

**TERMS OF REFERENCE**  
**Special Committee (SC) 209**  
**Minimum Operational Performance Standards for**  
**ATCRBS/Mode S Transponder**  
**(Rev 7)**

**1. REQUESTORS:**

Organization	Person
Federal Aviation Administration	David Hempe

**2. SC LEADERSHIP:**

Position	Name	Affiliation	Telephone	email	Change
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Chairman	Matt Erickson	Collins Aerospace	(407) 421-4966	matt.erickson@collins.com	
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**3. BACKGROUND:**

Mode Select, (Mode S), and the associated technologies that support it provide the basis for aircraft surveillance within the National Airspace System (NAS), in the US and around the world. Mode S is also the basis for ADS-B, the next generational step in aircraft surveillance technology. There are a number of tangible benefits that FAA customers (e.g., airlines and the flying public) and service providers (e.g., air traffic controllers) realize using Mode S and its associated applications. The benefits of Mode S are enhanced safety, increased aviation efficiency and an increase in the capacity of all air and ground space used by the aviation industry. As the demands and requirements of the NAS change over time, Mode S standards must also be periodically updated to keep up with the dynamic aviation environment. To satisfy the need for providing an industry baseline for Mode S capabilities, SC-209 has been established to recommend industry standards for Mode S that can be made available to governments, industry and other organizations. Version

update releases are planned to support the dynamic nature of the aviation and surveillance industry. The activities of Special Committee 209 support the FAA NextGen Operational Concept.

**4. DELIVERABLES:**

Product	Description	Due Date	Change
<b>Revisions to Transponder MOPS, DO-181E</b>	Review/correction based on issues that have been identified since the publishing of DO-181E and ADS-B MOPS (DO-260B). Develop revisions to maintain consistency with requirements developed for DO-260C, current and new collision avoidance systems and Detect and Avoid systems.	August 2020	Dec 2019

**5. SCOPE:**

Special Committee 209 (SC-209) shall codify operational requirements based upon the airborne and ground user needs for a Mode S system. The development activities of SC-209 shall consider the relevant work of other bodies, including ICAO Panels, FAA/CAAs, EUROCAE, AEEC, SAE, and other RTCA Special Committees. SC-209 should work closely with SC-186, the ADS-B SC, and in particular SC-186 Working Group 3 and Working Group 4. The Special Committee should also coordinate with EUROCAE and ICAO representatives.

**6. ENVISIONED USE OF DELIVERABLE(S):**

Expected deliverable for this work is RTCA/DO-181F, a revision to the current Minimum Operational Performance Standards (MOPS) published by SC-209. This revised standard is intended to be used by the FAA and other Civil Aviation Authorities (CAAs) as an acceptable means of certifying Mode S equipment that use this link, such as civil aircraft and ground vehicles on an airport surface. Additional documents from SC-209 may form the basis of advisory material for certification authorities, and may inform the operational approval process and safety risk management directives for the FAA and other CAAs.

- 6.1. Specifically, the deliverables above are intended to:
  - 6.1.1. Provide Mode S specifications that will be compatible with previous versions of DO-181 as well as the ADS-B standards in DO-260B and DO-260C.
  - 6.1.2. Serve as an acceptable avionics standard for the US Mode S and ADS-B OUT.

**7. SPECIFIC GUIDANCE:**

- 7.1. The committee should work jointly with the following groups to harmonize operational concepts and perform high-level safety, performance and interoperability performance

- analysis for well-defined Aircraft Surveillance (AS) and Ground Surveillance (GS) applications:
- 7.1.1. RTCA SC-186, ADS-B, (in particular, Working Group 3 1090 MHz ADS-B MOPS)
  - 7.1.2. RTCA SC-147, TCAS II, ACAS-X to address agreed changes
  - 7.1.3. RTCA SC-228, UAS Working Group 1, Detect and Avoid (DAA) to support surveillance requirements
  - 7.1.4. RTCA SC-206, Aeronautical Information Services (AIS) and Meteorological Data Link Services to support Aircraft-based Observation (AbO) meteorological requirements.
  - 7.1.5. EUROCAE Working Group 49 (WG49), Mode S
  - 7.1.6. EUROCAE Working Group 51, (WG51), ADS-B, (in particular, Subgroup 1 1090 MHz ADS-B MOPS)
  - 7.1.7. ICAO Surveillance Panel
  - 7.1.8. Other user groups, and sponsor programs, such as FAA/SBS and Eurocontrol/Surveillance Unit
  - 7.2. Work as a joint RTCA/EUROCAE activity, based both on previous work done within RTCA and EUROCAE WG49 and WG51, to produce a revision to DO-181 that has been harmonized with EUROCAE document ED-73, (Mode S), and ED-102, (ADS-B), to address recommended changes noted the Deliverables section above.
  - 7.3. Update and maintain DO-181 and verify consistency with ICAO standards. For changes that require updates to ICAO standards, coordinate as required with ICAO Surveillance Panel to maintain consistency and achieve ICAO standards harmonization for all recommended changes.
  - 7.4. Update and maintain, as required, Minimum Operational Performance Standards (MOPS) for the Mode S system operating on 1030 and 1090 MHz frequency in RTCA Document No. RTCA/DO-181.
  - 7.5. Update and maintain DO-181 in a manner that is compatible with US 14 CFR 91.215, the Mode S rule, as well as 14 CFR 91.225, the ADS-B rule. DO-181 is a basis for the U.S. transponder rule 14 CFR 91.215, so any subsequent versions of DO-181 must be compatible with current DO-181 MOPS.
  - 7.6. Update and maintain DO-181 in a manner that is compatible with the MOPS related to ADS-B OUT, such as DO-260 (*MOPS for ADS-B OUT and Traffic Information Services – Broadcast (TIS-B)*). As an example, DO-260B is part of the basis for the U.S. ADS-B OUT rule in 14 CFR 91.225 and 14 CFR 91.227 so any subsequent versions of DO-181 must be compatible with the broadcast requirements in DO-260B.
  - 7.7. Update and maintain DO-181 in a manner that is compatible with the MOPS related to ADS-B IN, such as RTCA/DO-317(), *MOPS for Aircraft Surveillance Applications*. DO-317() (currently at revision B) is part of the basis for ADS-B IN applications so

- any subsequent versions of DO-181 must be compatible with the requirements in DO-317().
- 7.8. Update and maintain DO-181 in a manner that is compatible with the requirements in RTCA/DO-185() (currently at revision B), *MOPS for Traffic Alert and Collision Avoidance System II*.
  - 7.9. Update and maintain DO-181 in a manner that is compatible with the requirements in RTCA/DO-385() (ACAS-X MOPS), *MOPS for Aircraft Collision Avoidance System X (ACAS X) (ACAS Xa and ACAS Xo)*.

## 8. TERMINATION:

Activities of Special Committee SC-209 will terminate with approval by the PMC of the committee's final document.

## 9. ACRONYMS:

ACAS-X	Airborne Collision Avoidance System for NextGen
ADS-B	Automatic Dependent Surveillance – Broadcast
AEEC	Airlines Electronic Engineering Committee
AS	Aircraft Surveillance
CAA	Civil Aviation authority
CFR	Code of Federal Regulations
CSPO	Closely Spaced Parallel Operations
DAA	Detect and Avoid
ECAC	European Civil Aviation Conference (ECAC) area
EUROCAE	European Organization for Civil Aviation Equipment
ETA	Estimated Time of Arrival
FAA	Federal Aviation Administration
GS	Ground Surveillance
ICAO	International Civil Aviation Organization
MASPS	Minimum Aviation System Performance Standards
Mode S	Mode Select
MOPS	Minimum Operational Performance Standards
NAS	National Airspace System

NextGen	Next Generation Air Transportation System
PMC	Program Management Committee
RTCA	RTCA
SAE	SAE
SC	Special Committee
TABS	Traffic Awareness Beacon System
TCAS	Traffic Alert and Collision Avoidance System
TSO	Technical Standard Order
UAS	Unmanned Aircraft System
UAT	Universal Access Transceiver
WG	Working Group