

TERMS OF REFERENCE
Special Committee (SC) 227
Standards of Navigation Performance
 [Revision 10]

ORIGINAL REQUESTOR(S):

Organization	Person
FAA Associate Administrator for Aviation Safety	Ms. Peggy Gilligan

SC LEADERSHIP:

Position	Name	Affiliation	Telephone	email	Change
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BACKGROUND: Since the 2013-2014 publication of RTCA DO-236C and Change 1, *Minimum Aviation System Performance Standards: Required Navigation Performance for Area Navigation*, and 2015 publication of DO-283B, *Minimum Operational Performance Standards for Required Navigation Performance for Area Navigation*, and the publication in 2018 of DO-257B, *Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Maps*, the Federal Aviation Administration (FAA) has utilized these standards as the basis for new regulatory guidance that define the system and functional requirements for aircraft and flight crew enabling Performance Based Navigation (PBN) operations in the U.S. National Airspace System (NAS).

In June 2018, SC-227 was placed in Active Monitor Status by the PMC. Revision 9 of the TOR directed the committee to monitor the activity of EUROCAE WG-107 which is developing a new DME facility standard to offer more robust PBN reversion capability when GNSS is lost for any reason.

This Revision 10 of the SC-227 TOR calls primarily for updating RNP MASPS and MOPS to ensure more robust support for implementation of PBN operations relying on the RNP system by

offering new minimum performance standards to provide resilient RNP capability through DME navigation. The committee will also address PBN lessons learned as applicable to the material in the RNP MASPS and MOPS and offer ancillary improvements to the standards. The TOR also directs the committee to explore the possibility of defining new, first-of-their-kind, minimum standards for flight deck use of Data Driven Charts (DDC) with SC-217/WG-44 defined in DO-201B. This new TOR also directs SC-227 to update the RNP MASPS and MOPS as necessary to better support Aircraft Surveillance Applications (ASA) and Flight Deck Interval Management (FIM) to the maximum extent practical.

DELIVERABLES:

Product	Description	FRAC Completion Due Date*	Change
MASPS DO-236D	The committee will combine DO-236C and Change 1 along with updates resulting from the committee work tasks into the updated MASPS and will develop and include new standards for DME navigation and consider more guidance on multi-sensor and inertial integration, datalink, and aircraft performance data utilization.	6/2022	
MOPS DO-283C	The committee will update the MOPS reflecting the MASPS DO-236D changes, along with any updates based upon lessons learned.	12/2023	
MOPS DO-257C	Update DO-257B to add minimum standards for Data Driven Charting in support of an RNP/RNAV system.	6/2023	

*Note: Final Review and Comment (FRAC) Completion Due Date refers to the date that the committee plenary approves the document after completing the FRAC Process. SCs should submit the final document at least 45 days before the PMC meeting where it will be considered for approval.

SCOPE and COORDINATION:

The scope of work will combine DO-236C and Change 1 along with updates resulting from the committee work tasks into Revision D of the MASPS. In making this update, the committee will coordinate with SC-186/WG-51 to ensure operational compatibility between Flight-deck Interval Management (FIM) and Required Time of Arrival (RTA) / Time of Arrival Control (TOAC) from the RNP system minimum standards in both DO-236C and DO-283B. If necessary, an ISRA (Inter-Special Committee Requirements Agreement) will be created between SC-186 and SC-227 to capture any dependencies. These updates will better facilitate the RNP system's support for future aircraft incorporating DO-317(), the MOPS for Airborne Surveillance Applications (ASA) Systems, and DO-361(), the MOPS for Flight-deck Interval Management (FIM), as a means to gain efficiencies in congested airspace through the better aircraft-to-aircraft sequencing by ATC due to the improved functionality between the aircraft's RNP system and its surveillance systems.

The committee also intends to upgrade the existing minimum standards for the performance of DME-based RNP to offer a more robust capability permitting continuation of RNP operations in areas where the GNSS signal-in-space is denied for any reason (jamming, interference or spoofing). To the extent practical, the new standards will require taking advantage of all DME facilities in view and require appropriate checks to ensure continuing RNP monitoring and alerting. The new standards will also recognize the ability to perform DME RNP through operational use of DME facilities consistent with the existing DME facility standard in ICAO Annex 10, while also making no changes to the DME receiver or antenna requirements. The MASPS updates will be coordinated with EUROCAE. Coordination with EUROCAE WG-107 will also be beneficial to this effort to ensure the WG's work toward defining a new DME facility MASPS does not conflict with any aircraft-level requirements for DME use (i.e. no new hardware or software).

The committee will also consider expanding guidance for multi-sensor integration, inertial system integration, datalink use and applications of aircraft performance data consistent with new regulator guidance materials, operational implementations and new RTCA standards.

Finally, the committee would like to coordinate with SC-217/WG-44 to develop new minimum standards for DDC. SC-227 would define the minimum requirements for the RNP system to utilize DDC, while SC-217/WG-44 would define the minimum database requirements to support the charts. DDCs intend to provide a means to negate the need for paper charts in an aircraft and provide a level of flexibility in the presentation of digital charts through screening of select chart attributes while retaining select minimum attributes (to-be-determined). The minimum standards will also provide a means to depict the aircraft's "own-ship" position relative to the paths the charts depict. By collaborating together, the two committees can develop the new minimum requirements for a DDC application presented on the flight deck of an aircraft eligible for the RNP operations supported by DO-236D, DO-283C and DO-257C. Details of an ISRA will be determined after SC-217/WG-44 is reactivated.

ENVISIONED USE OF DELIVERABLE(S)

FAA will use the updated minimum requirements in DO-236D for aircraft-level RNP approvals and the requirements in DO-283C for update of TSO-C115(), the TSO for RNP Equipment Supporting Multi-Sensor Inputs (e.g. flight management systems). Likewise, FAA will update guidance materials in AC20-138(), TSO-C115(), and/or AC90-105(), as appropriate. The FAA will update TSO-C165() to reflect the update to DO-257C. The ETSOs and CS-ACNS that reference these documents are also expected to be updated as necessary.

The intent is to provide the basis for FAA and user community procedural planning, investment analysis, and NAS architectural decision making providing the operational capabilities needed to achieve more efficient airspace management through enhanced capabilities of the aircraft incorporating these new and updated standards.

SPECIFIC GUIDANCE:

This paragraph is used to further define the committee's work program. Appropriate entries might include specific issues to be addressed, specific tasks to be accomplished, other agencies or organizations with which the committee should coordinate its activity, existing reference documents to consider, etc.

- *ICC Coordination* – This ToR should inform the Integration and Coordination Committee (ICC) of the committee's needs for coordination with SC-217 on DDC and with SC-186 regarding RTA/TOAC and FIM operational compatibility. ISRAs will be created as specific dependencies are identified.
- *Support for the Activity* – The committee has support from OEMs: Collins Aerospace, Garmin, Ltd., Esterline CMC Electronics, GE Aviation, Honeywell International, Universal Avionics, Northrop Grumman, Boeing, Airbus, Bombardier, Dassault, Embraer, Thales and Lufthansa Systems. Support from operators includes American Airlines, United Airlines and Delta Airlines. All branches of the FAA needed are in support as well.
- *EUROCAE Coordination* – At this time we are in contact with EUROCAE regarding possible joint activity with WG-85. Unresolved.

- *Initial Documentation* - if applicable, list any input documents that will be made available to this committee to include the source of documents and purpose.

Documents	Intended Use
Executive Order 13905 of February 12, 2020	Awareness of current policy directives on Position, Navigation and Timing to insure resiliency with the US NAS.
MASPS DO-236C and DO236C Change 1	Initial documentation
MOPS DO-283B	Initial Documentation
MOPS DO-257B	Initial Documentation
DO-201B Appendix A.9	Reference for initial DDC concepts as captured by SC-217/WG-44. Currently does not include requirements

TERMINATION: When the scope of this Terms of Reference is complete, the committee will recommend either that the committee Sunset, going into Active Monitoring Mode, or spend a period of time in Hiatus. If additional documents are identified by the committee as beneficial and useful, the group is expected to propose adding them to the PMC before initiating development.