepared by SC-207

This document supersedes DO-230A, "Standards for Airport Security Access Control Systems," originally published in 2003. It provides standards and guidelines for implementing access control systems in the context of an Integrated Security System for an Airport. The document provides guidance on acquiring and designing such systems, testing and evaluating system performance, and operational requirements. The document incorporates the latest technological advances in security access control systems and identity management technologies, including smart cards and biometrics. The major areas covered are: system level requirements, identity management requirements, physical access control requirements, video surveillance requirements, security operating center requirements, intrusion detection requirements, communications infrastructure requirements and general procurement level guidance.

The document indicates not only what are the current best practices and system requirements to meet the current regulatory requirements, but also provides guidance for those airports who wish to go beyond these requirements and provides guidance for what the committee believes are logical and reasonable methods for implementing the advances in security technology.

DO-230A, Standards for Airport Security Access Control Systems

Issued 4-10-03 | Prepared by SC-199 *Supersedes DO-230*

This document updates RTCA DO-230, *Standards for Airport Security Access Control Systems*, originally published in 1996. Using the original DO-230 format, the document has been expanded into the following sections: Section 1 introduces the Access Control Systems (ACS), purpose, scope, goals, and operational requirements. Section 2 provides guidance for system performance. Section 3 addresses subsystem performance of access media and hardware. Section 4 provides guidance for system verification and validation. The document also contains the three appendixes that provide guidance and reference material: Appendix A provides detailed guidance on biometrics and smart card technologies. Appendix B provides reference examples of sample reports commonly found in ACS. Appendix C provides a list of acronyms and abbreviations used in the document. This material should be useful to airport operators as a tool to assist in obtaining Airport Improvement Program (AIP) funding.

DO-229E, Supporting Tool

Issued 12-15-16 | Prepared by SC-159

The GEO Bias tool is a MATLAB script. The GEO Bias tool is intended to be used by the manufacturer to demonstrate that their GNSS receiver is compliant with the GEO Bias requirements in DO-229E as described in section 2.1.4.1.5. Appendix T in DO-229E provides a description of this tool and associated test procedure.

DO-229E, Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment

Issued 12-15-16 | Prepared by SC-159

The changes related to the Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment systems, published by RTCA on December 13, 2006 as RTCA

DO-229D, and the Change -1 for RTCA DO-229D are contained herein as RTCA DO-229E. This new version has been produced to introduce new PRN codes in order to manage the existing and planned evolutions of SBAS around the world. On very specific cases, clarifications of a requirement and addition of a new requirement have been introduced.

Modifications in this new version of DO-229 include, but are not limited to:
1, Correcting typographical and paragraph reference errors;

2. Adding clarifying text where issues have been raised, or where clarification is needed to enhance understanding, including IPP computation clarifications and the possibility to enable graceful degradation to RAIM/FDE upon SBAS UNHEALTHY designation.

3. Modifying Table, A-1 to reflect the addition of 20 PRNs and updating other paragraphs in Appendix A where there is relation with the number of PRNs.

4. Modifying Appendix T assumptions and GEO bias tool to reflect the addition of 20 PRNs

5. Adding a new requirement to prevent the use of the Navigation Message Correction Table and added associated verification

A new tool is also available for use with DO-229E.

FAA Technical Standard Order (TSO) TSO-C145e/C146e reference this standard.

Change 1 to DO-229D, Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment

Issued 02-01-13 | Prepared by SC-159

Change 1 to DO-229D reflects errata, corrections, and clarifications to requirements and test procedures for SBAS airborne equipment as a result of comments received from industry during their implementation of products conforming to the referenced standard since the standard's publication in December 2006. These changes do not alter any requirements within the original DO-229D document published in December 2006

that were not previously altered by Federal Aviation Administration (FAA) Technical Standard Orders (TSOs) C145c and C146c.

The title changes from “Wide-Area Augmentation” to “Satellite-Based Augmentation” to harmonize the title with ICAO documentation - Satellite-Based Augmentation System (SBAS).

Change 1 is published as a “stand-alone” document and as Appendix V in a “full version” of DO-229D with the updates entered /highlighted

DO-229D with Change 1, Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment

Issued 02-01-13 Prepared by SC-159

Note: The title of DO-229D changed to *Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment* from *Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment*. This change harmonizes the title with ICAO documentation: SBAS - Satellite-Based Augmentation System.

The original document is DO-229D issued December 13, 2006 with Change 1 (described above) issued February 1, 2013 included as Appendix V. The Change is also incorporated throughout the document and includes the errata issued July 31, 2008. This Change has been produced to reflect errata, corrections, and clarifications to requirements and test procedures for SBAS airborne equipment as a result of comments received from industry during their implementation of products conforming to the referenced standard since the standard’s publication in December 2006. These changes do not alter any requirements within the original DO-229D document published in December 2006 that were not previously altered by Federal Aviation Administration (FAA) Technical Standard Orders (TSOs) C145c and C146c.

This document contains Minimum Operational Performance Standards (MOPS) for airborne navigation equipment (2D and 3D) using the Global Positioning System (GPS) augmented by the Satellite-Based Augmentation System (SBAS).

See the document description for DO-229D (describer below) for the primary areas of change from DO-229C to DO-229D.

DO-229D, Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment

Issued 12-13-06 | Prepared by SC-159 Errata Issued 07-31-08

This document contains Minimum Operational Performance Standards (MOPS) for airborne navigation equipment (2D and 3D) using the Global Positioning System (GPS) augmented by the Wide Area Augmentation System (WAAS). The primary areas of change from DO-229C to DO-229D are:

1. Clarifications: Numerous changes have been incorporated to more clearly describe the meaning and intent of the requirements. To accomplish this there have been changes in the requirements text, explanatory notes added to clarify intent, or both.

2. Appendix Updates: Appendices F and I from DO-229C have been deleted and replaced with entirely new material. Appendix F now addresses SBAS capability considerations for ADS-B. Appendix I now contains mode switching process flow diagrams to aid in understanding the mode transition requirements.

There are three new appendices in DO-229D, Appendix S, Appendix T and Appendix U. Appendix S contains process flow diagrams that are examples of the computation and logic flow to meet MOPS requirements for the possible operational modes. Appendix T is a description of the tool used to determine GEO bias error in receiver correlator designs. Appendix U contains guidance information for interfacing WAAS with ADS-B equipment.

3. Corrections: There are numerous changes in DO–229D to correct errors in equations and to update references to other documents. For example, equations in several places had incorrect signs, symbols, and/or nomenclature. Some of these errors were noted in the errata sheet and TSO-C145a/C146a. The errors documented by those sources have been incorporated; and, many additional errors were found during the review.

Further, the update to DO-229D includes changes related to the changing environment for GPS and service provider experience gained thru operating SBAS systems. For example, the narrow-band geostationary satellites in the WAAS system are in the process of being replaced with wide-band satellites. A result is that major requirement changes have been incorporated in DO-229D related to noise, minimum/maximum satellite power levels, and antenna gains.

4. New Requirements: There are new requirements either embedded within previously existing requirements from DO-229C, or, captured as entirely new sections that never previously existed. Some examples are:

1. There is a new requirement for Fault Detection Prediction so that SBAS equipment provides at least the same capability as TSO-C129a equipment when operating outside of SBAS coverage.

2. There is a new GEO bias error requirement to account for the net group delay through the receiver correlator that results from the signal bandwidth of SBAS satellites compared to GPS satellites.

3. There is a requirement to only use weighted solutions for FDE algorithms.

Section 2.3 for Delta-class receivers has been extensively re-written and expanded.

GEO Bias Modeling Tool for DO-229D

Issued 12-13-06 Prepared by SC-159

The GEO Bias tool is a MATLAB script. The GEO Bias tool is intended to be used by the manufacturer to demonstrate that their GNSS receiver is compliant with the GEO Bias requirements in DO-229D as described in section 2.1.4.1.5. Appendix T in DO-229D provides a description of this tool and associated test procedure.

DO-229C, Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment

Issued 11-28-01 Prepared by SC-159 *Supersedes DO-229B* Errata Issued 8-16-02

This document contains Minimum Operational Performance Standards (MOPS) for airborne navigation equipment (2D and 3D) using the Global Positioning System (GPS) augmented by the Wide Area Augmentation System (WAAS). DO-229C supersedes DO-229B and includes: 1) Message Type 28 information, 2) Modification of the satellite tracking constraints, 3) Changes to the equipment classifications and the accommodating document realignment, 4) Interference environment revisions in Appendix C and 5) New GPS/Inertial requirements in Appendix R. The regulatory application of these standards is the responsibility of appropriate government agencies. In the United States, the Federal Aviation Administration (FAA) plans to publish Technical Standard Order (TSO) C-145 and C-146 for GPS/ WAAS equipment. TSO C-146 will reference the requirements and bench tests procedures in Section 2.

FAA Technical Standard Order (TSO) - C145 references this document.

DO-228, Minimum Operational Performance Standards for Global Navigation Satellite Systems (GNSS) Airborne Antenna Equipment

Issued 10-20-95 | Prepared by SC-159

Defines the antenna performance for antennas that will be used with GNSS receiver equipment. Contains Minimum Operational Performance Standards (MOPS) for GNSS airborne antenna equipment designed to use GPS or GLONASS augmented by other systems/equipment/techniques as appropriate to meet the performance requirements for primary means of navigation for en route, terminal, non-precision, and precision approach phases of flight. Incorporated within these standards are equipment characteristics that should be useful to users, designers, manufacturers, and installers of equipment.

Change 1 to DO-228

Issued 1-11-00 | Prepared by SC-159

This change was developed in response to inputs from antenna manufactures. Changes include references to RTCA DO-160D vice DO-160C, updates minimum frequency range, axial ration, frequency selectivity requirements, and differential group delay to ensure airborne equipment is protected by the LAAS and WAAS ground monitoring facilities during precision approach operations.

DO-227A, Minimum Operational Performance Standards (MOPS) for Non-Rechargeable Lithium Batteries

Issued 09-21-17 | Prepared by SC-235

This standard provides design, testing, and installation guidance for non-rechargeable lithium batteries and battery systems which are permanently installed on aircraft or used in aviation. It contains a set of requirements, tests, and evaluation criteria to establish and assure the safe operation of End Items which are powered by non-rechargeable lithium batteries containing lithium metal or lithium alloys.

The intent of this document is to assist equipment designers and manufacturers in the selection of non-rechargeable cells and battery systems whose safety and performance have been demonstrated as appropriate to the aviation environment. It applies to batteries used as the main power source or that are used for back-up or stand-by power. Guidance is also provided on design, safety, handling, and storage of these items.

DO-227, Minimum Operational Performance Standards for Lithium Batteries

Issued 6-23-95 Prepared by SC-168

Contains both requirements and general guidelines regarding the design, testing, application, handling, storage, and disposal of lithium cells and batteries. It provides designers, manufacturers, and users of equipment installed in aircraft with information on the performance characteristics and operating and environmental limitations of lithium cells and batteries powering such equipment. Two categories of maximum cell and battery sizes are identified.

Category I: Solid-cathode cells that contain less than 0.15 grams of lithium or lithium alloy, and batteries that use not more than four such cells.

Category II: Liquid-cathode cells that contain less than 0.15 grams of lithium or lithium alloy, or batteries comprised of these cells. Cells that contain 0.15 to not more than 5 grams of lithium or lithium alloy. Batteries that contain no more than 25 grams lithium or lithium alloy. Cells containing more than 5 grams of lithium or lithium alloy, or batteries that contain more than 25 grams of lithium or lithium alloy are beyond the scope of this document.

FAA Technical Standard Order (TSO) – C97 references this document.

NOTE: The electronic DO-227 is a pdf file but it is not in searchable format.

DO-226, Guidance Material for Evolving Airborne Precision Area Navigation Equipment with Emphasis on MLS

Issued 5-25-95 Prepared by SC-171 *Supersedes DO-198 (SC-151)*

This document spans a decade of work by two RTCA Special Committees (151/171). During this period, alternative technologies to the Microwave Landing System (e.g., satellite navigation) have evolved. Yet the need for precision, near-airport area navigation continues. Whatever the navigation source for an operational capability, much of the material in this document is germane to any precision, terminal-area navigation system. The philosophy used in preparing the document was to provide guidance for any terminal area navigation system, although the specific performance requirements and test procedures assume the MLS Random (Area) Navigation (RNAV) sensor inputs.

DO-225, VHF Air-Ground Communications System Improvements Alternatives Study and Selection of Proposals for Future Action

Issued 11-17-94 | Prepared by SC-172

This report represents a broad study of very high frequency (VHF) air-ground communications system improvements. The study includes: (1) gaining an understanding of the present VHF air-ground communications system, (2) developing future Air Traffic Service (ATS) and Aeronautical Operational Control (AOC) communications functional requirements and desirable features, (3) studying present system improvements, (4) selecting a future system candidate to pursue towards implementation, and (5) developing recommendations resulting from this study. Seven candidate future system alternatives were evaluated against future system requirements and desirable features and as a result of this study, six recommendations to pursue present and future system improvements were adopted.

NOTE: The electronic DO-225 is a pdf file but it is not in searchable format.

Change 1 to DO-224C, Signal-In-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 03-18-14 | Prepared by SC-214

Change 1 to DO-224C provides multi-frequency refinements for VDL Mode 2 Minimum Aviation System Performance Standards (MASPS), operating/system parameters, technical descriptions and other considerations to be taken into account when determining compliance.

DO-224D, Signal-In-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 09-20-2018 | Prepared by SC-214

The purpose of this document is to define Minimum Aviation System Performance Standards (MASPS) for the signal-in-space characteristics for advanced Very High Frequency (VHF) digital data communications, including compatibility with digital voice techniques. The MASPS document is divided into three sections; an introduction, aviation user requirements, and technical characteristics.

The introductory section provides VHF communications system characteristics including aeronautical VHF communications frequencies utilized and its implications to spectrum congestion.

The aviation user requirements section identifies the users of the systems and specific aircraft characteristics.

The technical characteristics section describes the new system. Two modes of operation are defined: VDL Mode 2 and VDL Mode 3.

DO-224C, Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 12-13-11 – Prepared by SC-214

This document provides the final planned version of the VDL Mode 2 and Mode 3 MASPS consolidated from previous documents. It is synchronized with ICAO SARPS and Technical Manuals for VDL Modes 2 and 3. Future updates to DO-281A, *MOPS for VDL Mode 2*, and DO-271C, *MOPS for VDL Mode 3*, will be synchronized with DO-224C.

DO-224C provides VDL Mode 2 refinements for operating/system parameters, technical descriptions and other considerations to be taken into account when determining compliance. The key improvements include separating frequency selection list (FSL) into airborne-FSL and ground-FSL, refining FSL-based handoff procedures, introducing “ground” bit usage in the Aviation VHF Link Control (AVLC) specific options parameter, refining frequency recovery and missing parameter handling. No refinements were made to VDL Mode 3.

DO-224B, Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 8-03-05 – Prepared by SC-172

This final planned version of the VDL Mode 2 and Mode 3 MASPS consolidates previous documents. It is synchronized with ICAO SARPS and Technical Manuals for VDL Modes 2 and 3. Future updates to DO-281A, MOPS for VDL Mode 2, and DO-271C, MOPS for VDL Mode 3, will be synchronized with DO-224B. Specific changes include:

- VDL Mode 2 – minor updates
- VDL Mode 3 – aircraft address space is increased, the aircraft cross-link buss requirement is removed, ground system requirements are added to accommodate changes, and clarifying definitions are added.

DO-223, Minimum Operational Performance Standards for Context Management (CM) Equipment

Issued 7-13-94 Prepared by SC-169

Identifies aircraft equipment requirements to support the forwarding of addresses, such as “log-on”, between aircraft systems and ground systems. Context management will support Air Traffic Service communications, such as ATC Two-Way Data Link communications, Automatic Dependent Surveillance, Flight Information Services, as well as satellite voice and Aeronautical Operational Communications. Broadcast communications will probably not use context management.

DO-222, Guidelines on AMS(R) S Near-Term Voice Implementation and Utilization

Issued 4-29-94 Prepared by SC-165 Errata Issued 6-21-94

Contains operational guidelines and recommendations for the implementation and utilization of Aeronautical Mobile Satellite (Route) Services, voice communication functions in the near-term (circa 1993-1996) air traffic environment. It presents a system-level view of how satellite voice services can be implemented and used in the Air Traffic Services (ATS) and Aeronautical Operational Control (AOC) environments inclusive of aircraft installation requirements, ground infrastructure requirements, and available AMS(R)S services. This document defines the functions and performance needed to facilitate the development, implementation, certification, and operational use of satellite voice in an environment where satellite voice communication is not yet a required capability for air navigation. It uses as its basis the existing standards for satellite avionics and ground equipment. It should be useful to designers, manufacturers, installers, and operators of equipment used in AMSS voice service.

DO-221, Guidance and Recommended Requirements for Airport Surface Movement Sensors

Issued 4-29-94 | Prepared by SC-178

Provides recommended standards for both sensor and system characteristics. The primary purpose for these sensors is to operate stop bars located on taxiways which provide entrance to low visibility runways. The

sensors may also be used for other low visibility functions such as taxiway light sequencing, runway exiting notification, and presence detection. This document provides guidance to airport system designers, manufacturers, installers, and users.

DO-220A Change 1 Reference Supplement

Issued 08-17-2018 | Prepared by SC-230

This Reference Supplement includes the following items referenced in DO-220A Change 1:

- Britt, C. L., *Detection and False Alert Probabilities for the NASA Airborne Pulsed Doppler Windshear Radar*, NASA Contract NAS1-18925, Task Assignment No. 24, March 1993
- Switzer, G. F., F. H. Proctor, D. A. Hinton, and J. V. Aanstoos, *Windshear Database for Forward-Looking Systems Certification*, NASA Contract NAS1-18925, Task Assignment No. 26, NASA Technical Memorandum 109012, November 1993
- NASA Windshear Database Models, NASA Langley Research Center
- ADWRS, Airborne Doppler Weather Radar Simulation program, NASA Langley Research Center. (Note: NASA developed the initial version of ADWRS in FORTRAN. They continue to refine and develop this simulation, including versions in other computer languages. Submit any requests for this software in computer languages other than FORTRAN directly to NASA. NASA will provide source code in the requested computer language if it has already been developed and is available for release. Contact NASA directly at Software Release Authority, NASA Langley Research Center, Hampton, VA 23681-2199)
- Bowles, Roland L. and Bill K. Buck, *A Methodology for Determining Statistical Performance Compliance for Airborne Doppler Radar with Forward-Looking Turbulence Detection Capability*, NASA/CR-2009-215769 "Corrected Copy", 2009
- NASA Turbulence Event Scenarios, NASA Langley Research Center

DO-220A Change 1, Minimum Operational Performance Standards (MOPS) For Airborne Weather Radar Systems

Issued 08-17-2018 | Prepared by SC-230

This document contains Minimum Operational Performance Standards for Airborne Radar Systems that may include any combination of the following functions: weather detection, ground mapping, forward-looking windshear detection, forward-looking turbulence detection, or atmospheric threat awareness capability.

Since the last revision to DO-220, there have been many technological advances in the field of airborne weather radar. DO-220A incorporates updates and corrections to the previous version. In addition to modernizing the requirements and test procedures for the weather, ground mapping, and predictive windshear functions set out in its predecessors, specifications for radar detection of turbulence and atmospheric threat awareness were added. Any of these functions may be implemented individually or in combination with any others. DO-220A has been designed such that the requirements and test procedures for each function are grouped into distinct sections to facilitate testing and showing of compliance.

These standards specify system characteristics that should be useful to designers, manufacturers, installers, and users of the equipment.

DO-220A, Minimum Operational Performance Standards (MOPS) for Airborne Weather Radar Systems

Issued 3-17-16 | Prepared by SC-230

DO-220A incorporates corrections to the previous version and technological advances in the field of airborne weather radar. In addition to modernizing the requirements and test procedures for the weather, ground mapping, and predictive windshear functions set out in its predecessors, specifications were added for radar detection of turbulence and atmospheric threat awareness. Any of these functions may be implemented individually or in combination with any others. DO-220A is designed such that the requirements and test procedures for each function are grouped into distinct sections to facilitate testing and showing of compliance. The document supersedes DO-173 and DO-220, including Change 1.

DO-220, Minimum Operational Performance Standards (MOPS) for Airborne Weather Radar with Forward-Looking Windshear Detection Capability

Issued 9-21-93 | Prepared by SC-173 | Change 1 issued 6-23-95

Incorporates new radar technology and serves as a standard for both air carrier and general aviation aircraft. It considers those requirements and technologies pertinent to general aviation, where limitations on space and/or weight apply. Compliance with these standards by manufacturers, installers, and users is recommended as one means of assuring the equipment will perform its intended function under conditions normally encountered in routine aeronautical operations.

FAA Technical Standard Order (TSO) – C117a references this document.

NOTE: The electronic DO-220 is a pdf file but it is not in searchable format.

Change 1 to DO-220

Issued 6-23-95

Change 1 adds new data contained within the NASA Windshear Simulation Data Sets, standard deviation of rain velocities calculated by AWDRS, and expanded explanatory notes to the data sets.

NOTE: The electronic DO-220, Change 1 is a pdf file but it is not in searchable format.

DO-219, Minimum Operational Performance Standards for ATC Two-Way Data Link Communications

Issued 8-27-93 Prepared by SC-169

Presents the requirements for Two-Way Data Link Communication (TWDL) services. TWDL services include pre-departure clearance, clearances, reports, and requests. In addition to testing standards, the document includes functional, performance, interface, and equipment standards for "ATCCOMM." The term "ATCCOMM" as used in this document includes all components and units, including software, necessary for the aircraft equipment to support TWDL services with an ATC ground system peer via the Aeronautical Telecommunications Network (ATN).

DO-218B, Minimum Operational Performance Standards for the Mode S Airborne Data Link Processor

NOTE: DO-218B was removed as an active document as of July 1, 2009, The RTCA Program Management Committee recommended at their October 2, 2008 meeting that DO-218B be retired. The requirements that remain relevant, Appendices B and C, are retained in DO-181D.

DO-217, Minimum Aviation System Performance Standards DGNSS Instrument Approach System: Special Category 1 (SCAT-1) Revised to Include Change 1

Issued 8-27-93 Prepared by SC-159 Change 1, Issued 7-13-94 Reprinted

in April 1995 to include Change 1

Provides the guidelines for a system to support differential GNSS (DGNSS) special instrument approaches. Requested by the FAA and consistent with the recommendations of the RTCA GNSS Task Force Report, the recommended standards in this document are specifically oriented toward supporting Special Category I precision approaches - specially authorized approaches made to MLS/ILS Category I minima with DGNSS used to provide navigation guidance. These approaches are expected to be authorized for specific aircraft approaching specific airports; thereby, providing the civil aviation community the basis for developing precision approaches using satellite technology.

Note: For those who currently possess a copy of DO-217 printed before April 1994, the following change may be purchased separately. The prices above reflect the inclusion of Change 1 into the body of the document.

Change 1 to DO-217, Minimum Aviation System Performance Standards DGNSS Instrument Approach System: Special Category 1 (SCAT-1)

Issued 8-13-94

Replaces the original Appendix F with one method of implementing the differential message format described in Appendix A, using VHF data link. The data link characterized is more robust and may provide growth potential for Category II/III precision approaches. This change is included in the April 1995 printing of DO-217.

NOTE: The electronic DO-217, Change 1 is a pdf file but it is not in searchable format.

Change 2 to DO-217, Minimum Aviation System Performance Standards DGNSS Instrument Approach System: Special Category 1 (SCAT-1)

Issued 11-15-96

This document recognizes the technology developments since the original issuance of DO-217 in August 1993. While RTCA/DO-217 including this change does not guarantee interoperability with a future GNSS CAT- I system, this change does address interoperability among SCAT I systems and provides a means to improve interoperability.

DO-216, Minimum General Specification for Ground-Based Electronic Equipment

Issued 7-14-93 Prepared by SC-175

Contains general specification for the procurement of ground-based electronic equipment by the Federal Aviation Administration. This material incorporates industry standards to facilitate use of Commercial Off the Shelf/Non-Development Items (COTS/NDI). This updated Version Downloadable of FAA Standard G-2100e also contains revised quality assurance provisions and is expected to be used as a key element in FAA future procurement.

DO-215A, Guidance on Aeronautical Mobile Satellite Service (AMSS) End-to-End System Performance

Issued 2-21-95 Prepared by SC-165 *Supersedes DO-215*

This document contains guidance for the system and service requirements performance, availability, and integrity for an End-to-End System providing Aeronautical Mobile Satellite Services (AMSS) to end users.

The primary elements of the End-to-End System are also considered individually. The material should be useful to users, designers, manufacturers, and installers of the AMSS system and its elements.

NOTE: The electronic DO-215A is a pdf file but it is not in searchable format.

Change 1 to DO-215A

Issued 9-28-98

DO-215 originally published May 1993, was updated as DO-215A in February 1995. It offers the only currently published guidance for performance, integrity, and availability for data and voice over end-to-end links and their individual subsystems. New AMSS development activities in industry and government require criteria for establishing their feasibility and acceptability. DO-215A is in widespread use in those regards and will fill those needs until a new AMSS MASPS is available. This change provides needed clarifications and corrections required for applying DO-215A methodologies to an evolved geo-stationary satellite communications system.

NOTE: The electronic DO-215A, Change 1 is a pdf file but it is not in searchable format.

DO-214A, Audio Systems Characteristics and Minimum Operational Performance Standards for Aircraft Audio Systems and Equipment

Issued 12-18-13 ♦ Prepared by SC-226 *Supersedes DO-214*

This document defines audio systems characteristics and minimum operational performance standards for aircraft headset microphones, handset microphones (Except carbon), oxygen mask microphones, headsets, handsets, speakers, audio selector panels (ASP) and amplifiers. In addition to postulating operational goals, equipment applications and installations, it recommends test procedures necessary to demonstrate equipment compliance with the stated minimum requirements. This Revision includes requirements covering technology advances, harmonization of DO 214 with other revised standards, addresses industry and FAA feedback for improvements and from advancements in audio, acoustic and communications sciences and methodologies that have developed since the original release of DO-214.

DO-214, Audio Systems Characteristics and Minimum Operational Performance Standards for Aircraft Audio Systems and Equipment

Issued 3-2-93 ♦ Prepared by SC-164 *Supersedes DO-170*

This document defines audio systems response characteristics that affect the intelligibility of air-ground speech communication including review and evaluation of design measures giving promise of audio response characteristics. It recommends a means for improvement by users and designers of communications

equipment. In addition to postulating goals and applications, it recommends minimum standards and test procedures for aircraft microphones (except carbon), aircraft headsets, handsets and loudspeakers, and aircraft audio systems.

DO-213A Change 1, Minimum Operational Performance Standards for Nose-Mounted Radomes

Issued 06-21-2018 • Prepared by SC-230

This document contains minimum operational performance standards for radomes for use with airborne weather radars with or without forward-looking windshear detection capability. These standards specify radome characteristics for designers, manufacturers, installers, and users of the equipment.

It establishes radome performance requirements to ensure that the radome characteristics do not adversely interfere with the performance of weather radar systems, including those with predictive windshear functions. It also includes testing requirements to ensure that the radome continues to perform correctly after repair.

DO-213A, Minimum Operational Performance Standards for Nose-Mounted Radomes

Issued 3-17-16 • Prepared by SC-230

DO-213A incorporates the many advances in the field of radome design and testing; as well as updates and corrections to the previous version. The document establishes radome performance requirements to ensure that the radome characteristics do not adversely interfere with the performance of weather radar systems, including those with predictive windshear functions. It also includes testing requirements to ensure that the radome continues to perform correctly after repair. The document was completed in conjunction with DO-220A.

DO-213, Minimum Operational Performance Standards for Nose-Mounted Radomes

Issued 1-14-93 • Prepared by SC-173 • Change 1 issued 6-23-95

Contains minimum operational performance standards for radomes for use with airborne doppler weather radars having forward-looking windshear detection capability and for use with airborne weather radars.

These standards specify radome characteristics for designers, manufacturers, installers, and users of the equipment.

Change 1 to DO-213

Issued 6-23-95

Change 1 adds definitions for “Transmission Efficiency, Minimum,” and “Transmission Efficiency, Average.” The change also includes new material in Section 2.1.5, Maintenance Performance Rules and Section 2.1.6, Documentation and Identification; redefines “Side Lobe Upper Limits.

DO-212, Minimum Operational Performance Standards for Airborne Automatic Dependent Surveillance (ADS) Equipment

Issued 10-26-92 Prepared by SC-170

Addresses application of the ADS function and recommends standards for Automatic Dependent Surveillance (ADS) hardware. The document provides assumptions and information needed to understand the rationale for equipment requirements and characteristics. The standard defines required performance under standard operating conditions and stressed physical environment conditions.

DO-211, User Requirements for Future Airport and Terminal Area Communications, Navigation, and Surveillance

Issued 10-26-92 Prepared by SC-166

Presents a comprehensive statement of user requirements for the next quarter century (to the year 2015). It examines the potential capabilities of developmental and proposed communications, navigation, and surveillance (CNS) systems and Air Traffic Management as they could apply in terminal areas and at airports. The report examines current US plans for the terminal area airspace and airports in light of the limitation of the existing air traffic management system and addresses emerging technologies that could help meet future needs. A number of conclusions and recommendations are offered for meeting user requirements and assuring a smooth transition.

Change 4 to DO-210D

Issued 03-24-15 ♦ Prepared by SC-222

The purpose of the change is to correct several known deficiencies in DO-210D, including Changes 1-3, and to bring certain sections of DO-210D into alignment with the new DO-262B, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems, Appendix E.

Change 3 to DO-210D

Issued 9-19-06 ♦ Prepared by SC-208

Change 3 is intended to harmonize DO-210D and ARINC 741. The scope of Change 3 is limited to a) changes involving output amplifier intermodulation effects and tests related to such effects, and, b) changes involving the performance characteristics such as harmonics, spurious, and noise emissions that depend on the shape of the diplexer filter. The goal of these changes is to achieve the maximum commonality possible with ARINC 741, as approved in October 2005.

Change 2 to DO-210D

Issued 11-28-01 ♦ Prepared by SC-165

Change 2 updates receiver interference susceptibility characteristics to include wide-band, as well as narrow-band, interfering signals. The Change also provides a complete set of verification procedures for all requirements, whether contained within DO-210D itself or invoked by external references.

Change 1 to DO-210D

Issued 12-14-00 ♦ Prepared by SC-165

Change 1 addresses Electromagnetic Compatibility (EMC) issues that required resolution to ease the process of issuing a FAA Technical Standard Order (TSO) implementing DO-210 D.

DO-210D, Minimum Operational Performance Standards (MOPS) for Geosynchronous Orbit Aeronautical Mobile Satellite Services (AMSS) Avionics

Issued 4-19-00 | Prepared by SC-165

This standard addresses Aeronautical Mobile Satellite Services operating in the frequency bands 1.5 and 1.6 GHz. DO-210D updates DO-210C and contains new material regarding Inmarsat Aero H+/I services, intermediate-gain antenna, channel descriptions, related physical layer and management characteristics, and the 4.8 kbps Advanced Multiband Excitation (AMBE) voice codec. New verification procedures related to priority, precedence, and preemption are also included. Revisions relate to the Aero H+/I services, clarifications of requirements, and a review of verification procedures with respect to the Inmarsat System Definition Manual as well as ICAO Standards and Recommended Practices. The document includes equipment performance requirements, recommended bench tests and other performance verification procedures, and installed equipment tests and operational performance characteristics. DO-210D supersedes DO-210C and should be useful to designers, manufacturers, installers, and users of the AMSS system and

DO-209, Minimum Operational Performance Standards for Devices that Prevent Blocked Channels Used in Two-Way Radio Communications Due to Simultaneous Transmissions

Issued 4-23-92 | Prepared by SC-163 Errata Issued 7-1-92

Sets forth goals and applications and recommends standards and procedures for systems that provide a means for reducing simultaneous transmissions that adversely affect two-way voice radio communications. This specification is applicable to ground-based, ground-mobile, and airborne two-way UHF and VHF voice radio communications equipment used for intercommunication and control of air traffic.

DO-208, Minimum Operational Performance Standards for Airborne Supplemental Navigation Equipment Using Global Positioning System (GPS)

Issued 7-12-91 | Prepared by SC-159 Change 1 Issued 9-21-93

Sets forth the operational goals and applications and recommends standards and test procedures for airborne supplementary navigation equipment (2D and 3D) using Global Positioning System (GPS) inputs in the en route, terminal, and approach modes or any combination thereof. A supplemental navigation system may be used as a primary navigation reference in an aircraft when an approved and operational sole means navigation system is available. The report defines performance, functions, and features for 2D airborne equipment, which performs only lateral guidance, and 3D equipment, which performs both lateral and vertical guidance.

FAA Technical Standard Order (TSO) – C129a references this document.

Change 1 to DO-208

Issued 9-21-93 | Errata Issued 3-16-95

Change 1 provides editorial changes to subparagraphs on Marginal Geometry Tests, Good Geometry Tests, and Dynamic Tests. Appendix B has been rewritten to provide corrected computations to calculate geodesics on the WGS-84 ellipsoid. A new Appendix K provides simulation of a second-order Gauss-Markov process.

DO-207, Minimum Operational Performance Standards for Devices that Prevent Blocked Channels Used in Two-Way Radio Communications Due to Unintentional Transmissions

Issued 1-25-91 | Prepared by SC-163

Recommends standards and procedures for systems that reduce unintentional transmissions and prevent blocked frequencies that adversely affect two-way voice radio communications. This specification is applicable to ground-based, ground-mobile, and airborne two-way VHF and UHF radio voice communications equipment used for control of air traffic.

FAA Technical Standard Order (TSO) – C128 references this document.

DO-206, Minimum Aviation System Performance Standards for Radiodetermination Satellite Service (RDSS)

Issued 2-12-90 | Prepared by SC-161

Sets forth a system description for the Radiodetermination Satellite Service (RDSS). Provides a description of non-safety-related functional capabilities that may be provided by and RDSS system implemented for civil aviation users.

DO-204B, Minimum Operational Performance Standard for Aircraft Emergency Locator Transmitters 406 MHz

Issued 12-13-18 Prepared by SC-229

This MOPS was authored to update DO-204A. This revision was developed jointly with EUROCAE WG-98 with the goal of making DO-204B technically equivalent to ED-62B.

The updates to DO-204A include:

ELT Crashworthiness – NASA R&D and Installation Considerations

GNSS – specifications and RLS

Power Sources – Primary Lithium

2nd Gen ELTs (MEOSAR)

In Flight Triggered ELT(DT) for GADSS

Note that while DO-204 and ED-62 were technically equivalent, DO-204A and ED-62A were not technically equivalent.

DO-204A, Minimum Operational Performance Standards for 406 MHz Emergency Locator Transmitters (ELT)

Issued 12-06-07 Prepared by SC-204

DO-204A incorporates numerous changes to clarify the meaning and intent of the requirements. Text revisions and explanatory notes have been added. COSPAS/SARSAT testing criteria and DO-183 tests have been incorporated into the specification. G-Switch characteristics have been replaced. The document is harmonized with EUROCAE ED-62. Includes test conditions and procedures for installed equipment performance for emergency locator transmitters (ELTs) utilizing the 406.0 to 406.1 MHz band and operating in the COSPAS-SARSAT system.

DO-202, Report of Special Committee 159 on Minimum Aviation System Performance Standards (MASPS) for Global Positioning System (GPS)

Issued 11-28-88 | Prepared by SC-159

This document reports on the Global Positioning System (GPS) and related parameters, for operation and use of a GPS-based navigation system by civil users of the airspace. The report considers the use of GPS both as a supplemental and as a sole means system for en route, terminal area, and non-precision approach operations. Integrity monitoring requirements are presented with a discussion of suitable methods for determining GPS integrity and broadcasting this information to civil aeronautical users. Coordinated with EUROCAE.

DO-201B, User Requirements for Navigation Data

Issued 12-13-2018 | Prepared by SC-217

This document provides industry requirements for navigation databases for aeronautical use by identified applications. This document attempts to state the information requirements for users. The expectation is that navigation data originators, navigation data providers, and application integrators would use this document when providing those data to system designers and/or users. This document provides an industry recommended basis for DQRs to facilitate end user development in support of an intended function.
This revision refines the scope to navigation data, provides an overview of Performance Based Navigation (PBN) and System Wide Information Management (SWIM) concepts in relation to navigation data, defines a data catalog, expands the set of data quality requirements, and provides new guidance on procedure design and coding. It addresses applications and related data needs that have emerged since the last revision. Definitions were also reviewed and updated throughout the document to maintain compatibility with other database and data processing standards.

RTCA DO-201B and EUROCAE ED-77A, User Requirements for Navigation Data are technically equivalent documents.

DO-201A, Standards for Aeronautical Information

Issued 4-19-00 | Prepared by SC-181

This document provides for the improved operational effectiveness of airborne navigation systems that use stored databases. It presents a collection of disciplines necessary to provide assurance that aeronautical

information used by the aviation industry meets the high quality and integrity for safe flight. The information in the document has been compiled for the purpose of stating aeronautical information requirements of the aviation industry with emphasis on RNAV operations in RNP airspace. There is focus on the importance of quality aeronautical information and the fact that the evolution of computer navigation technology requires a greater dependency on the accuracy, reliability, integrity, and timely availability of navigation reference data than ever before. This is a joint RTCA/EUROCAE document.

DO-200B, Standards for Processing Aeronautical Data

Issued 06-18-15 ♦ Prepared by SC-217

This standard provides the minimum requirements and guidance for the processing of aeronautical data that are used for navigation, flight planning, terrain/obstacle awareness, flight deck displays, and flight simulators and for other applications. The standard provides requirements to develop, assess change, and support implementation of data quality management. DO-200B supports ATM modernization programs such as NextGen and SESAR, including the capabilities and flexibilities provided by Performance Based Navigation (PBN). Several other NextGen and SESAR collaborative capabilities implement shared responsibilities between both ground and aircraft operations. System Wide Information Management (SWIM) enables the provision of data and information supporting these concepts of future enhancements. This standard address aeronautical databases as well as the associated data processing. These databases may be utilized by airborne or ground-based aviation products. When applied by each organization in the aeronautical data chain, the standard will provide assurance that the level of data quality is established and maintained.

DO-200A, Standards for Processing Aeronautical Data

Issued 9-28-98 ♦ Prepared by SC-181

This document provides the minimum standards for the processing of aeronautical data that are used for navigation, flight planning, terrain awareness, flight simulators and for other purposes. The standards cover data processing quality assurance and quality management requirements. They provide the user the necessary assurance that delivered aeronautical databases meet the appropriate quality requirements for the data. DO-200A supports new technology and the expanding scope of aeronautical data by providing a more structured approach to the extremely important issues of data quality and data integrity management.

DO-199, Potential Interference to Aircraft Electronic Equipment from Devices Carried Aboard

Issued 9-16-88 Prepared by SC-156 Supersedes DO-119

Reports on the investigation to determine potential interference effects to aircraft electronic systems due to emissions from self-powered portable electronic and electrical devices operated aboard aircraft. Recommends regulatory actions relating to operation and identification of passenger-operated devices to assure control of possible sources of interference and recommends standardized procedures for reporting suspected interference. Volume I is the basic report and includes background, data collection, data analysis, conclusions, and recommendations. Volume II provides amplification or background material for some of the summary data included in the basic report.

DO-197A, Minimum Operational Performance Standards for an Active Traffic Alert and Collision Avoidance System I (Active TCAS I)

Issued 9-12-94 Prepared by SC-147 Errata 11-22-94 Supersedes DO-197

Pertains to aircraft with up to 30 passenger seats as prescribed by the Federal Aviation Administration (FAA) TCAS rules. Active TCAS I is an air-to-air interrogation device that provides traffic advice to the flight crew by alerting them to the presence of a nearby transponder- equipped aircraft and advising the crew where to look for that aircraft so it can be visually acquired and avoided if necessary. Unlike TCAS II and TCAS III, Active TCAS I do not provide conflict resolution advisories.

FAA Technical Standard Order (TSO) – C118 references this document.

NOTE: The electronic DO-197A is a pdf file but it is not in searchable format.

Change 1, DO-197A, Minimum Operational Performance Standards for an Active Traffic Alert and Collision Avoidance System I (Active TCAS I)

Issued 7-29-97 Prepared by SC-147

Analysis of data recorded from TCAS I equipped aircraft indicated that the TCAS I interference limiting algorithms were causing acquisition of intruders at low ranges and that the tracks were often intermittent. This change enhances the minimum TCAS I surveillance performance by refining the assumptions used in development of the original interference limiting algorithms. These modifications provide a significant operational benefit to the operators of TCAS I equipment, without increasing the total amount of interrogation

power transmitted by TCAS I equipped aircraft. Power is reallocated to more closely reflect the actual operating environment.

NOTE: The electronic DO-197A, Change 1 is a pdf file but it is not in searchable format.

DO-196, Minimum Operational Performance Standards for Airborne VOR Receiving Equipment Operating within the Radio Frequency Range of 108- 117.95 Megahertz

Issued 11-17-86 | Prepared by SC-153 *Supersedes DO-149 and DO-153A*

Sets forth operational goals and applications and recommends standards and test procedures for airborne VHF Omnirange (VOR) receiving equipment. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C40c references this document.

DO-195, Minimum Operational Performance Standards for Airborne ILS Localizer Receiving Equipment Operating within the Radio Frequency Range of 108- 112 Megahertz

Issued 11-17-86 | Prepared by SC-153 *Supersedes DO-131A*

Postulates operational goals and applications and recommends standards and test procedures for airborne ILS localizer receiving equipment. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C36e references this document.

DO-194, Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Loran-C Inputs

Issued 11-17-86 | Prepared by SC-137 *Supersedes DO-159*

Sets forth operational goals and applications and recommends standards and test procedures for airborne area navigation equipment (2D and 3D) using Loran-C inputs. Includes test conditions and procedures for installed Loran-C receiving equipment performance and operational characteristics with test procedures.

Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C60b references this document.

DO-193, User Requirements for Future Communications, Navigation, and Surveillance Systems, Including Space Technology Applications

Issued 9-19-86 | Prepared by SC-155

Reports on the operational requirements for communications, navigation, and surveillance services likely to be required in the 2010-time frame as foreseen by airspace users. Investigates new concepts and technology, including the use of satellites, which may have applications in a future airspace management system.

Institutional, economic, and transitional issues are assessed from United States and worldwide perspectives.

DO-192, Minimum Operational Performance Standards for Airborne ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328.6-335.4 Megahertz

Issued 7-18-86 | Prepared by SC-153 *Supersedes DO-132A*

Postulates operational goals and applications and recommends standards and test procedures for airborne ILS glide slope receiving equipment. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C34e references this document.

NOTE: The electronic DO-192 is a pdf file but it is not in searchable format

DO-191, Minimum Operational Performance Standards for Airborne Thunderstorm Detection Equipment

Issued 5-16-86 Prepared by SC-154

Defines the capabilities and limitations of the various methods of airborne thunderstorm detection and determines the correlation between the detection of electrical activity, precipitation, and any other phenomena that is measured or detected and likely to be hazardous to flight operations.

FAA Technical Standard Order (TSO) – C110a references this document.

DO-190, Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Omega/ VLF Inputs

Issued 5-16-86 Prepared by SC-137 *Supersedes DO-140*

Postulates operational goals and applications and recommends standards and test procedures for airborne area navigation equipment (2D and 3D) using Omega/VLF signals. Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C120 references this document.

DO-189, Minimum Operational Performance Standards for Airborne Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 MHz

Issued 9-20-85 Prepared by SC-149 *Supersedes DO-141 and DO-151A*

Postulates operational goals and applications and recommends standards and test procedures for airborne distance measuring equipment (DME). It updates the former DME operational characteristics and performance

standards for airborne equipment that operates with conventional DME (DME/N) ground facilities and establishes standards for airborne equipment which will operate with both DME/N and precision DME (DME/P) ground facilities. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C66c references this document.

NOTE: The electronic DO-189 is a pdf file but it is not in searchable format.

DO-188, Emergency Locator Transmitter (ELT) Batteries Guidance and Recommendations

Issued 11-13-84 Prepared by SC-136 Battery Subcommittee

Provides guidelines and recommendations concerning ELT battery construction, storage, and methodology for qualifying replacement batteries. An appendix concerning considerations for design and manufacture of batteries for ELTs is included.

FAA Technical Standard Order (TSO) – C91a references this document.

NOTE: The electronic DO-188 is a pdf file but it is not in searchable format.

DO-187, Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Multi-Sensor Inputs

Issued 11-13-84 Prepared by SC-137

Postulates operational goals and applications and recommends standards and test procedures for airborne area navigation equipment (2D and 3D) using multi-sensor inputs. Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C115b references this document.

NOTE: The electronic DO-187 is a pdf file but it is not in searchable format.

DO-186B, Minimum Operational Performance Standards for Airborne Radio Communications Equipment.

Issued 11-08-05 • Prepared by SC-172

DO-186B recommends standards and test procedures for airborne VHF communication transmitters and includes test conditions and procedures for installed equipment. This update incorporates Changes 1 and 2 of DO-186A and establishes performance standards for equipment designed for offset carrier operations, i.e., equipment classes A and C. An exclusion band to enable a successful and appropriate Radio Frequency Susceptibility Test (DO-160 Section 20.0) is defined. The document also includes class E receivers which are able to be used in an 8.33 kHz channel separation environment.

This document supersedes DO-186A.

Change 2 to DO-185B, Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II)

Issued 03-20-13 • Prepared SC-147

Change 2 to DO-185B provides for the following changes:

- Improved efficiency of the TCAS surveillance function designed to reduce utilization of the 1030 and 1090 MHz channel without reducing the effectiveness of the equipment's collision avoidance function.
- Allows TCAS to implement a narrow band Mode S receive function compatible with the RTCA/DO-260B ADS-B receiver requirements without negatively impacting the TCAS receiver function.
- Updates the flight test requirements to add Atlanta, GA as an alternate location for high density Mode S flight testing and to modify the combined air and ground density requirement accordingly.
- Decreases the TCAS RA broadcast interval from 8 seconds to 1 second to be compatible with the intended use of this data by ground controllers.
- Clarifies the intent of interference limiting by adding text to the requirements and adding a new test.

Change 1 to DO-185B, Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II)

Issued 07-01-09

Change 1 to DO-185B specifies changes to the TCAS II requirements.

Section 1 provides the text changes to Volume I. The change affects the “middle” aircraft of a multi-threat situation, and removes the feature that would have required a green arc to accompany that aircraft’s RA. Section 2 provides changes to the Pseudocode in Volume II, Attachment A. It clarifies the coding of certain bits reporting Hybrid Surveillance capability within the Data Link Capability Report, to be consistent with a change made to DO-300.

Section 3 provides changes to the state charts in Volume II.

Section 4 provides changes to the TSIM data set that is specified for the verification of the TCAS implementation. This material is not part of DO-185B, but is accompanying material distributed by FAA, not by RTCA.

DO-185B, Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II)

Issued 06-19-08 Prepared by SC-147 Errata Issued 7-14-08

This document provides Version Downloadable 7.1 of the TCAS II logic and sets forth the minimum operational performance standards for TCAS II equipment. The main changes are the enhancement of the Resolution Advisory Sense reversal function, and the replacement of “Adjust Vertical Speed, Adjust” Resolution Advisories by “Level Off, Level Off” advisories.

Volume I contain the rationale for equipment characteristics, minimum performance standards, bench test procedures, and installed equipment performance. Volume II presents the required collision avoidance algorithms in a state chart formulation with informational commentary text. Attachment A provides both high and low-level pseudocode representations of the collision avoidance algorithms. The standards and performance requirements in the document ensure that TCAS II is fully interoperable with other elements and equipment of the National Airspace System.

Document available only as an electronic download.

An Errata is provided with purchase of the document.

DO-185A, Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II) Airborne Equipment

Issued 12-16-97 | Prepared by SC-147

This document provides Version Downloadable 7.0 of the TCAS II logic and sets forth the minimum operational performance standards for TCAS II equipment. Among the changes, this Version Downloadable improv es the system's surveillance performance and modifies the interference limiting algorithms to account for aircraft densities near airports as well as to permit longer range surveillance. Improvements have been made i n tracking Mode S targets and in permitting TCAS to receive the extended Mode S squitter. To preclude repeatedly issuing Traffic Advisories (TA) against the same target, changes have been made to ensure that a target's TA status is maintained in slow closure situations by using more stringent drop criteria. Other changes include credibility checks to ensure integrity of the data being supplied to the collision avoidance logic and additional, more thorough tests for installed equipment.

Volume 1 contains the rationale for equipment characteristics, minimum performance standards, bench test procedures, and installed equipment performance. Volume 2 presents the required collision avoidance algorithms in a state chart formulation with informational commentary text. Attachment A provides both high and low-level pseudocode representations of the collision avoidance algorithms. The standards and performance requirements in the document ensure that TCAS II is fully interoperable with other elements and equipment of the National Airspace System.

Note:

TSO-C119b -Requests for a Copy of the CD-ROM Titled “TSO C119B Changes to DO-185A, Approved by

SC-147 RWG* dated December 4, 1998 should be directed to: Federal Aviation Administration, Headquarters, and Technical Programs & Continued Airworthiness Branch (AIR-120), (P) 202-267-9578.

DO-184, Traffic Alert and Collision Avoidance System (TCAS) I Functional Guidelines

Issued 5-13-83 | Prepared by SC-147

Sets forth minimum requirements and describes the various elements of TCAS I. Discusses both passive and active TCAS I applications. Provides the minimum performance requirements for electromagnetic compatibility for an active TCAS I and test procedures for both active and passive systems. Appendix A addresses cross-link advisories.

NOTE: The electronic DO-184 is a pdf file but it is not in searchable format.

DO-183, Minimum Operational Performance Standards for Emergency Locator Transmitters-Automatic Fixed-ELT (AF), Automatic Portable-ELT (AP), Automatic Deployable-ELT (AD), Survival-ELT (S) Operating on 121.5 and 243.0 Megahertz

Issued 5-13-83 ▯ Prepared by SC-136 *Supersedes DO-145, DO-146 and DO-168* ♦ Change 1 issued 1-17-86

Postulates operational goals and applications and recommends standards and test procedures for emergency locator transmitters. Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures.

FAA Technical Standard Order (TSO) – C91a references this document.

NOTE: The electronic DO-183 is a pdf file but it is not in searchable format.

DO-182, Emergency Locator Transmitter (ELT) Equipment Installation and Performance

Issued 11-17-82 ▯ Prepared by SC-136

Provides analyses of ELT performance in regard to false alarms and activations in crash environments; provides criteria and guidelines for placement and installation of ELTs in aircraft; reports on ELT system performance in a variety of typical installations; and provides specific recommendations on all of the above standards.

NOTE: The electronic DO-182 is a pdf file but it is not in searchable format.

DO-181E, Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment

Issued 03-17-11 ▯ Prepared by SC-209 *Supersedes DO-181D*

This document supersedes DO-181D published in 2008. It provides standards for Mode S airborne equipment (Mode S implies a combined ATCRBS/Mode S capability). Incorporated within these standards are system characteristics that will be helpful to users of the system as well as designers, manufacturers and installers.

The document considers an equipment configuration consisting of transponder, control panel, antenna and interconnecting cables. Level 1 through Level 5 transponders are addressed, and test procedures are provided as well as information for optional features. It reflects issues identified and discussed by the ICAO Aeronautical Surveillance Panel Technical Subgroup and reported by Civil Aviation Authorities since the publication of DO-181D in October 2008. The document is a coordinated effort with EUROCAE WG-49 and includes changes resulting from DO-260B, ADS-B MOPS, published in December 2009. Appendix E details the Changes from DO-181D to DO-181E.

DO-181D Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment

Issued 10-02-2008 ♦ Prepared by SC-209 *Supersedes DO-181C*

This document supersedes DO-181C published in 2001. It provides standards for Mode S airborne equipment (Mode S implies a combined ATCRBS/Mode S capability). Incorporated within these standards are system characteristics that will be useful to users of the system as well as designers, manufacturers and installers.

The document considers an equipment configuration consisting of: transponder, control panel, antenna and interconnecting cables. Level 1 through Level 5 transponders are addressed, test procedures are provided as well as information for optional features. It reflects the latest amendment to ICAO Annex 10. The document is a coordinated effort with EUROCAE WG-49.

DO-181C with Change 1 and Errata, Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment

Issued 06-12-2001 ♦ Prepared by SC-187 *Supersedes DO-181B*

This document supersedes DO-181B published in 1999. It provides standards for Mode S airborne equipment (Mode S implies a combined ATCRBS/Mode S capability). Incorporated within these standards are system characteristics that will be useful to users of the system as well as designers, manufacturers and installers.

The document considers an equipment configuration consisting of: transponder, control panel, antenna and interconnecting cables. Level 1 through Level 5 transponders are addressed, test procedures are provided as well as information for optional features.

Change 1 assures continuous transmission of a hijack signal, even if the flight deck-selected code or function is turned off. It defines the functionality and test procedures required to perform the new transponder operating requirements. The Change supports new transponder features as determined by the FAA-Industry Transponder Task Force. The FAA request originated from the Department of Transportation's Aircraft Security Rapid Response Team Report.

DO-180A, Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using a Single Collocated VOR/DME Sensor Input

Issued 5-24-90 Prepared by SC-137 *Supersedes DO-180*

Postulates operational goals and applications and recommends standards and test procedures for airborne area navigation equipment (2D and 3D) using sensor inputs from a single collocated VOR/DME station.

Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures. Coordinated with EUROCAE.

NOTE: The electronic DO-180A is a pdf file but it is not in searchable format.

DO-179, Minimum Operational Performance Standards for Automatic Direction Finding (ADF) Equipment

Issued 5-13-82 | Prepared by SC-146 *Supersedes DO-137 and DO-142*

Postulates operational goals and applications and recommends standards and test procedures for airborne automatic direction-finding equipment. Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures. Coordinated with EUROCAE.

Coordinated with EUROCAE FAA Technical Standard Order (TSO) – C41d references this document.

NOTE: The electronic DO-179 is a pdf file but it is not in searchable format.

DO-178C, Software Considerations in Airborne Systems and Equipment Certification

Issued 12-13-11 | Prepared by SC-205

This document provides recommendations for the production of software for airborne systems and equipment that performs its intended function with a level of confidence in safety that complies with airworthiness requirements. Compliance with the objectives of DO-178C is the primary means of obtaining approval of software used in civil aviation products.

DO-178B, Software Considerations in Airborne Systems and Equipment Certification

Issued 12-1-92 | Prepared by SC-167 Advisory Circular | *Supersedes DO-178A* | Errata Issued 3-26-99

Provides guidance for determining that, in a consistent manner and with an acceptable level of confidence, the software aspects of airborne systems and equipment comply with airworthiness requirements.

DO-177, Minimum Operational Performance Standards for Microwave Landing System (MLS) Airborne Receiving Equipment

Issued 7-17-81 | Change 1 | Change 2 issued 9-19-86 | Prepared by SC-139

Postulates operational goals and applications and recommends standards and test procedures for use of Microwave Landing System (MLS) airborne receiving equipment. Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C104 references this document.

DO-176, FM Broadcast Interference Related to Airborne ILS, VOR and VHF Communications

Issued 11-18-81 | Prepared by SC-141

Reviews the various aspects of the problem of commercial FM broadcast stations contributing to the interference of airborne systems. Recommends improved intra-governmental coordination procedures and recommends steps to limit growth of the problem, to reduce the problem with installed receivers, and to minimize the problem with new receivers or installations.

DO-175, Minimum Operational Performance Standards for Ground-Based Automated Weather Observation Equipment

Issued 1-23-81 | Prepared by SC-143

Postulates operational goals and applications, recommends standards and test procedures for ground-based automated weather observation equipment. Provides system characteristics for users, designers, manufacturers, and installers of such equipment of interest to various users, including airfield operations, meteorological services, aviation administrations, airplane and helicopter operators, etc. Includes test conditions and procedures for installed system performance and operational characteristics with test procedures.

DO-174, Minimum Operational Performance Standards for Optional Equipment Which Displays Non-Radar-Derived Data on Weather and Ground Mapping Radar Indicators

Issued 3-20-81 | Prepared by SC-133

Postulates operational goals and applications and recommends standards and test procedures for use of weather and ground mapping radar indicators for display of non-radar graphic and/or alphanumeric data. Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures.

FAA Technical Standard Order (TSO) – C105 references this document.

NOTE: The electronic DO-174 is a pdf file but it is not in searchable format.

DO-173, Minimum Operational Performance Standards for Airborne Weather and Ground Mapping Pulsed Radars

Issued 11-19-80 | Corrigendum/Errata/Change 1 | *Supersedes DO-134* | Prepared by SC-133

Postulates operational goals and applications; recommends standards and test procedures for airborne weather and ground mapping pulsed radars. Takes into account new radar technology and is applicable to both large aircraft and general aviation aircraft systems. Includes test conditions and procedures for

installed equipment performance and operational characteristics with test procedures.

FAA Technical Standard Order (TSO) – C63c references this document.

NOTE: The electronic DO-173 is a pdf file but it is not in searchable format.

DO-172, Minimum Operational Performance Standards for Airborne Radar Approach and Beacon Systems for Helicopters

Issued 11-19-80 | Change 1 | Prepared by SC-133

Postulates operational goals and applications and recommends standards and test procedures for Airborne Radar Approach (ARA) systems for helicopters, particularly when operating under IFR, IMC conditions, or at night, including standards for the ground-based radar beacon. Includes test conditions and procedures for installed equipment performance and operational characteristics with test procedures.

FAA Technical Standard Order (TSO) – C102 references this document.

NOTE: The electronic DO-172 is a pdf file but it is not in searchable format.

DO-171, Recommendations on Policies and Procedures for Off-the-Shelf Electronic Test Equipment Acquisition and Support

Issued 1-25-80 | Prepared by SC-134

Provides rationale and recommendations for various conditions and procedures that could provide major benefits to those responsible for drafting legislation, policies, procedures, and guidelines for the acquisition and support of electronic test equipment.

DO-169, VHF Air-Ground Communication Technology and Spectrum Utilization

Issued 7-20-79 | Prepared by SC-140

Reports on VHF (118-136 MHz) spectrum utilization including the investigation of modulation techniques and reduced channel separation. Identifies problem areas and recommends, among other things, use of reduced channel spacing on a selective basis.

DO-167, Airborne Electronics and Electrical Equipment Reliability

Issued 9-16-77 | Prepared by SC-130

Provides a tutorial discussion on reliability related to aircraft accidents. Discusses airborne electronic equipment failures and means of reducing failures and presents arguments against use on MTBF and MTBR as reliability measures for use in RTCA MPSs and FAA TSOs.

NOTE: The electronic DO-167 is a pdf file but it is not in searchable format.

DO-166, Microwave Landing System (MLS) Implementation

Issued 7-15-77 | Prepared by SC-125

Reports on a study of develop user recommendations for a national implementation policy for MLS as the primary landing system in service by the year 2000. Volume I provide recommendations on how best to transition from ILS to MLS; recommends implementation strategy and a national implementation policy, which are summarized in a findings and recommendations chapter. Volume II includes six appendices, which are the reports of working groups in special categories such as Benefits, Airborne Systems Operational Capabilities, and Civil System Costs.

NOTE: The electronic DO-166 V1 and V2 are pdf files but they are not in searchable format.

DO-165, Initial Report on Civil Aviation Frequency Spectrum Requirements-1980- 2000

Issued 5-27-76 | Prepared by SC-129

Provides a comprehensive report on civil aviation's frequency requirements. Appendices recommend revisions to the ITU Table of Allocations and the footnotes thereto. Provides justification for stated operational requirements; provides an aviation forecast.

DO-164A, Minimum Performance Standards-Airborne Omega Receiving Equipment

Issued 9-21-79 | Superseded DO-164 | Prepared by SC-138

Recommends standards and test procedures for airborne Omega Navigation Receivers, Systems Sensors, and Navigation Systems. Also included are operational characteristics. Appendices include conditions for testing, detailed test procedures, and a description of Omega Error Mechanisms.

FAA Technical Standard Order (TSO) – C94a references this document.

DO-163, Minimum Performance Standards-Airborne HF Radio Communications Transmitting and Receiving Equipment Operating within the Radio-Frequency Range of 1.5 to 30 Megahertz

Issued 3-19-76 | Errata | *Supersedes DO-48A and DO-49A* | Prepared by SC-131

Recommends standards and test procedures for HF/SSB receivers and transmitters designed to operate in a 3-kHz channel environment. Also, includes standards for the provision of AM equivalent mode of operation. Appendices include conditions for testing and detailed test procedures.

FAA Technical Standard Order (TSO) – C31d and C32d reference this document.

NOTE: The electronic DO-163 is a pdf file but it is not in searchable format.

DO-162, Report on Air-Ground Communications-Operational Considerations for 1980 and Beyond

Issued 10-17-75 | Prepared by SC-120

Provides an analysis of air-ground communications requirements anticipated for the post-1980-time frame. Includes definitions of US aviation system and future trends, requirements, systems concepts, and recommendations. This is a companion report to RTCA Paper No. 128-72/EC-671 issued 8-18-72, entitled Proposed US National Aviation Standard for the VHF A/G Communications System.

DO-161A, Minimum Performance Standards-Airborne Ground Proximity Warning Equipment

Issued 5-27-76 Prepared by SC-128 *Supersedes DO-161*

Recommends standards and test procedures for Ground Proximity Warning Equipment. This is a revision of DO-161 and includes changes (1 & 2) to that document and other improvements suggested by operating experience. Appendices include envelopes of conditions for warning, conditions for testing, and detailed test procedures.

FAA Technical Standard Order (TSO) – C92c references this document.

NOTE: The electronic DO-161A is a pdf file but it is not in searchable format.

DO-160G Change 1, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-16-14 ♦ Prepared by SC-135

Change 1 to DO-160G Environmental Conditions and Test Procedures for Airborne Equipment, addresses different improvements aimed at removing the current User Guide material from DO-160G for Sections, 9, 18, 20, 21, 22 and 26. The new DO-357 User Guide: Supplement to DO-160G provides an update of the User Guide material for these same Sections and provides new User Guide material for Sections 4, 5, 7, 8, 10, 11, 15, 16, 17, 18 and 23.

DO-160G, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-08-10 Prepared by SC-135 *Supersedes DO-160F*

DO-160G provides standard procedures and environmental test criteria for testing airborne equipment for the entire spectrum of aircraft from light, general aviation aircraft and helicopters through the "jumbo jets" and SST categories of aircraft. The document includes 26 sections and three appendices. Examples of tests covered include vibration, power input, radio frequency susceptibility, lightning and electrostatic discharge. Coordinated with EUROCAE, RTCA/DO-160G and EUROCAE/ED-14G are identically worded.

DO-160G is recognized by the International Organization for Standardization (ISO) as de facto international standard ISO-7137.

Note:

The current User Guide material from DO-160G for Sections, 9, 18, 20, 21, 22 and 26 have been removed. The new DO-357 User Guide: Supplement to DO-160G provides an update of the User Guide material for these same Sections and provide new User Guide material for Sections 4, 5, 7, 8, 10, 11, 15, 16, 17, 18 and 23.

DO-160F, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-06-07 | Prepared by SC-135 *Supersedes DO-160E*

| Errata 1 – 10-01-2009 | Errata 2 – 06-02-2010

Standard procedures and environmental test criteria for testing airborne equipment for the entire spectrum of aircraft from light general aviation aircraft and helicopters through the "Jumbo Jets" and SST categories of aircraft. The document includes 26 Sections and three Appendices. Examples of tests covered include vibration, power input, radio frequency susceptibility, lightning and electrostatic discharge. Coordinated with EUROCAE, RTCA/DO-160F and EUROCAE/ED-14F are identically worded.

Revision F updates DO-160E issued in December 2004. Twenty-one of the twenty-six Sections have been revised. Major changes were made to Sections 8 – Vibration, 10 – Waterproofness, 16 – Power Input, 18 – Audio Frequency Conducted Susceptibility, 20 – RF Susceptibility and 21 – RF Emissions.

DO-160F is recognized by the International Organization for Standardization (ISO) as de facto international standard ISO-7137.

Two Errata are provided for this document.

DO-160E, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-09-04 | Errata Issued 6-20-06 | Prepared by SC-135 *Supersedes DO-160D, Changes 1, 2 & 3*

Standard procedures and environmental test criteria for testing airborne equipment for the entire spectrum of aircraft from light general aviation aircraft and helicopters through the “Jumbo Jets” and SST categories of aircraft. The document includes 26 Sections and three Appendices. Examples of tests covered include vibration, power input, radio frequency susceptibility, lightning, and electrostatic discharge. Coordinated with EUROCAE, RTCA/DO-160E and EUROCAE/ED-14E are identically worded. This revision updates 22 Sections and adds one new Section – Fire, Flammability.

DO-160E is recognized by the International Organization for Standardization (ISO) as de facto international standard ISO-7137.

An Errata is provided for this document.

DO-160D, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 7-29-97 Prepared by SC-135 *Supersedes DO-160C, Changes 1, 2 & 3*

Standard procedures and environmental test criteria for testing airborne equipment for the entire spectrum of aircraft from light general aviation aircraft and helicopters through the "Jumbo Jets" and SST categories of aircraft. The document includes 25 Sections and three Appendices. Examples of tests covered include vibration, power input, radio frequency susceptibility, lightning, and electrostatic discharge. Coordinated with EUROCAE, RTCA/DO-160D and EUROCAE/ED-14D are identically worded.

DO-160D is recognized by the International Organization for Standardization (ISO) as de facto international standard ISO-7137.

Change 1 to DO-160D

Issued 12-14-00

This change provides revised text for Section 8.0 – Vibration, Section 20.0 – Radio Frequency Susceptibility (Radiated and Conducted) and Appendix C – Change Coordinators.

Change 2 to DO-160D

Issued 6-12-01

This change provides revised text for Section 16.0 – Power Input, Section 18.0 – Audio Frequency Conducted Susceptibility – Power Inputs and Appendix A – Environment Test Identification.

Section 16 – *Power Input*

This section proposes test modifications to address the issues of harmonic distortion and variable frequency AC buses. The revised power test requirements include:

- Requirements for variable frequency systems similar to constant frequency systems.
- Added designation H for equipment that is tested for current harmonic emission.
- Deletion of Category E equipment.
- Introduction of requirements for normal frequency transients.
- Revision of existing tables and addition of new tables for current harmonic emissions.

Section 18 – *Audio Frequency Conducted Susceptibility – Power Inputs*

This section provides revisions to ensure harmony with the changes to Section 16 and consistency with the sweep speed testing procedures in Section 20.

Appendix A – *Environment Test Identification*

This Appendix provides revisions to ensure harmony with the changes to Sections 16 and 18

Change 3 to DO-160D

Issued 12-05-02

Change 3 revises Section 22 - *Lightning Induced Transient Susceptibility* and Appendix C – *Change Coordinators*. Section 22 provides two groups of tests for equipment qualification. The first is a damage tolerance test performed using pin injection and the second group evaluates the functional upset tolerance of equipment when transients are applied to interconnecting cable bundles. Change 3 revisions are provided in three areas: multiple stroke and multiple burst testing applications, clarification of the dielectric withstands voltage tests and clarification of the power line tests. The test requirement table has been revised and new figures are provided for the multiple stroke application, multiple burst application and pin injection calibration setup. Appendix C updates the contact information for the Change Coordinators.

DO-160C, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-04-89 | Prepared by SC-135 *Supersedes DO-160B*

The document provides standard procedures and environment test criteria for testing airborne equipment. Numerous tests are covered including vibration, power input, and radio frequency suspectibility. This document was superseded by DO-160D, issued July 29, 1997.

The electronic version of DO-160C includes Changes 1, 2, and 3. The price for the hardcopy version of DO-160C also includes Changes 1, 2, and 3.

NOTE: The electronic DO-160C is a pdf file but it is not in a searchable format.

DO-160B, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 7-20-84 | Prepared by SC-135 *Supersedes DO-160A*

The document provides standard procedures and environment test criteria for testing airborne equipment. Numerous tests are covered including vibration, power input, and radio frequency suspectibility. This document was superseded by DO-160C, issued December 4, 1989.

The electronic version of DO-160B includes Change 1. The price for the hardcopy version of DO-160B also includes Change 1.

NOTE: The electronic DO-160B is a pdf file but it is not in a searchable format.

DO-160A, Environmental Conditions and Test Procedures for Airborne Equipment

Issued 01-25-80 | Prepared by SC-135 *Supersedes DO-160*

The document provides standard procedures and environmental test criteria for testing airborne equipment. Numerous tests are covered including vibration, power input, and radio frequency susceptibility. This document was superseded by DO-160B, issued July 20, 1984.

The electronic version of DO-160A includes Change 1. The price for the hardcopy version of DO-160A also includes Change 1.

NOTE: The electronic DO-160A is a pdf file but it is not in searchable format.

DO-158, Minimum Performance Standards-Airborne Doppler Radar Navigation Equipment

Issued 10-17-75 | Prepared by ICG-13 *Supersedes DO-98 & DO-104*

Recommends standards and test procedures for Airborne Doppler Radar Navigation Equipment. Appendices include conditions of testing and detailed test procedures. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C65a references this document.

NOTE: The electronic DO-158 is a pdf file but it is not in searchable format.

DO-155, Minimum Performance Standards-Airborne Low-Range Radar Altimeters

Issued 1-11-74 | Prepared by SC-115 (ICG-2) *Supersedes DO-123*

Recommends standards and test procedures for those characteristics of an Airborne Low-Range Radar Altimeter that are essential for its operation in applications to provide measured height above terrain for obstruction clearance and landing. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C87 references this document.

NOTE: The electronic DO-155 is a pdf file but it is not in searchable format.

DO-154, Recommended Basic Characteristics for Airborne Radio Homing and Alerting Equipment for Use with Emergency Locator Transmitters (ELTs)

Issued 3-9-73 | Prepared by SC-124

Recommends basic system characteristics and provides test and guidance material for Airborne Radio Homing and Alerting Equipment.

DO-152, Minimum Operational Characteristics-Vertical Guidance Equipment Used in Airborne Volumetric Navigational Systems

Issued 3-17-72 | Appendix D 4-23-74 | Prepared by SC-116E

Part I defines the concepts, philosophy, and development of MOCs for airborne systems, and Part II covers the MOCs for vertical guidance equipment used in airborne volumetric navigation systems, including system characteristics; provides information for demonstration of compliance and guidance accuracy analysis.

Appendix D provides a VOR/ DME/Altimeter vertical guidance analysis.

DO-148, A New Guidance System for Approach and Landing

Issued 12-18-70 | Prepared by SC-117

Defines a system concept and technical description (signal format) for a new precision instrument approach and landing guidance system (LGS) intended to satisfy the varied operational needs of different classes of aviation users, civil and military, in the United States and abroad. Volume I is an 80-page summary of findings and recommendations. Volume II is a 400-page compilation of the milestone Special Committee Reports, including the Tentative Operational Requirements, the Report of the Techniques Assessment Team, and the Report of the Signal Format Development Team.

DO-144A, Minimum Operational Characteristics-Airborne ATC Transponder Systems

Issued 10-02-08 – Prepared by SC-209

This document presents a consolidation of performance requirements from two sources: RTCA /DO-144 dated March 12, 1970 and Change 1 to DO-144, posted as RTCA Paper No. 232-70/EC-643, dated November 5, 1970; and the performance standards referred to in paragraph (a)(1) of Federal Aviation Administration (FAA) Technical Standard Order (TSO)-C47c, dated February 20, 1973. The document includes the technical changes/advances necessary to ensure proper operation with Mode S and TCAS interrogators. The document is a coordinated effort with EUROCAE WG-49.

DO-143, Minimum Performance Standards-Airborne Radio Marker Receiving Equipment Operating on 75 MHz

Issued 3-12-70 – Prepared by SC-115 (ICG-7) *Supersedes DO-57A*

Recommends standards and test procedures for Airborne Radio Marker Receiving Equipment. Coordinated with EUROCAE.

FAA Technical Standard Order (TSO) – C35d references this document.
NOTE: The electronic DO-143 is a pdf file but it is not in a searchable format.

DO-136, Universal Air-Ground Digital Communication System Standards

Issued 3-7-68 – Prepared by SC-110 & SC-111 *Amended and supersedes portions of DO-122*

Recommends universal digital standards for linking aircraft into the ground communications and data processing environment of the air traffic control system, airlines, and military management information systems.

DO-127, Standard Procedure for the Measurement of the Radio-Frequency Radiation from Aviation Radio Receivers Operating within the Radio-Frequency Range of 30-890 Megacycles

Issued 4-15-65 | Prepared by SC-96

Recommends standards and test procedures for use by manufacturers of aviation receivers in making necessary radiation measurements using the Far-Field method. In addition, the report discusses two alternative methods of performing such measurements using the Near-Field method.

DO-117, Standard Adjustment Criteria for Airborne Localizer and Glide Slope Receivers

Issued 3-14-63 | Errata | Prepared by SC-98

Recommends procedures for adjustment of Airborne Glide Slope and Localizer Receivers.

DO-93A, Minimum Performance Standards (MOPS) for Airborne Selective Calling Equipment

Issued 3-17-16 | Prepared by SC-232

This document contains Minimum Operational Performance Standards for Selective Calling (SELCAL) systems installed in all types of aircraft. The document provides information needed to understand the rationale for equipment characteristics and performance for the expansion of the 16-tone system with 16 new tones for a total of 32-tones.

The FAA intends to use the document to update Technical Standard Order – TSO-C59.

The SELCAL system is a signaling method used to alert individual aircraft that a ground station wishes to communicate with the aircraft. The system uses common HF and VHF radio communication paths. The document was developed in parallel with ARINC Characteristic 714A – Mark IV Airborne SELCAL and ICAO Annex 10 – International Standards and Recommended Practices – Aeronautical Telecommunications.

DO-93, Minimum Performance Standards – Airborne Selective Calling Equipment

Issued 02-10-59 ▯ Prepared by SC-83 ♦ Errata issued 09-13-62 included

This document sets forth the Minimum Performance Standards for Airborne Selective Calling Equipment for use with the ground-to-air selective calling system known as SELCAL. The SELCAL system is to permit selective calling of individual aircraft over normal radiotelephone channels linking the ground station with the aircraft.

DO-88, Altimetry

Issued 11-1-58 ▯ Issued Appendix I 5-15-59 ▯ Prepared by SC-70

Reports on studies of the problems associated with the measurement of aircraft altitude. States requirement that would permit all aircraft to maintain assigned heights within specific limits as related to terrain clearance and the safe vertical separation of aircraft in flight. Appendix I reports on Meteorological Aspects of Pressure Altimetry.

NOTE: The electronic DO-88 is a pdf file but it is not in a searchable format.

DO-62, Calibration Procedures-Test Standard Omni-Bearing Selectors and Omni-Bearing Selector Test Sets

Issued 12-2-54 ▯ Prepared by SC-61

Recommends procedures to aid operators of aircraft radio service stations in the Calibration of Test Standard Omni-Bearing Selectors and Omni-Bearing Selector Test Sets used in testing and adjusting VOR receivers and their associated Omni-Bearing Selectors.

DO-56, VOR Test Signals

Issued 4-15-54 | Prepared by SC-60

Describes methods for determining, in an aircraft, the accuracy of VOR bearing indications. The causes of VOR bearing error due to VOR receiver malfunctioning are analyzed.

DO-52, Calibration Procedures for Signal Generators used in the Testing of VOR and ILS Receivers

Issued 12-8-53 | Prepared by SC-61

Recommends procedures for testing and calibrating signal generators used in the servicing of airborne VOR and ILS receivers. The accuracy of the components of simulated VOR and ILS signals is stated for signal generators calibrated as described.

Task Force 5 – NextGen Mid-Term Implementation Task Force Report

Issued 9-09-09 Prepared by the RTCA NextGen Task Force

This report documents the community-wide consensus on the recommended NextGen operational capabilities to be implemented during the transition between now and 2018. Over 300 stakeholders participated in the development of this report. Each operational capability recommended defines the associated "What", "Where", "Who", and "When". The Report further recommends strategies for accelerating benefits, and strategi es for encouraging equipage. Several overarching recommendations aimed at facilitating the transition to NextGen are also documented in this report, including streamlining the operations approval process, and establishing effective institutional mechanisms for post-Task Force government - industry collaboration. As a companion to this document, all the supporting analytic data and detailed descriptions of each operational capability are available on a CD for purchase on this website.

Task Force 5 – NextGen Mid-Term Implementation Task Force Report– Data Files

Issued 9-09-09 Prepared by the RTCA NextGen Task Force

Important Notes:You must have Excel 2007 to access the dashboard and Supporting Information The data files are only available as an electronic download.

Instructions:

1. Download the .zip file by choosing “Save Target As” to the appropriate location on your computer (e.g., desktop).
2. “Right Click” on the .zip file and select “Extract All”
3. Select the file location where you want to save the unzipped files (Default is a folder under the location where the .zip file was downloaded.)
4. Enter the password (case sensitive)
5. These instructions are repeated in the INSTRUCTIONS FOR USING THIS ZIP FILE in the unzipped folder.

6. In the unzipped folder, open the Dashboard Excel file. The “instructions” tab in the Excel file (5th tab, just to left of “Top” tab) contains detailed instructions on the use of the Dashboard.

Task Force 4 – Final Report of the RTCA Task Force 4 Certification

Issued 2-26-99 – Prepared by the RTCA Certification Task Force

Any improvements in safety, capacity, or efficiency will require some form of change. Prior to operationally implementing the improvement, equipment, procedures, and people will need to be “certified.” Experience, both prior to and during the Task Force, indicate that significant benefits will accrue to the entire aviation community if the process is “systems oriented” and if refinements are made to reduce the time and cost of the process thereby expediting the availability of the operational enhancements. The Final Report of the RTCA Task Force 4 Certification underscores the critical role of certification in achieving FAA's safety and modernization goals and provides 15 consensus-based recommendations for improving the certification process.

Task Force 3 – Final Report of RTCA Task Force 3 Free Flight Implementation

Issued 10-26-95 – Prepared by Task Force 3

The Free Flight Implementation Task Force Report underscores the need for changes in the air traffic system and emphasizes that changes should be both benefits driven and implemented in steps, such that incremental changes lead immediately to incremental benefits.

This report provides the definition of free flight, addresses “dynamic density” plus other operational initiatives, and recommends a transition strategy based on the time-phased implementation of new procedures and technology. The strategy provides benefits to the entire air transportation community. The strategy also simultaneously moves the community from an analog communication, ground-based navigation air traffic control system to a digital communication, ground- and space-based navigation air traffic management system that makes increasingly heavier use of decision support systems to help air traffic service providers meet their important responsibilities.

Task Force 3 – Interim Report on Free Flight Implementation

Issued 8-28-95 | Prepared by Task Force 3

The RTCA Task Force 3 Free Flight Implementation Interim Report summarizes the 44 recommendations that had grown out of the group's deliberations as of August 1995, the recommendations are initially grouped by time frame: near-term, present - 1997; mid-term, 1998-2000; and long-term, beyond 2000. Of the 44 Interim Report recommendations, 35 are included in the near-term, six in the mid-term and three in the long-term.

Within each time frame, recommendations are aggregated by category: Procedural; Technology Application; New Concepts; and Studies and Investigations. All time frames do not include all categories of recommendations.

Task Force 2 – Report on the Transition to Digital Communications

Issued 12-20-93 | Prepared by Task Force 2

The Transition to Digital Communications Task Force Report concludes that the aviation community urgently needs the economic benefits that can flow from the use of digital communications. Technology is available. Broad-based implementation of digital communications will hinge on international cooperation, a close and effective government partnership devoted to fielding new equipment plus prior assurances from government that aircraft operators will obtain a prompt and significant return on their investment in new technology.

Task Force 1 – Report on Global Navigation Satellite System (GNSS) Transition and Implementation Strategy

Issued 9-18-92 | Prepared by Task Force 1

The RTCA Task Force Report on Global Navigation Satellite System (GNSS) Transition and Implementation Strategy concludes that: the entire user community is enthusiastic about the operational benefits to be derived from the use of GNSS, basic satellite navigation technology needed to achieve an early GNSS operational capability is available, there are no institutional issues that should preclude early implementation, the transition to operational use should begin almost immediately, should be user driven and should occur in an evolutionary manner, and additional action should begin now to expand on initial operational capabilities

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National Airspace System Concept of Operations and Vision for the Future of Aviation

Issued 11-15-02 Approved by the Free Flight Steering Committee

The new document updates the December 2000 *National Airspace System Concept of Operations*, identifies broad-gauged requirements of NAS users and service providers and is intended to serve as the basis for an incremental, benefits-driven approach for modernization of the Air Traffic Management System.

This update adds a new Preface and Introductory section outlining a vision for the future of aviation. The immediate and primary focus is on making greater use of available information technology to help pilots and controllers meet their responsibilities. Operations are expected to become increasingly aircraft centric and human interactions with the system will evolve over time to a role of strategic planning supported by automation in managing real time operations.

Recommendations Regarding the Concept of Equipage and Mandated versus Voluntary Considerations

Issued 8-27-02 Approved by the Free Flight Steering Committee

This two-part document responds to the need for the aircraft equipage recommendations for realizing the benefit of capacity enhancement initiatives outlined in the Operational Evolution Plan. The objective of the Concept of Equipage work was to provide a recommended process and milestones to configure the fleet to achieve OEP capabilities. Four categories of capability were found to have avionics equipage implications: Domestic Reduced Vertical Separation Minima, Area Navigation, Controller Pilot Data Link Communication, and Future Air Navigation System 1A. In equipage related follow on work, additional detail will be obtained upon which avionic costing and installation time lines can be based. The second section of the document provides definitions of “mandated” and “voluntary” and offers recommended guidelines and criteria for FAA consideration when making mandated/voluntary equipage decisions.

National Airspace System Concept of Operations

Issued 12-13-00 Approved by the Free Flight Steering Committee

This publication is an update that supersedes the previously published *Government/Industry Operational Concept for the Evolution of Free Flight, Edition 2*. This document is intended as a guide for the FAA and user community to coordinate development and implementation activities for air traffic services and operational capabilities within the NAS. The evolution of capabilities for three timeframes is described:

Near Term, through 2005
Mid Term, 2005 – 2010

Far Term, 2010 – 2015

Concepts are discussed from environmental, airspace user, and service provider perspectives for all phases of flight. The concept will serve as a living document and will be the subject of regular review and updates to reflect changes in FAA and user strategy.

National Airspace System Concept of Operations, Addendum 4: Free Flight Phase 2

Issued 12-13-00 Approved by the Free Flight Steering Committee

Addendum 4 provides detail for the Free Flight Phase 2 recommendations made to the Free Flight Steering Committee in December 1999. Implementation strategies are recommended for TMA, URET, pFAST, and CPDLC and the recommendation for CDM is refined. Priority research and development initiatives are identified as well as the need for a high-altitude airspace structure to accommodate more Free Flight activity. Operational scenarios are included. Appendix B of this publication documents the issues and problem-based analyses used to develop the FFP2 recommendations, and summarizes the capabilities recommended for the 2003-2005 period.

Government/Industry Operational Concept for the Evolution of Free Flight, Edition 2

Issued 8-16-00 Approved by the Free Flight Steering Committee

Edition 2 of the Government/Industry Operational Concept combines two previous documents:

- Free Flight Steering Committee, *Government/Industry Operational Concept for the Evolution of Free Flight*

- Federal Aviation Administration*, Concept of Operations for the National Airspace System in 2005*

This combined document provides the aviation community with a single, agreed to Operational Concept from the perspectives of National Airspace System (NAS) users and service providers. The concepts provided herein cover the transition of the current NAS from the near term through the far-term time when mature Free Flight occurs. It is intended to incorporate the needs and requirements of NAS users and service providers and to serve as the basis for an incremental and a benefits-driven approach towards Free Flight. It is also intended to form the basis for both the Federal Aviation Administration (FAA) and the user community to plan procedural, investment and architectural decisions that will provide the operational capabilities needed to achieve Free Flight.

NOTE: The electronic Government / Industry Operational Concept for the Evolution of Free Flight, Edition 2, is a pdf file but it is not in searchable format.

Government/Industry Operational Concept for the Evolution of Free Flight, Addendum 3.1: Roadmap for Surveillance Modernization

Issued 8-16-00 – Approved by the Free Flight Steering Committee

This addendum presents a consensus for the evolutionary modernization of surveillance capabilities in the National Airspace System (NAS) and is based on the operational objectives identified in the RTCA document, Addendum 3: Surveillance. Both documents are driven by the need to improve aviation safety, capacity and efficiency. This roadmap provides a set of target architecture characteristics that include delivery of a common surveillance “picture” to ATC service providers, flight crews, and airport/airline operational personnel; the utilization of “enriched” surveillance data for decision support tools, and reliance on ADS-B as the “cornerstone” of the future surveillance architecture. This document also identifies key business case considerations and activities that will appropriately justify both FAA and industry investment commitments.

Government/Industry Operational Concept for the Evolution of Free Flight, Addendum 3: Surveillance

Issued 8-16-00 – Approved by the Free Flight Steering Committee

The Surveillance Addendum documents one of the essential elements of Free Flight and describes future capabilities that cover a period of approximately the next two decades. The document focuses on the operational use of surveillance, not the technical or architectural aspects of providing the information to those

needing it. The approach described transitions from the current radar/interrogator baseline of surveillance information to a digital information environment that encompasses air and ground operations.

This approach envisions providing shared real-time surveillance information to service providers (using automation to manage aircraft separation in all operation) and to pilots (utilizing new technology to aid in those aircraft management and separation services).

Government/Industry Operational Concept for the Evolution of Free Flight

Addendum 2: Candidate Recommendations on Near Term Procedural Enhancements, 1998 – 2002

Issued 8-19-98 Approved by the Free Flight Steering Committee

This document offers 25 procedural changes that can be made in the near term, 1998-2002. These proposals will provide benefits to NAS users and service providers with minimal dependence on new systems. The focus is on changes to today's operations, making better use of what is currently available. Addendum 2 also outlines a process for keeping stakeholders involved.

Government/Industry Operational Concept for the Evolution of Free Flight,

Addendum 1: Free Flight Phase 1 Limited Deployment of Select Capabilities (URET, TMA (SC), pFAST, CPDLC, CDM, SMA)

Issued 8-19-98 Approved by the Free Flight Steering Committee

This document details the concept of operations for FFP1 Core Capability Limited Deployment (CCLD). The focus is on near-term implementations, 1998 - 2002, with an emphasis on scenarios that illustrate the functions and enhancements of FFP1 capabilities. This document is the basis for both the FAA and the user community plans for procedural, investment, and architectural decisions that will make FFP1 a reality.

Free Flight Action Plan Update 2

Issued 12-10-98

Provides updated status on Free Flight Recommendations listed in the original RTCA Free Flight Action Plan.

Free Flight Action Plan Update 1

Issued 4-2-98

Provides updated status on Free Flight Recommendations listed in the original RTCA Free Flight Action Plan.

Free Flight Action Plan

Issued 8-15-96

The Free Flight Action Plan outlines current and planned activities leading to the implementation of Task Force 3 recommendations, provides the points of contact and phone numbers for each initiative, and establishes intermediate milestones approved by the Free Flight Steering Committee on August 15, 1996.

Report of the RTCA Board of Directors' Select Committee on Free Flight

Issued 1-18-95 Prepared by the RTCA Board of Directors' Select Committee on Free Flight

This report summarizes requirements, flight operations, and expected user benefits attendant with Free Flight and will be used as the basis for follow-on work leading to concept implementation.

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FS-1, Feasibility Study Weather Radar for Ice Crystal Detection

Issued 09-21-17 – Prepared by SC-230

In parallel with the US HIWC and European HAIC projects, the European Organization for Civil Aviation Equipment (EUROCAE) Working Group WG95 (Long Range Awareness subgroup), in association with the RTCA Special Committee SC-230, was tasked with demonstrating the maturity and the feasibility of using an X-band radar system for long-range detection of ice crystal conditions.

This feasibility study document details the context of the study and a description of the intended function (situational display of regions ahead of the aircraft that present potential hazards to the aircraft due to ice crystals). Its goals are:

- To determine if a radar ice crystal awareness function is possible using an airborne X-band weather radar system
- To assess the feasibility of such a function
- To provide guidance on the design and validation of long-range ice crystal awareness functions for X- band radar technology.

This document also provides recommendations going forward.

Future Flight Data Collection Committee Final Report

Issued 12-04-01 – Prepared by the Future Flight Data Collection Committee

This report was prepared at the request of the FAA Administrator and the Chairman of the National Transportation Safety Board. The committee's objective was to define operational concepts for acquiring, storing, and managing data concerning the state of the aircraft, operation of the aircraft, and air/ground and air/air communications. The document is intended to help identify recorded data requirements to industry in advance, so the technology can be incorporated early in new designs, minimizing event-driven rulemaking. The final report contains seven recommendations that summarize the important issues and changes that

need to be considered in the area of flight data collection over the next 15 years. Appendices detailing the work of the three working groups are included:

- WG-1, Data Needs
- WG-2, Technology
- WG-2, Data Use and Protection

Additionally, the report includes an appendix on deployable cockpit voice and flight data recorders.

Certification Steering Committee Final Report

Issued 08-31-01 Prepared by Certification Steering Committee

The Final Report of the Certification Steering Committee addresses the status of the 15 recommendations of the Certification Task Force, formed in 1998 at the request of the FAA Administrator. Over 200 members of the international aviation community participated in the Task Force to produce broad gauged recommendations for issues that were seen to introduce inefficiencies into the certification process.

The 15 Task Force recommendations address the following topical areas:

Organizational Focal Point in FAA

Systems Engineering Capability

Multi-tiered Airworthiness
Requirements Human Performance
Considerations Agreement or
Regulator/Applicant Roles Standardize
Designee Programs

Early Deployment of Advanced Systems

Instrument Approach Procedures to Exploit Current
Capabilities Commonly Agreed Concept of Ops

Eliminate Duplicate Committees
Correct Misapplication of Rules
Certification Process Improvements
New Rule Harmonization

Publicize how Rules have been
applied A “No Fear” Feedback Process

RTCA formed the Certification Steering and Select Committees in response to the FAA’s request for a follow-on effort. The Steering Committee and its supporting Select Committee reviewed the 15 Task Force recommendations and documented FAA initiatives already underway for implementing certain Task Force recommendations and provided proposals for implementing those recommendations not yet addressed. Each Task Force recommendation is cited, and the action taken to respond to the recommendation is discussed.

PBN1, Blueprint for Success to Implementing Performance Based Navigation

Issued 10-08-14 Prepared by NextGen Advisory Committee

Captures the lessons learned from PBN implementations. The report includes a "checklist" aimed at ensuring that PBN initiatives will benefit from lessons learned resulting in an increasingly streamlined path to achieving those benefits.

Portable Hand-Held GPS Receivers-What You Should Know

Issued 9-21-93 Prepared by SC-179

Presented in an encapsulated form, information on usage, antenna mounting, and other considerations including signal interference, power, and answers to commonly asked questions. The information is applicable to the models of portable hand-held GPS receivers that do not meet TSO C129 standards.

The Authority of Agreement—A History of RTCA

William G. Osmun, a professional writer of note and longtime observer of RTCA activity, researched and wrote this volume under contract with RTCA. In this history, Osmun traces the effort of engineers, pilots, technicians, and other aeronautical experts to forge agreement out of conflicting desires and in the face of changing technology, government reorganization, and the tremendous growth of worldwide air service. For reference, appendices include a brief chronology of RTCA and tabulate the work of RTCA Special

Committees and their chairmen, membership of the Executive Committee, Technical Advisors, and International Associates.

NOTE: The electronic Authority of Agreement is a pdf file, but it is not in searchable format.

WP-4, Command and Control (C2) Data Link White Paper Phase 2

Issued 09-21-17 | Prepared by SC-228

This White Paper contains the description and plan for development, verification and validation of Phase 2 activity will define both normative performance standards and informative guidance material for UAS Command and Control (C2) Link Systems and their associated top-level constituent subsystems. These activities are focused on extensions to point-to-point architectures addressed in Phase 1 to address Beyond- Radio-Line-of-Sight (BRLOS) applications and architectures. The primary focus as envisaged in the original TOR is on SATCOM architectures. This will include multiple bands of application, to include selected Ku and Ka sub-bands, and possibly C Band allocations. Additionally, standards for network architectures and performance (SATCOM and terrestrial based) may be developed. Finally, updates/refinements to C2 MOPS (Terrestrial) are anticipated to implement changes consistent with requirements from other standards developed during this phase.

Additionally, there is a need to address emerging requirements driven by changes in the UAS market needs and how they impact required C2 performance and implementation limitations. Specifically, work done in Phase 1 (and foundational work by RTCA Special Committee 203) focused on larger aircraft, with operational sizing, anticipated size, weight, and power (SWAP). There is a need to support smaller UAS, operating BRLOS, which have significant SWAP limitations and are anticipated to be deployed in larger numbers than considered previously.

WP-3, Detect and Avoid (DAA) White Paper Phase 2

Issued 09-21-17 | Prepared by SC-228

This White Paper contains the description and plan for development, verification and validation of Phase 2 Minimum Operational Performance Standards (MOPS) for Unmanned Aircraft System (UAS) Detect and Avoid (DAA) systems. The standards will specify performance standards that should be useful to designers, manufacturers, installers and users of the equipment. Emphasis for Phase 2 will be development of standards for UAS equipped to conduct extended Beyond-Visual-Line-of-Sight (BVLOS) operations in the National Airspace System (NAS).

WP-2, Command and Control (C2) Data Link White Paper

Issued 03-18-14 ♦ Prepared by SC-228

This White Paper contains the Approach and Considerations for development of Phase 1 Minimum Operational Performance Standards (MOPS) for Unmanned Aircraft System (UAS) Command and Control (C2) Data Link.

WP-1, Detect and Avoid (DAA) White Paper

Issued 03-18-14 ♦ Prepared by SC-228

This White Paper contains the Plan and Description for development of Phase I Minimum Operational Performance Standards (MOPS) for Unmanned Aircraft System (UAS) Detect and Avoid (DAA) system.

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AeroMACS

DO-379, Internet Protocol Suite

Issued 09-12-2019 Prepared by SC-223

DO-343B, Minimum Aviation System Performance Standard for AMS(R)S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP)

Issued 04-01-19 Prepared by SC-222

DO-346 Minimum Operational Performance Standards (MOPS) for the Aeronautical Mobile Airport Communication System (AeroMACS)

Issued 02-20-14 Prepared by SC-223

DO-345 Aeronautical Mobile Airport Communications System (AeroMACS) Profile

Issued 12-18-13 ♦ Prepared by SC-223

DO-262D - Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 04-01-19 Prepared by SC-222

Aeronautical Data

DO-370 Guidelines for In Situ Eddy Dissipation Rate (EDR) Algorithm Performance

Issued 12-19-17 ♦ Prepared by SC-206

DO-369 Guidance for the Usage of Data Linked Forecast and Current Wind Information in Air Traffic Management (ATM) Operations

Issued 07-13-17 ♦ Prepared by SC-206

DO-364 Minimum Aviation System Performance Standards (MASPS) for Aeronautical Information/Meteorological Data Link Services

Issued 12-15-16 ♦ Prepared by SC-206

DO-358A, Supplement

Issued 06-27-19 ♦ Prepared by SC-206

DO-358A, Minimum Operational Performance Standards (MOPS) for Flight Information Services - Broadcast (FIS-B) with Universal Access Transceiver (UAT)

Issued 06-27-19 ♦ Prepared by SC-206

DO-342, Guidelines for Verification and Validation of Aerodrome Mapping Databases (AMDB) Aerodrome Surface Routing Networks (ASRN) for Routing Applications

Issued 03-20-13 ♦ Prepared by SC-217

DO-296 Safety Requirements for Aeronautical Operational Control (AOC) Datalink Messages

Issued 10-19-04 ♦ Prepared by SC-201

Supplements to

DO-291C Minimum Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data

Issued 09-22-15 ♦ Prepared by SC-217

DO-291B Minimum Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data

Issued 09-28-11 ♦ Prepared by SC-217

DO-291A Interchange Standards for Terrain, Obstacle and Aerodrome Mapping Data

Issued 04-14-09 ♦ Prepared by SC-217

DO-276C User Requirements for Terrain & Obstacle Data

Issued 09-22-15 ♦ Prepared by SC-217

DO-276B User Requirements for Terrain & Obstacle Data

Issued 09-26-12 ♦ Prepared by SC-217

DO-276A User Requirements for Terrain & Obstacle Data

Issued 08-03-05 ♦ Prepared by SC-193

DO-272D User Requirements for Aerodrome Mapping Information

Issued 09-22-15 ♦ Prepared by SC-217

DO-272C User Requirements for Aerodrome Mapping Information

Issued 09-28-11 ♦ Prepared by SC-217

DO-272B User Requirements for Aerodrome Mapping Information

Issued 04-14-09 ♦ Prepared by SC-217

DO-201A Standards for Aeronautical Information

Issued 04-19-00 ♦ Prepared by SC-181

DO-201B User Requirements for Navigation Data

Issued 12-13-2018 ♦ Prepared by SC-217

DO-200B Standards for Processing Aeronautical Data

Issued 06-18-15 • Prepared by SC-217

DO-200A Standards for Processing Aeronautical Data

Issued 09-28-98 ♦ Prepared by SC-181

Aeronautical Telecommunication Network

DO-353 Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation, Initial Release (ATN Baseline 1 - Baseline 2 Interop Standard)

Issued 03-18-14 ♦ Prepared by SC-214

DO-352 Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation, Initial Release (FANS 1/A - Baseline 2 Interop Standard)

Issued 03-18-14 ♦ Prepared by SC-214

DO-351 Interoperability Requirements Standard for Baseline 2 ATS Data Communications, Initial Release (Baseline 2 Interop Standard) Volume I and II

Issued 03-18-14 ♦ Prepared by SC-214

DO-350 Safety and Performance Standard for Baseline 2 ATS Data Communications, Initial Release ((Baseline 2 SPR Standard) Volume I and II

Issued 03-18-14 ♦ Prepared by SC-214

DO-305A Future Air Navigation System 1/A - Aeronautical Telecommunications Network Interoperability Standard (FANS 1/A – ATN B1 Interop Standard)

Issued 03-21-12 ♦ Prepared by SC-214

DO-305 Future Air Navigation System 1/A (FANS 1/A) - Aeronautical Telecommunications Network (ATN) Interoperability Standard

Issued 06-26-07 ♦ Prepared by SC-189

DO-287 Plans and Principles for the Implementation of Aeronautical Data Link System (ADLS) Edition 1, Aeronautical Telecommunications Network (ATN)

Issued 06-25-03 ♦ Prepared by SC-194

DO-280B Change 1 Interoperability Requirements Standard for Aeronautical Telecommunication Network Baseline 1 (ATN B1 Interop Standards)

Issued 03-18-14 ♦ Prepared by SC-214

DO-280B Interoperability Requirements Standard for ATN Baseline 1

Issued 06-26-07 ♦ Prepared by SC-189

DO-250 Guiding Principles for Air Traffic Services Provided via Data Communications Utilizing, the ATN, Builds 1 and 1A

Issued 01-11-00 ♦ Prepared by SC-194

DO-240 Minimum Operational Performance Standards for Aeronautical Telecommunications Network (ATN)

Issued 07-29-97 ♦ Prepared by SC-162

Airborne Ground Proximity Warning Equipment

DO-161A Minimum Performance Standards-Airborne Ground Proximity Warning Equipment

Issues 05-27-76 ♦ Superseded DO-161 ♦ Prepared by SC-128

Airborne Selective Calling Equipment

DO-93A Minimum Operational Performance Standards (MOPS) Airborne Selective Calling Equipment

Issued 03-17-16 • Prepared by SC-232

Airport Applicable Documents

DO-234 Minimum Performance and Installation Standards for Runway Guard Lights (RGLs)

Issued 11-15-96 ♦ Prepared by SC-184

DO-221 Guidance and Recommended Requirements for Airport Surface Movement Sensors

Issued 4-29-94 ♦ Prepared by SC-178

Air Traffic Services

DO-306 Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (Oceanic SPR Standard)

Issued 10-11-07 ♦ Prepared by SC-189

DO-306

Change 1 Issued 03-17-11 Prepared by SC-214

DO-290 Safety and Performance Requirements Standard for Air Traffic Data Link Services in Continental Airspace (Continental SPR Standard)

Issued 04-29-04 ♦ Prepared by SC-189

DO-290

Change 1 Issued 12-13-06 ♦ Prepared by SC-189

DO-290

Change 2 Issued 06-26-07 ♦ Prepared by SC-189

DO-290

Change 3 Issued 09-12-2019 • Prepared by SC-214

DO-285 Next Generation Air/Ground Communication (NEXCOM) VDL Mode 3 Interoperability

Issued 04-10-03 ♦ Prepared by SC-198

DO-269 Concepts for Services Integrating Flight Operations and Air Traffic Management Using Addressed Data Link

Issued 06-12-01 ♦ Prepared by SC-194

DO-264 Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications

Issued 12-14-00 ♦ Prepared by SC-189

DO-258A Interoperability Requirements for ATS Applications Using ARINC 622 Data Communications

Issued 04-07-05 ♦ Prepared by SC-189 ♦ Supersedes DO-258

Altimeters/Altimetry

DO-155 Minimum Performance Standards- Airborne Low-Range Radar Altimeters

Issued 01-11-74 ♦ Prepared by SC-115 (ICG-2) ♦ Supersedes DO-123

DO-88 Altimetry

Issued 11-01-58 ♦ Prepared by SC-70 ♦ Appendix I Issued 05-15-59

Area Navigation Equipment (Airborne)

DO-190 Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Omega/VLF Inputs

Issued 05-16-86 ♦ Superseded DO-140 ♦ Prepared by SC-137

DO-187 Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Multi-Sensor Inputs

Issued 11-13-84 ♦ Prepared by SC-137

DO-180A Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using a Single Collated VOR/DME Sensor Input

Issued 05-24-90 ♦ Prepared by SC-137 ♦ Supersedes DO-180

DO-164A Minimum Performance Standards-Airborne Omega Receiving Equipment

Issued 09-21-79 ♦ Supersedes DO-164 ♦ Prepared by SC-138

Attitude & Heading Systems

DO-334 Minimum Operational Performance Standards (MOPS) for Strapdown Attitude and Heading Reference Systems (AHRS)

Issued 03-21-12 ♦ Prepared by SC-219

Audio Systems

DO-214A Audio Systems Characteristics and Minimum Operational Performance Standards for Aircraft Audio Systems and Equipment

Issued 12-18-13 ♦ Supersedes DO-214 ♦ Prepared by SC-226

DO-214 Audio Systems Characteristics and Minimum Operational Performance Standards for Aircraft Audio Systems and Equipment

Issued 03-02-93 ♦ Prepared by SC-164 ♦ Supersedes DO-170

DO-209 Minimum Operational Performance Standards for Devices that Prevent Blocked Channels Used in Two-Way Radio Communications Due to Simultaneous Transmissions

Issued 04-23-92 ♦ Prepared by SC-163 ♦ Errata Issued 07-01-92

DO-207 Minimum Operational Performance Standards for Devices that Prevent Blocked Channels Used in Two-Way Radio Communications Due to Unintentional Transmissions

Issued 01-25-91 ♦ Prepared by SC-163

Automatic Dependent Surveillance

DO-212 Minimum Operational Performance Standards for Airborne Automatic Dependent Surveillance (ADS) Equipment

Issued 10-26-92 ♦ Prepared by SC-170

DO-361 Minimum Operational Performance Standards (MOPS) for the Flight Flight Interval Management (FIM)

Issued 09-22-15 ♦ Prepared by SC-186

DO-358 Minimum Operational Performance Standards (MOPS) for Flight

Supplement Information Services-Broadcast (FIS-B) with Universal Access Transceiver (UAT)

Issued 03-24-15 ♦ Prepared by SC-206

DO-358 Minimum Operational Performance Standards (MOPS) for Flight Information Services Broadcast (FIS-B) with Universal Access Transceiver (UAT)

Issued 03-24-15 ♦ Prepared by SC-206

DO-354 Safety and Performance Requirements Document for CDTI Assisted Visual Separation (CAVS)

Issued 06-17-14 ♦ Prepared by SC-186

DO-348 Safety, Performance and Interoperability Requirements Document for Traffic Situation Awareness with Alerts (TSAA)

Issued 03-18-14 ♦ Prepared by SC-186

DO-338 Minimum Aviation System Performance Standards (MASPS) for ADS-B Traffic Surveillance Systems and Applications (ATSSA)

Issued 06-13-12 ♦ Prepared by SC-186

DO-328A Safety, Performance and Interoperability Requirements Document for Airborne Spacing – Flight Deck Interval Management (ASPA-FIM)

Issued 09-22-15 Prepared by SC-186

DO-328 Safety, Performance and Interoperability Requirements Document for Airborne Spacing – Flight Deck Interval Management (ASPA-FIM)

Issued 06-21-11 Prepared by SC-186

DO-323 Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA)

Issued 12-08-10 ♦ Prepared by SC-186

DO-323 Supplement Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness on the Airport Surface with Indications and Alerts (SURF IA)

Issued 12-08-10 ♦ Prepared by SC-186

DO-322 Safety, Performance and Interoperability Requirements Document for ATSA- SURF Application

Issued 12-08-10 ♦ Prepared by SC-186

DO-321 Safety, Performance and Interoperability Requirements Document for ADS-B Airport Surface Surveillance Application (ADS-B-APT)

Issued 12-08-10 ♦ Prepared by SC-186

DO-319 Safety, Performance and Interoperability Requirements Document for Enhanced Traffic Situational Awareness during Flight Operations (ATSA-AIRB)

Issued 03-17-10 ♦ Prepared by SC-186

DO-318 Safety, Performance and Interoperability Requirements Document for Enhanced Air traffic services in Radar-Controlled Areas Using ADS-B Surveillance (ADS-B-RAD)

Issued 09-09-09 ♦ Prepared by SC-186

DO-317B, Change 1 to Appendix U

Issued 03-21-19 • Prepared by SC-186

DO-317B Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Supplement Applications (ASA) System

Issued 06-17-14 Prepared by SC-186

DO-317B Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System

Issued 06-17-14 ♦ Prepared by SC-186

DO-317A Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Supplement Applications (ASA) System

Issued 12-11-11 • Prepared by SC-186

DO-317A Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications (ASA) System

Issued 12-13-11 ♦ Prepared by SC-186

DO-317 Minimum Operational Performance Standards (MOPS) for Aircraft Surveillance Applications System (ASAS)

Issued 04-14-09 ♦ Prepared by SC-186

DO-314 Safety, Performance and Interoperability Requirements Document for Enhanced Visual Separation on Approach (ATSA-VSA)

Issued 12-16-08 ♦ Prepared by SC-186

DO-312

Supplement Safety, Performance and Interoperability Requirements Document for the In-Trail Procedure in Oceanic Airspace (ATSA-ITP) Application

Issued 03-21-12 ♦ Prepared by SC-186

DO-312 Safety, Performance and Interoperability Requirements Document for the In-Trail Procedure in Oceanic Airspace (ATSA-ITP) Application

Issued 06-19-08 ♦ Prepared by SC-186

DO-303 Safety, Performance and Interoperability Requirements Document for the ADS-B Non-Radar-Airspace (NRA) Application

Issued 12-13-06 ♦ Prepared by SC-186

DO-302 Minimum Operational Performance Standards (MOPS) for Surveillance Transmit Processing (STP)

Issued 12-13-06 ♦ Prepared by SC-186

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

Issued 12-09-03 ♦ Prepared by SC-186

DO-289

Change 1 Issued 12-13-06 ♦ Prepared by SC-186

DO-286B Minimum Aviation System Performance Standards (MASPS) for Traffic Information Service – Broadcast (TIS-B)

Issued 10-11-07 ♦ Prepared by SC-186 ♦ Supersedes DO-286A

DO-282B, Corr. 1 Minimum Operational Performance Standards for Universal Access Transceiver (UAT) Automatic Dependent Surveillance – Broadcast (ADS-B)

Issued 12-13-11 ♦ Prepared by SC-186

DO-282B Minimum Operational Performance Standards for Universal Access Transceiver (UAT) Automatic Dependent Surveillance - Broadcast

Issued 12-02-09 ♦ Prepared by SC-186

DO-263 Application of Airborne Conflict Management: Detection, Prevention, & Resolution

Issued 12-14-00 ♦ Prepared by SC-186

DO-260B, Corr. 1 Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services (TIS-B)

Issued 12-13-11 ♦ Prepared by SC-186

DO-260B Minimum Operational Performance Standards for 1090 MHz Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) and Traffic Information Services (TIS-B)

Issued 12-13-11 ♦ Supersedes DO-260A ♦ Prepared by SC-186

DO-260 Minimum Operational Performance Standards for 1090 MHz Automatic Dependent Surveillance – Broadcast (ADS-B)

Issued 09-13-00 ♦ Prepared by SC-186

DO-260

Change 1 Issued 06-27-06 ♦ Prepared by SC-186

DO-249 Development and Implementation Planning Guide for Automatic Dependent Surveillance Broadcast (ADS-B) Applications

Issued 10-6-99 ♦ Prepared by SC-186

DO-242A Minimum Aviation System Performance Standards for Automatic Dependent Surveillance Broadcast (ADS-B)

Issued 06-25-02 ♦ Prepared by SC-186

DO-242A

Change 1 Issued 12-13-06 Prepared by SC-186

DO-242 Minimum Aviation System Performance Standards for Automatic Dependent Surveillance Broadcast (ADS-B)

Issued 02-14-98 • Prepared by SC-186

Automatic Direction-Finding Equipment (Airborne)

DO-179 Minimum Operational Performance Standards for Automatic Direction Finding (ADF) Equipment

Issued 5-13-82 ♦ Prepared by SC-146 ♦ Supersedes DO-137, DO-142

Automatic Flight Guidance, Control Systems and Equipment (AFGCS)

DO-336 Guidance for Certification of Automatic Flight Guidance and Control Systems for Part 27/29 Rotorcraft

Issued 03-21-12 ♦ Prepared by SC-220

DO-335 Guidance for Installation of Automatic Flight Guidance and Control Systems for Part 23 Airplanes

Issued 03-21-12 ♦ Prepared by SC-220

DO-325 Minimum Operational Performance Standards (MOPS) for Automatic Flight Guidance and Control Systems and Equipment

Issued 12-08-10 ♦ Prepared by SC-220

Avionics Computer Resources

DO-255 Requirements Specification for Avionics Computer Resource (ACR)

Issued 06-20-00 ♦ Prepared by SC-182

Batteries

DO-347 Certification Test Guidance for Small and Medium Sized Rechargeable Lithium Batteries and Battery Systems

Issued 12-18-13 ♦ Prepared by SC-225

DO-311A Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems

Issued 12-19-2017 ♦ Prepared by SC-211

DO-311 Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems

Issued 03-13-08 ♦ Prepared by SC-211

DO-293A Minimum Operational Performance Standards for Nickel-Cadmium and Lead Acid Batteries

Issued 12-02-09 ♦ Prepared by SC-211

DO-227A Minimum Operational Performance Standards (MOPS) for Non-Rechargeable Lithium Batteries

Issued 09-21-17 ♦ Prepared by SC-235

DO-227 Minimum Operational Performance Standards for Lithium Batteries

Issued 06-23-95 ♦ Prepared by SC-168

Cabin Systems and Equipment

DO-313 Certification Guidance for Installation of Non-Essential, Non-Required Aircraft Cabin Systems and Equipment

Issued 10-02-08 ♦ Prepared by SC-210

Certification

Final Report of the RTCA Task Force 4 Certification

Issued 02-26-99 • Prepared by the RTCA Certification Task Force

Cockpit Display

DO-259 Applications Descriptions for Initial Cockpit Display of Traffic Information (CDTI) Applications

Issued 09-13-00 ♦ Prepared by SC-186

Collision Avoidance

DO-337 Recommendations for Future Collision Avoidance Systems

Issued 03-21-12 ♦ Prepared by SC-147

Communications

DO-378, Minimum Aviation System Performance Standard (MASPS) for Coexistence of Wireless Avionics Intra-Communication Systems within 4200-4400 MHz

Issued 06-27-19 Prepared by SC-236

Issued 03-05-02 ♦ Prepared by TF-2

DO-353A Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1-Baseline 2 Interop Standard)

Issued 03-17-16 • Prepared by SC-214

DO-353 Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1-Baseline 2 Interop Standard)

Issued 03-18-14 • Prepared by SC-214

DO-352A Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANSA 1/A Accommodation (FANS 1/A-Baseline 2 Interop Standard)

Issued 03-17-16 • Prepared by SC-214

DO-352 Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANSA 1/A Accommodation (FANS 1/A-Baseline 2 Interop Standard)

Issued 03-18-14 • Prepared by SC-214

DO-351A Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard) Volume I and II

Issued 03-17-16 • Prepared by SC-214

DO-351 Interoperability Requirements Standard for Baseline 2 ATS Data Communications (Baseline 2 Interop Standard)

Volume I and II Issued 03-18-14 • Prepared by SC-214

DO-350A Safety and Performance Standard or Baseline 2 ATS Data Communications (Baseline2 SPR Standard) Volume I and II

Issued 03-17-16 • Prepared by SC-214

DO-350 Safety and Performance Standard or Baseline 2 ATS Data Communications (Baseline2 SPR Standard) Volume I and II

Issued 03-18-14 • Prepared by SC-214

DO-288 Next Generation Air/Ground Communication System (NEXCOM) Implementation Considerations: Factors and Issues to be Considered in Planning for the Transition to Air/Ground, ICAO, VDL Mode 3 Based Integrated Voice and Data Communications in the U.S. National Airspace System

Issued 10-28-03 ♦ Prepared by SC-198

DO-287 Plans and Principles for the Implementation of Aeronautical Data Link System (ADLS) Edition 1, Aeronautical Telecommunication Network (ATN) Baseline 1 Implementation and ADLS Build IIA & IIB

Issued 6-25-03 ♦ Prepared by SC-194

DO-284 Next Generation Air/Ground Communication System (NEXCOM) Safety and Performance Requirements (SPR)

Issued 1-23-03 ♦ Prepared by SC-198

DO-284

Change 1 Issued 06-25-03 Prepared by SC-198

DO-281C, Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer

Issued 09-20-2018 Prepared by SC-214

DO-281B Change 1 Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer.

Issued 03-18-14 ♦ Prepared by SC-214

DO-281B Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer

Issued 03-21-12 ♦ Prepared by SC-214 ♦ Supersedes DO-281A

DO-281A Minimum Operational Performance Standards for Aircraft VDL Mode 2 Physical Link and Network Layer

Issued 11-08-05 ♦ Prepared by SC-172 ♦ Supersedes DO-281

DO-279 Next Generation Air Ground Communications (NEXCOM) Principles of Operation VDL Mode, 3

Issued 10-12-01 ♦ Prepared by SC-198

DO-274 Next Generation Air/Ground Communications (NEXCOM) Principles of Operation

Issued 10-12-01 ♦ Prepared by SC-198

DO-273 Response to the Report of the RTCA Chairman's Committee on NEXCOM

Issued 10-12-01 ♦ Prepared by SC-198

DO-271C Minimum Operational Performance Standards for Aircraft VDL Mode 3 Transceiver Operating in the Frequency Range 117.975-137.000 MHz

Issued 11-8-05 ♦ Prepared by SC-172 ♦ Supersedes DO-271B

DO-270 Minimum Aviation System Performance Standards (MASPS) for the Aeronautical Mobile-Satellite (R) Service (AMS(R)S as Used in Aeronautical Data Links

Issued 10-12-01 ♦ Prepared by SC-165

DO-270

Change 1 Issued 04-14-09 ♦ Prepared by SC-215

DO-262D, Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 03-21-19 Prepared by SC-222

DO-262C Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 05-31-17 ♦ Prepared by SC-222

DO-262B Minimum Operational Performance Standards for Avionics Supporting Next Change 1 to Generation Satellite Systems (NGSS)

Appendix D Issued 12-15-15 ♦ Prepared by SC-222

DO-262B Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 06-17-14 ♦ Prepared by SC-222

DO-262A Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS)

Issued 12-16-08 ♦ Prepared by SC-215

DO-250 Guiding Principles for Air Traffic Services Provided via Data Communications Utilizing the ATN, Builds I and IA

Issued 01-11-00 ♦ Prepared by SC-194

DO-231 Design Guidelines and Recommended Standards for the Implementation and Use of AMS(R)S Voice Services in a Data Link Environment

Issued 3-13-96 ♦ Prepared by SC-165

DO-225 VHF Air-Ground Communications System Improvements Alternatives Study and Selection of Proposals for Future Action

Issued 11-17-94 ♦ Prepared by SC-172

DO-224D, Signal-In-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 09-20-2018 Prepared by SC-214

DO-224C Change 1 Signal-In-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 03-18-14 • Prepared by SC-214

DO-224C Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 12-13-11 ♦ Prepared by SC-214

DO-224B Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques

Issued 08-03-05 ♦ Prepared by SC-172

DO-223 Minimum Operational Performance Standards for Context Management (CM) Equipment

Issued 07-13-94 ♦ Prepared by SC-169

DO-222 Guidelines on AMS(R)S Near-Term Voice Implementation and Utilization

Issued 04-29-94 ♦ Prepared by SC-165 ♦ Errata Issued 06-21-94

DO-219 Minimum Operational Performance Standards for ATC Two-Way Data Link Communications

Issued 08-27-93 ♦ Prepared by SC-169

DO-186B Minimum Operational Performance Standards for Airborne Radio Communications Equipment Operating within the Radio Frequency Range 117.975-137.000 MHz

Issued 11-08-05 ♦ Prepared by SC-172 ♦ Supersedes DO-186A

DO-169 VHF Air-Ground Communication Technology and Spectrum Utilization

Issued 07-20-79 ♦ Prepared by SC-140

DO-165 Initial Report on Civil Aviation Frequency Spectrum Requirements 1980- 2000

Issued 05-27-76 ♦ Prepared by SC-129

DO-163 Minimum Performance Standards-Airborne HF Radio Communications Transmitting and Receiving Equipment Operating within the Radio-Frequency Range of 1.5 to 30 Megahertz

Issued 03-19-76 ♦ Prepared by SC-131 ♦ Errata ♦ Supersedes DO-48A & DO-49A

DO-136 Universal Air-Ground Digital Communication System Standards

Issued 03-07-68 ♦ Amended and superseded portions of DO-122 ♦Prepared by SC- 110 & SC-111

DO-93 Minimum Performance Standards – Airborne Selective Calling Equipment

Issued 02-10-59 ♦ Prepared by SC-83 ♦ Errata issued 09-13-62

Data Link

DO-277 Minimum Aviation System Performance Standards (MASPS) for the High Frequency Data Link Operating in the Aeronautical Mobile (Route) Service (AM(R)S)

DO-265 Minimum Operational Performance Standards for Aeronautical Mobile High Frequency Data Link (HFDL)

Issued 12-14-00 ♦ Prepared by SC-188

Display of Traffic Information

DO-243 Guidance for Initial Implementation of Cockpit Display of Traffic Information

Issued 02-19-98 ♦ Prepared by SC-186

Distance Measuring Equipment

DO-189 Minimum Operational Performance Standards for Airborne Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 MHz Issued 09-20-85 ♦ Prepared by SC-149 ♦ Supersedes DO-14, DO-151A

Doppler Radar (Airborne)

DO-158 Minimum Performance Standards – Airborne Doppler Radar Navigation Equipment

Issued 10-17-75 ♦ Prepared by ICG-13

Electronic Hardware

DO-254 Design Assurance Guidance for Airborne Electronic Hardware

Issued 04-19-00 ♦ Prepared by SC-180

Electronic Map Displays

DO-257A Minimum Operational Performance Standards for the Depiction of Navigation Information on Electronic Maps

Issued 06-25-03 ♦ Prepared by SC-181 ♦ Supersedes DO-257

Emergency Locator Transmitters (ELTs)

DO-204B, Minimum Operational Performance Standard for Aircraft Emergency Locator Transmitters

406 MHz

Issued 12-13-18 • Prepared by SC-204

DO-204A Minimum Operational Performance Standards for 406 MHz Emergency Locator Transmitters (ELTs)

Issued 12-06-07 ♦ Prepared by SC-229

DO-188 Emergency Locator Transmitter (ELT) Batteries Guidance and Recommendations

Issued 11-13-84 ♦ Prepared by SC-136 Battery Subcommittee

DO-183 Minimum Operational Performance Standards for Emergency Locator Transmitters-Automatic Fixed-ELT (AF), Automatic Portable-ELT (AP), Automatic Deployable-ELT (AD), Survival-ELT (S) Operating on 121.5 and 243.0 Megahertz

Issued 05-13-83 ♦ Prepared by SC-136 ♦ Supersedes DO-145, DO-146, DO-168 and Change 1

DO-182 Emergency Locator Transmitter (ELT) Equipment Installation and Performance

Issued 11-17-82 ♦ Prepared by SC-136

DO-154 Recommended Basic Characteristics for Airborne Radio Homing and Alerting Equipment for Use with Emergency Locator Transmitters (ELTs)

Enhanced Vision Systems, Synthetic Vision Systems, Combined Vision Systems and Enhanced Flight Vision Systems

DO-375, Minimum Aviation System Performance Standards (MASPS) for a Combined Vision Systems for Helicopter Operations

Issued 12-13-18 Prepared by SC-213

DO-374, Safety, Performance and Interoperability Requirements Document Defining Takeoff Minima by Use of Enhanced Flight Vision Systems

Issued 09-20-18 Prepared by SC-213

DO-371 Minimum Aviation System Performance Standards (MASPS) for Aircraft State Awareness Synthetic Vision Systems

Issued 01-09-2018 ♦ Prepared by SC-213

DO-359 Minimum Aviation System Performance Standard (MASPS) for Synthetic Vision Guidance Systems

Issued 05-18-15 ♦ Prepared by SC-213

DO-341 Minimum Aviation System Performance Standards (MASPS) for an Enhanced Flight Vision System to Enable All-Weather Approach, Landing and Roll-Out to a Safe Taxi Speed

Issued 09-26-12 ♦ Prepared by SC-213

DO-315B Minimum Aviation System Performance Standards (MASPS) for Enhanced Vision Systems, Synthetic Vision Systems, Combined Vision Systems and Enhanced Flight Vision Systems

Issued 06-21-11 ♦ Prepared by SC-213

DO-315A Minimum Aviation System Performance Standards (MASPS) for Enhanced Vision Systems, Synthetic Vision Systems, Combined Vision Systems and Enhanced Flight Vision Systems

Issued 09-15-10 ♦ Prepared by SC-213

Environmental Test

DO-357 User Guide: Supplement to DO-160G

Issued 12-16-14 ♦ Prepared by SC-135

DO-160G Environmental Conditions and Test Procedures for Airborne Equipment Change 1

Issued 12-16-14 ♦ Prepared by SC-135

DO-160G Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-08-10 ♦ Prepared by SC-135 ♦ Supersedes DO-160F

DO-160F Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-06-07 ♦ Prepared by SC-135 ♦ Supersedes DO-160E

DO-160E Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-09-04 ♦ Prepared by SC-135 ♦ Supersedes DO-160D, Changes 1, 2 & 3

DO-160D

Change 3 Issued 12-05-02

DO-160D

Change 2 Issued 06-12-01

DO-160D

Change 1 Issued 12-14-00

DO-160D Environmental Conditions and Test Procedures for Airborne Equipment

Issued 07-29-97 ♦ Prepared by SC-135 ♦ Supersedes DO-160C, Change 1-3

DO-160C Environmental Conditions and Test Procedures for Airborne Equipment

Issued 12-04-89 ♦ Prepared by SC-135 ♦ Supersedes DO-160B

DO-160B Environmental Conditions and Test Procedures for Airborne Equipment

Issued 7-20-84 ♦ Prepared by SC-135 ♦ Supersedes DO-160A

DO-160A Environmental Conditions and Test Procedures for Airborne Equipment

Issued 1-25-80 ♦ Prepared by SC-135 ♦ Supersedes DO-160

Flight Data Collection

Future Flight Data Collection Committee Final Report

Issued 12-04-01 ♦ Prepared by the Future Flight Data Collection Committee

Flight Information Services

DO-360 Standards Development Activities for using Near Real-Time Aircraft-Derived Data in future applications

Issued 09-22-15 ♦ Prepared by –Wake Vortex Tiger Team

D0-349 Architecture Recommendations for Aeronautical Information (AI) and Meteorological (MET) Data Link Services

Issued 03-18-14 ♦ Prepared by SC-206

DO-340 Concept of Use for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services

Issued 09-26-12 ♦ Prepared by SC-206

DO-339 Aircraft Derived Meteorological Data via Data Link for Wake Vortex, Air Traffic Management and Weather Applications – Operational Services and Environmental Definition (OSED)

Issued 06-13-12 ♦ Prepared by SC-206

DO-324 Safety and Performance Requirements (SPR) for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services

Issued 12-08-10 ♦ Prepared by SC-206

DO-308 Operational Services and Environment Definition (OSED) for Aeronautical Information Services (AIS) and Meteorological (MET) Data Link Services

Issued 12-06-07 ♦ Prepared by SC-206

DO-267A Minimum Aviation System Performance Standards (MASPS) for Flight Information Services Broadcast (FIS-B) Data Link

Issued 04-29-04 ♦ Prepared by SC-195 ♦ Supersedes DO-267

DO-241 Operational Concepts and Information Elements Required to Improve Air Traffic Management (ATM) – Aeronautical Operational Control (AOC) Ground-Ground Information Exchange to Facilitate Collaborative Decision Making

Issued 10-6-97 ♦ Prepared by SC-169

DO-239 Minimum Operational Performance Standards for Traffic Information Service (TIS) Data Link Communications

Issued 04-02-97 ♦ Prepared by SC-169 ♦ Errata Issued 10-17-97

DO-232 Operations Concepts for Data Link Applications of Flight Information Services

Issued 03-13-96 ♦ Prepared by SC-169

National Airspace System Concept of Operations and Vision for the Future of Aviation

Issued 11-15-02 ♦ Approved by the Free Flight Steering Committee

Recommendations Regarding the Concept of Equipage and Mandated versus Voluntary Considerations

Issued 08-27-02 ♦ Approved by the Free Flight Steering Committee

Final Report of RTCA Task Force 3 Free Flight Implementation

Issued 10-26-95 ♦ Prepared by TF3

RTCA Task Force 3 Interim Report on Free Flight Implementation

Issued 08-28-95 ♦ Prepared by TF3

Government / Industry Operational Concept for the Evolution of Free Flight

Issued 12-01-97 ♦ Approved by the Free Flight Steering Committee

Government / Industry Operational Concept for the Evolution of Free Flight,

Addendum 1: Free Flight Phase 1 Limited Deployment of Select Capabilities (URET, TMA (SC) pFAST, CPDLC, CDM, SMA)

Issued 08-19-98 ♦ Approved by the Free Flight Steering Committee

Government/Industry Operational Concept for the Evolution of Free Flight

Addendum 2: Candidate Recommendations on Near Term Procedural Enhancements, 1998 – 2002

Issued 08-1998 ♦ Approved by the Free Flight Steering Committee

Free Flight Action Plan

Issued 08-15-96 ♦ Approved by the Free Flight Steering Committee

Free Flight Action Plan Update

Issued 04-02-98 ♦ Approved by the Free Flight Steering Committee

Free Flight Action Plan Update II

Issued 12-10-98 ♦ Approved by the Free Flight Steering Committee

Report of the RTCA Board of Directors' Select Committee on Free Flight

Issued 01-18-95 ♦ Prepared by the RTCA Board of Directors' Select Committee on Free Flight

Global Positioning System (GPS)

DO-373 MOPS for GNSS Airborne Active Antenna Equipment for the L1/E1 and L5/E5a Frequency Bands

Issued 06-21-2018 • Prepared by SC-159

DO-368, Minimum Operational Performance Standards for GPS/GLONASS (FDMA + antenna) L1-only Airborne Equipment

Issued 07-13-17 • Prepared by SC-159

DO-327 Assessment of the LightSquared Ancillary Terrestrial Component Radio Frequency Interference Impact on GNSS L1 Band Airborne Receiver Operations

Issued 06-03-11 ♦ Prepared by SC-159

DO-316 Minimum Operational Performance Standards for Global Positioning System / Aircraft Based Augmentation System Airborne Equipment

Issued 04-14-09 ♦ Prepared by SC-15

DO-310 Minimum Operational Performance Standards for GPS Ground-based Regional Augmentation System Airborne Equipment

Issued 03-13-08 ♦ Prepared by SC-159

DO-301 Minimum Operational Performance Standards for Global Navigation Satellite System (GNSS) Airborne Active Antenna Equipment for the L1 Frequency Band

Issued 12-13-06 ♦ Prepared by SC-159

DO-292 Assessment of Radio Frequency Interference Relevant to the GNSS L5/E5A Frequency Band

Issued 07-29-04 ♦ Prepared by SC-159

DO-261 NAVSTAR GPS L5 Signal Specification

Issued 12-14-00 ♦ Prepared by SC-159

DO-253D Change 1, Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 06-27-19 | Prepared by SC-159

DO-253D Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 07-13-17 • Prepared by SC-159

DO-253C Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 12-16-08 ♦ Prepared by SC-159

DO-253B Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment

Issued 06-26-07 ♦ Prepared by SC-159

DO-247 The Role of the Global Navigation Satellite System (GNSS) in Supporting Airport Surface Operations

Issued 01-07-99 ♦ Prepared by SC-159

DO-246E Change 1, GNSS-Based Precision Approach Local Area Augmentation System (LAAS) Signal-in-Space Interface Control Document (ICD)

Issued 06-27-19 Prepared by SC-159

DO-246E GNSS-Based Precision Approach Local Area Augmentation System (LAAS) Signal-in-Space Interface Control Document (ICD)

Issued 07-13-17 • Prepared by SC-159

DO-246D GNSS Based Precision Approach Local Area Augmentation System (LAAS) Signal-in-Space Interface Control Document (ICD)

Issued 12-16-08 ♦ Prepared by SC-159 ♦ Supersedes DO-246C

DO-245A Minimum Aviation System Performance Standards for Local Area Augmentation System (LAAS)

Issued 12-09-04 ♦ Prepared by SC-159 ♦ Supersedes DO-245

DO-235B Assessment of Radio Frequency Interference Relevant to the GNSS

Issued 03-13-08 ♦ Prepared by SC-159 ♦ Supersedes DO-235A

DO-229E Supporting Tool

Issued 12-15-16 • Prepared by SC-159

DO-229E Minimum Operational Performance Standards for Global Positioning System/Satellite-Based Augmentation System Airborne Equipment Issued 12-15-16 • Prepared by SC-159

Change 1 to DO-229D Minimum Operational Performance Standards for Global Positioning Systems/Satellite-Based Augmentation System Airborne Equipment

Issued 02-01-13 ♦ Prepared by SC-159

DO-229D with Change 1 Minimum Operational Performance Standards for Global Positioning Systems/Satellite Augmentation System Airborne Equipment

Issued 02-01-13 ♦ Prepared by SC-159

DO-229D Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment

Issued 12-13-06 ♦ Prepared by SC-159

DO-229C Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment Issued 11-28-01 ♦ Prepared by SC-159 ♦ Supersedes DO-229B

Errata issued 08-16-02

DO-228 Minimum Operational Performance Standards for Global Navigation Satellite Systems (GNSS) Airborne Antenna Equipment

Issued 10-6-99 ♦ Prepared by SC-159

DO-217

Change 2 Issued 11-15-96 ♦ Prepared by SC-159

DO-217

Change 1 Issued 08-13-94 ♦ Prepared by SC-159

DO-217 Minimum Aviation System Performance Standards DGNSS Instrument Approach System: Special Category 1 (SCAT-1) Revised to Include Change 1

Issued 08-27-93 ♦ Prepared by SC-159

DO-208 Minimum Operational Performance Standards for Airborne Supplemental Navigation Equipment Using Global Positioning System (GPS)

Issued 07-12-91 ♦ Prepared by SC-159

DO-208

Change 1 Issued 09-21-93♦ Prepared by SC-159 ♦ Errata Issued 3-16-95

DO-202 Report of Special Committee 159 on Minimum Aviation System Performance Standards (MASPS) for Global Positioning System (GPS)

Issued 11-28-88 ♦ Prepared by SC-159

GEO Bias Modeling Tool for DO-229D

Issued 12-13-06 ♦ Prepared by SC-159

Portable Hand-Held GPS Receivers-What You Should Know

Issued 9-21-93 ♦ Prepared by SC-179

RTCA Task Force Report on Global Navigation Satellite System (GNSS) Transition and Implementation Strategy

Issued 09-18-92 ♦ Prepared by Task Force 1

DO-254 Design Assurance Guidance for Airborne Electronic Hardware

Issued 04-19-00 ♦ Prepared by SC-180

DO-237 Aeronautical Spectrum Planning for 1997-2010

Issued 01-27-97 ♦ Prepared by SC-185

DO-216 Minimum General Specification for Ground-Based Electronic Equipment

Issued 07-14-93 ♦ Prepared by SC-175

DO-211 User Requirements for Future Airport and Terminal Area Communications, Navigation and Surveillance

Issued 10-26-92 ♦ Prepared by SC-166

DO-193 User Requirements for Future Communications, Navigation and Surveillance Systems, Including Space Technology Applications

Issued 09-19-86 ♦ Prepared by SC-155

DO-171 Recommendations on Policies and Procedures for Off-the-Shelf Electronic Test Equipment Acquisition and Support

Issued 01-25-80 ♦ Prepared by SC-134

DO-167 Airborne Electronics and Electrical Equipment Reliability

Issued 09-16-77 ♦ Prepared by SC-130

DO-162 Report on Air-Ground Communications- Operational Considerations for 1980 and Beyond

Issued 10-17-75♦ Prepared by SC-120

DO-148 A New Guidance System for Approach and Landing

Issued 12-18-70 ♦ Prepared by SC-117 ♦ Volume II Change

Portable Hand-Held GPS Receivers-What You Should Know

Issued 09-21-93 ♦ Prepared by SC-179

History

The Authority of Agreement—A History of RTCA

Human Factors

DO-372 Addressing Human Factors/Pilot Interface Issues for Avionics

Issued 12-19-17 ♦ Prepared by SC-233

DO-256 Minimum Human Factors Standards for Air Traffic Services Provided Via Data Communications Utilizing the ATN, Builds I and IA

Issued 06-20-00 ♦ Prepared by SC-194

DO-238 Human Engineering Guidance for Data Link Systems

Issued 04-02-97 ♦ Prepared by SC-169

Instrument Landing System (ILS)

DO-195 Minimum Operational Performance Standards for Airborne ILS Localizer Receiving Equipment Operating within the radio Frequency Range of 108-112 Megahertz

Issued 11-17-86♦ Prepared by SC-153 ♦ Supersedes DO-131A

DO-192 Minimum Operational Performance Standards for Airborne ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328.6 -

335.4 Megahertz

Issued 07-18-86 ♦ Prepared by SC-153 ♦ Supersedes DO-132A

DO-117 Standard Adjustment Criteria for Airborne Localizer and Glide Slope Receivers

Issued 03-14-63 ♦ Prepared by SC-98 ♦ Errata

Interference

DO-292 Assessment of Radio Frequency Interference Relevant to the GNSS L5/E5A Frequency Band

Issued 07-29-04 ♦ Prepared by SC-159

DO-235A Assessment of Radio Frequency Interference Relevant to the GNSS

Issued 12-05-02 ♦ Prepared by SC-159 ♦ Supersedes DO-235

DO-176 FM Broadcast Interference related to Airborne ILS, VOR and VHF Communications

Issued 11-18-81 ♦ Prepared by SC-141

LORAN

DO-194 Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Loran-C Inputs

Issued 11-17-86 ♦ Prepared by SC-137 ♦ Supersedes DO-159

Marker Beacon

DO-143 Minimum Performance Standards-Airborne Radio Marker Receiving Equipment Operating on 75 MHz

Issued 03-12-70 ♦ Prepared by SC-115 (ICG-7)♦ Supersedes DO-57A

Microwave Landing System (MLS)

DO-226 Guidance Material for Evolving Precision Area Navigation Equipment with Emphasis on MLS

Issued 05-25-95♦ Prepared by SC-171 ♦ Supersedes DO-198

DO-177 Minimum Operational Performance Standards for Microwave Landing System (MLS) Airborne Receiving Equipment

Issued 07-17-81 ♦ Prepared by SC-139

DO-166 Microwave Landing System (MLS) Implementation

Issued 07-15-77♦ Prepared by SC-125

National Airspace System

DO-266 Government and Industry Guidelines and Concepts NAS Analysis and Redesign

Issued 12-14-00 ♦ Prepared by SC-192

DO-251 U.S. National Airspace Systems (NAS) Plan for Air Traffic Service Data Link (Phase 1, En Route CONUS Implementation)

Issued 01-11-00 ♦ Prepared by SC-194

DO-244 Government/Industry Guidelines and Concept for National Airspace Analysis and Redesign

Issued 06-8-98 ♦ Prepared by SC-192

NextGen

RTCA Task Force 5 NextGen Mid-Term Implementation Task Force Report

Issued 09-09-09 ♦ Prepared by the RTCA NextGen Task Force

RTCA Task Force 5 NextGen Mid-Term Implementation Task Force Report Data Files

Issued 09-09-09 ♦ Prepared by the RTCA NextGen Task Force

Night Vision Imaging System

DO-295 Civil Operators' Training Guidelines for Integrated Night Vision Imaging System Equipment

Issued 10-19-04 ♦ Prepared by SC-196

DO-275 Minimum Operational Performance Standards for Integrated Night Vision Imaging System Equipment

Issued 10-12-01 ♦ Prepared by SC-196

DO-268 Concept of Operations, Night Vision Imaging System for Civil Operators

Issued 03-27-01 ♦ Prepared by SC-196

Performance Based Navigation (PBN)

PBN-1 Blueprint for Success to Implementing Performance Based Navigation

Issued 10-08-14 • Prepared by NextGen Advisory Committee

Portable Electronic Devices (PEDs)

DO-363 Change 1, Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft

Issued 04-1-19 Prepared by SC-234

DO-363 Guidance for the Development of Portable Electronic Devices (PED) Tolerance for Civil Aircraft

Issued 12-15-16 • Prepared by SC-234

DO-307A Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance

Issued 12-15-16 • Prepared by SC-234

DO-307

Change 1 Issued 12-16-08 ♦ Prepared by SC-202

DO-307 Aircraft Design and Certification for Portable Electronic Device (PED) Tolerance

Issued 10-11-07 ♦ Prepared by SC-202

DO-294C Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDs) on Aircraft

Issued 12-16-08 ♦ Prepared by SC-202

DO-233 Portable Electronic Devices Carried on Board Aircraft

Issued 08-20-96 ♦ Prepared by SC-177 ♦ Errata Issued 08-18-99

DO-199 Potential Interference to Aircraft Electronic Equipment from Devices Carried Aboard

Issued 09-16-88 ♦ Prepared by SC-156 ♦ Supersedes DO-119

Radar

DO-220A Minimum Operational Performance Standards (MOPS) for Airborne Selective Calling Equipment

Issued 03-17-16 • Prepared by SC-230

DO-220 Minimum Operational Performance Standards (MOPS) for Airborne Weather Radar with Forward-Looking Windshear Detection Capability

Issued 09-21-93 ♦ Prepared by SC-173 ♦ Change 1 issued 6-23-95

DO-213A Minimum Operational Performance Standards for Nose-Mounted Radomes

Issued 03-17-16 • Prepared by SC-230

DO-213

Change 1 Issued 6-23-95 Prepared by SC-173

DO-213 Minimum Operational Performance Standards for Nose-Mounted Radomes

Issued 01-14-93 ♦ Prepared by SC-173

DO-173 Minimum Operational Performance Standards for Airborne Weather and Ground Mapping Pulsed Radars

Issued 11-19-80 ♦ Prepared by SC-133 ♦ Supersedes DO-134

Corrigendum/Errata/Change 1 Included

DO-172 Minimum Operational Performance Standards for Airborne Radar Approach and Beacon Systems for Helicopters

Issued 11-19-80 ♦ Prepared by SC-133 ♦ Change 1

Required Navigation Performance (RNP)

DO-257B Minimum Operational Performance Standards for the Depiction of Navigational Information Electronic Maps

Issued 03-22-18 • Prepared by SC-227

DO-283B Minimum Operational Performance Standards for RNP for Area Navigation

Issued 12-15-15 ♦ Prepared by SC-227

DO-283A Minimum Operational Performance Standards for RNP for Area Navigation

Issued 10-28-03 ♦ Prepared by SC-181

DO-236C Minimum Aviation System Performance Standards: Change 1 Required Navigation Performance for Area Navigation

Issued 09-23-14 ♦ Prepared by SC-227

DO-236C Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation

Issued 06-19-13 • Prepared by SC-227 ♦ Supersedes DO-236B

DO-236B Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation

Issued 10-28-03 ♦ Prepared by SC-181 ♦ Supersedes DO-236A

Satellite Services

DO-343B, Minimum Aviation System Performance Standard for AMS(R)S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP)

Issued 03-21-19 ♦ Prepared by SC-222

DO-343A Minimum Aviation System Performance Standard for AMS(R)S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP)

Issued 05-31-17 ♦ Prepared by SC-222

DO-343 Minimum Aviation System Performance Standard for AMS(R) S Data and Voice Communications Supporting Required Communications Performance (RCP) and Required Surveillance Performance (RSP) in Procedural Airspace

Issued 08-21-13 ♦ Prepared by SC-222

DO-215A

Change 1 Issued 09-28-98 ♦ Prepared by SC-165

DO-215A Guidance on Aeronautical Mobile Satellite Service (AMSS) End-to-End System Performance

Issued 02-21-95 ♦ Prepared by SC-165 ♦ Supersedes DO-215

DO-210D

Change 4 Issued 03-24-15 ♦ Prepared by SC-222

DO-210D

Change 3 Issued 09-19-06 ♦ Prepared by SC-208

DO-210D

Change 2 Issued 11-28-01 ♦ Prepared by SC-165

DO-210D

Change 1 Issued 12-14-00 ♦ Prepared by SC-165

DO-210D Minimum Operational Performance Standards (MOPS) for Geosynchronous Orbit Aeronautical Mobile Satellite Services (AMSS) Avionics

Issued 04-19-00 ♦ Prepared by SC-165

DO-206 Minimum Aviation System Performance Standards for Radio Determination Satellite Service (RDSS)

Issued 02-12-90 ♦ Prepared by SC-161

Secondary Barriers

DO-329 Aircraft Secondary Barriers and Alternative Flight Deck Security Procedures

Issued 09-28-11 ♦ Prepared by SC-221

Security

DO-356A Airworthiness Security Methods and Considerations

Issued 06-21-2018 ▯ Prepared by SC-216

DO-356 Airworthiness Security Methods and Considerations

Issued 09-23-14 ♦ Prepared by SC-216

DO-355 Information Security Guidance for Continuing Airworthiness

Issued 06-17-14 ♦ Prepared by SC-216

DO-326A Airworthiness Security Process Specification

Issued 08-06-14 ♦ Prepared by SC-216

DO-326 Airworthiness Security Process Specification

Issued 12-08-10 ♦ Prepared by SC-216

DO-230J, Standards for Airport Security Access Control Systems

Issued 12-19-2019 | Prepared by SC-224

DO-230I, Standards for Airport Security Access Control Systems

Issued 06-21-2018 ▯ Prepared by SC-224

DO-230H Standards for Airport Security Access Control Systems

Issued 12-19-17 ♦ Prepared by SC-224

DO-230G Standard for Airport Security Access Control Systems

Issued 06-21-16 Prepared by SC-224

DO-230F Standard for Airport Security Access Control Systems

Issued 12-15-15 ♦ Prepared by SC-224

DO-230E Standard for Airport Security Access Control Systems

Issued 06-18-15 ♦ Prepared by SC-224

DO-230D Standard for Airport Security Access Control Systems

Issued 12-18-13 ♦ Prepared by SC-224

DO-230C Integrated Security System Standards for Airport Access Control

Issued 06-21-11 ♦ Prepared by SC-224 ♦ Supersedes DO-230B

DO-230B Integrated Security System Standards for Airport Access Control

Issued 06-19-08 ♦ Prepared by SC-207 ♦ Supersedes DO-230A

DO-230A Standards for Airport Security Access Control Systems

Issued 04-10-03 ♦ Prepared by SC-199 ♦ Supersedes DO-230

Software

DO-333 Formal Methods Supplement to DO-178C and DO-278A

Issued 12-13-11 ♦ Prepared by SC-205

DO-332 Object-Oriented Technology and Related Techniques Supplement to DO-178C and DO-278A

Issued 12-13-11 ♦ Prepared by SC-205

DO-331 Model-Based Development and Verification Supplement to DO-178C and DO-278A

Issued 12-13-11 ♦ Prepared by SC-205

DO-330 Software Tool Qualification Considerations

Issued 12-13-11 ♦ Prepared by SC-205

DO-297 Integrated Modular Avionics (IMA) Development Guidance and Certification Considerations

Issued 11-08-05 ♦ Prepared by SC-200

DO-278A Software Integrity Assurance Considerations for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems

Issued 12-13-11♦ Prepared by SC-205

DO-278 Guidelines for Communication, Navigation, Surveillance and Air Traffic Management (CNA/ATM) Systems Software Integrity Assurance

Issued 03-05-02 ♦ Prepared by SC-190/EUROCAE WG-52

DO-248C Supporting Information for DO-178C and DO-278A

Issued 12-13-11 ♦ Prepared by SC-205

DO-248B Final Annual Report for Clarification of DO-178B "Software Considerations in Airborne Systems and Equipment Certification"

Issued 10-12-01 ♦ Prepared by SC-190/EUROCAE WG-52

DO-178C Software Considerations in Airborne Systems and Equipment Certification

Issued 12-13-11 ♦ Prepared by SC-205

DO-178B Software Considerations in Airborne Systems and Equipment Certification

Issued 12-01-92 ♦ Prepared by SC-167 ♦ Supersedes DO-178A ♦ Errata Included

Terrain Awareness and Warning System (TAWS)

DO-367 Minimum Operational Performance Standards (MOPS) for Terrain Awareness and Warning Systems (TAWS) Airborne Equipment

Issued 05-31-17• Prepared by SC-231

DO-367 TAWS MOPS Supplement

Issued 05-31-17• Prepared by SC-231

DO-309 Minimum Operational Performance Standards (MOPS) for Helicopter Terrain Awareness and warning System (HTAWS) Airborne Equipment

Issued 03-13-08 ♦ Prepared by SC-212

Traffic Alert and Collision Avoidance System (TCAS)

DO-385 Change 1, Minimum Operational Performance Standards for Airborne Collision Avoidance System X (ACAS X) (ACAS Xa and ACAS Xo)

Issued 09-12-2019 Prepared by SC-147

DO-385 Volume I and II, Minimum Operational Performance Standards for Airborne Collision Avoidance System X (ACAS X) ACAS Xa and ACAS Xo)

Issued 09-20-2018 Prepared by SC-147

DO-385 Supplements

Issued 09-20-2018 Prepared by SC-147

DO-300A Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCASII) Hybrid Surveillance

Change 1 Issued 12-15-15 ♦ Prepared by SC-147

DO-300A Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCASII) Hybrid Surveillance

Issued 03-20-13♦ Prepared by SC-147

DO-300 Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCASII) Hybrid Surveillance

Change 2 Issued 12-15-15 • Prepared by SC-147

DO-300 Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCASII) Hybrid Surveillance

Change 1 Issued 07-01-09 ♦ Prepared by SC-147

DO-300 Minimum Operational Performance Standards (MOPS) for Traffic Alert and Collision Avoidance System II (TCAS II) Hybrid Surveillance

Issued 12-13-06 ♦ Prepared by SC-147

DO-299 Report - Assessment and Recommendations on Visual Alerts and Aural Annunciations for TCAS II

Issued 03-14-06 ♦ Prepared by SC-147

DO-298 Safety Analysis of Proposed Change to TCAS RA Reversal Logic

Issued 11-08-05 ♦ Prepared by SC-147

DO-197A

Change 1 Issued 07-29-97 Prepared by SC-147

DO-197A Minimum Operational Performance Standards for an Active Traffic Alert and Collision Avoidance System I (Active TCAS I)

Issued 09-12-94 ♦ Prepared by SC-147 ♦ Supersedes DO-197 ♦ Errata 11-22-94

DO-185B Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II)

Change 2 Issued 03-20-13 ♦ Prepared by SC-147

DO-185B Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II)

Change 1 Issued 07-01-09 ♦ Prepared by SC-147

DO-185B Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II)

Issued 06-19-08 ♦ Prepared by SC-147

DO-185A Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance System II (TCAS II) Airborne Equipment

Issued 12-16-97 ♦ Prepared by SC-147

DO-184 Traffic Alert and Collision Avoidance System (TCAS) I Functional Guidelines

Issued 05-13-83 ♦ Prepared by SC-147

Test Procedures/Calibration

DO-127 Standard Procedure for the Measurement of the Radio-Frequency Radiation from Aviation Radio Receivers Operating within the Radio-Frequency Range of 30-890 Megacycles

Issued 04-15-65 ♦ Prepared by SC-96

DO-62 Calibration Procedures- test Standard Omni-Bearing Selectors and Omni-Bearing Selector Test Sets

Issued 12-02-54 ♦ Prepared by SC-61

DO-56 VOR Test Signals

Issued 04-15-54 ♦ Prepared by SC-60

DO-52 Calibration Procedures for Signal Generators used in the Testing of VOR & ILS Receivers

Issued 12-08-53 ♦ Prepared by SC-61

Transponders – Mode S

DO-181E Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment I s s u e d 03-17-11 Prepared by SC-209 Supersedes DO-181D

DO-181D Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment

Issued 10-02-2008 • Prepared by SC-209 • Supersedes DO-181C

DO-181C w /Change 1

Issued 06-12-2001 ♦ Prepared by SC-187 Supersedes DO-181B

and Errata

DO-144A Minimum Operational Characteristics-Airborne ATC Transponder Systems

Issued 10-02-08 ♦ Prepared by SC-209 ♦ Supersedes DO-144

Unmanned Aircraft Systems (UAS)

DO-377, Minimum Aviation System Performance Standards for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems in U.S. Airspace

Issued 03-21-19 Prepared by SC-228

DO-366 Minimum Operational Performance Standards (MOPS) for Air-to-Air Radar for Surveillance

Issued 03-21-17 • Prepared by SC-228

DO-365 Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems

Issued 03-21-17 • Prepared by SC-228

DO-362 Command and Control(C2) Data Link Minimum Operational Performance Standards (MOPS) (Terrestrial)

Issued 09-22-16 • Prepared by SC-228

DO-344 Operational and Functional Requirements and Safety Objectives for Unmanned Volume 1 &2
Aircraft Systems Standards

Issued 06-19-13 • Prepared by SC-20

DO-344 Operational and Functional Requirements and Safety Objectives for Unmanned Volume 2
Aircraft Systems Standards

Appendices F &G Issued 06-19-13 • Prepared by SC-203

DO-320 Operational Services and Environmental Definition (OSED) for Unmanned Aircraft Systems

Issued 06-10-10 ♦ Prepared by SC-203

DO-304 Guidance Material and Considerations for Unmanned Aircraft Systems

Issued 03-22-07 ♦ Prepared by SC-203

WP-4 Command and Control (C2) Data Link White Paper Phase 2

Issued 09-21-17 ♦ Prepared by SC-228

WP-3 Detect and Avoid (DAA) White Paper Phase 2

Issued 09-21-17 ♦ Prepared by SC-228

WP-2 Command and Control (C2) Data Link White Paper

Issued 03-18-14 ♦ Prepared by SC-228

WP-1 Detect and Avoid (DAA) White Paper

Issued 03-18-14 ♦ Prepared by SC-228

Vertical Guidance Equipment

DO-152 Minimum Operational Characteristics-Vertical Guidance Equipment Used in Airborne Volumetric Navigational Systems

Issued 03-17-72 ♦ Prepared by SC-116E ♦ Appendix D 04-23-7

VOR

DO-196 Minimum Operational Performance Standards for Airborne VOR Receiving Equipment Operating within the Radio Frequency Range of 108-117.95 Megahertz Issued 11-17-86 ♦

Prepared by SC-153 ♦ Supersedes DO-149, DO-153A

Weather Detection

FS-1 Feasibility Study

Weather Radar for Ice Crystal Detection

Issued 00-21-17 ♦ Prepared by SC-230

DO-252A Minimum Interoperability Standards (MIS) for Automated Meteorological Transmission (AUTOMET)

Issued 09-23-14 ♦ Prepared by SC-206

DO-252 Minimum Interoperability Standards (MIS) for Automated Meteorological Transmission (AUTOMET)

Issued 01-11-00 ♦ Prepared by SC-195

DO-220A Change 1 Reference Supplement

Issued 08-17-2018 Prepared by SC-230

DO-220A Change 1, Minimum Operational Performance Standards (MOPS) For Airborne Weather Radar Systems

Issued 08-17-2018 Prepared by SC-230

DO-220A, Minimum Operational Performance Standards (MOPS) for Airborne Weather Radar Systems

Issued 3-17-16 Prepared by SC-230

DO-220, Minimum Operational Performance Standards (MOPS) for Airborne Weather Radar with Forward-Looking Windshear Detection Capability

Issued 9-21-93 Prepared by SC-173 Change 1 issued 6-23-95

Change 1 to DO-220

Issued 6-23-95

DO-213A Change 1, Minimum Operational Performance Standards for Nose-Mounted Radomes

Issued 06-21-2018 Prepared by SC-230

DO-191 Minimum Operational Performance Standards for Airborne Thunderstorm Detection Equipment

Issued 05-16-86 ♦ Prepared by SC-154

DO-175 Minimum Operational Performance Standards for Ground-Based Automated Weather Observation Equipment

Issued 01-23-81 ♦ Prepared by SC-143

DO-174 Minimum Operational Performance Standards for Optional Equipment Which Displays Non-Radar-Derived Data on Weather and Ground Mapping Radar Indicators

Issued 03-20-81 ♦ Prepared by SC-133