



RTCA Paper No. 244-16/SC227-037  
March 15-17, 2016

**Summary of the 17th Meeting  
Special Committee 227  
Standards of Navigation Performance**

The 17th Plenary Meeting of RTCA Special Committee 227 (SC-227) was held on March 15 and 17, 2015. This meeting was held at RTCA. Attendees, at meeting and via webex, included:

Dave Nakamura (Chairman SC-227)	Advanced PBN Solutions / SAIC
Barry Miller (Designated Federal Official)	Federal Aviation Administration
Sam Miller (WG3 Co-Chair)	MITRE
Richard Jinkins (WG3 Co-Chair)	Rockwell Collins, Inc.
Jennifer Iversen (Program Director)	RTCA
Mike Cramer	The MITRE Corporation
Shiva Anand	The MITRE Corporation
Patrick Cazaux	Thales Avionics
Mesfin Ali	Fedex Express
Steve Horvath	Garmin
David Jordan (on phone)	Universal Avionics Systems Corp.
Jeff Meyers (on phone)	Federal Aviation Administration
Brad Miller	Federal Aviation Administration
Michelle Yeh	Federal Aviation Administration
Trent Bigler	Federal Aviation Administration
Anup Raje	Honeywell International, Inc.
Hasan Haq	The Boeing Company
Michael Gordon Smith (on phone)	Esterline CMC Electronics

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In accordance with the Federal Aviation Advisory Committee Act, Barry Miller, Federal Aviation Administration, was the Designated Federal Official for this meeting.

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**RTCA SC-227, Standards of Navigation**

- The 17th Plenary meeting of SC-227 was convened at 9:00 a.m. EST by Chair Dave Nakamura (Advanced PBN Solutions / SAIC) and the meeting was opened officially by the FAA DFO Barry Miller.



- Each person in attendance was invited to introduce themselves.
- Dave reviewed the agenda (copied below). He noted that the purpose of this meeting was to get a common understanding of the work to be performed under the terms of reference, to set the context for the technical standard and to begin the process of identifying the issues to be worked.

### **Summary Agenda:**

#### Plenary, Tuesday

1. Welcome and Administrative Remarks
2. Introductions
3. Review of Minutes from Meeting 16
4. Agenda Overview
  - Schedule
  - New Business
5. Adjourn Plenary

#### Working Group 3 Work Session, Tuesday 10:15 AM- Thursday 10:30

#### Closing Plenary, Thursday, 10:45 – Noon

6. Working Group 3 Progress Report/Summary
7. Other Business
8. Next Meeting
9. Adjourn

During these initial discussions Dave walked through the minutes from the last meeting. There were no comments or changes. Dave suggested that the June meeting on the schedule be changed to just a working group session. It was noted that the primary difference in the conduct of the meeting is that it will not be advertised in the Federal Register. However, since the meeting participation to date has been SC227 members only for both plenary and working group, this should not be a problem. The committee accepted the change for the June meeting.

### **Intellectual Property Policy**

Jennifer reviewed the RTCA policy and process for development of standards and how any related or relevant intellectual property must be addressed.

### **Membership Policy**

Jennifer reviewed the new membership policy. She stated that companies participating in RTCA committees must be members of RTCA starting January 1, 2016. Consultants to the FAA are considered to be members if they have an FAA email address, and similarly for consultants for other companies.

## ICAO PBN Study Group

Dave stated that the PBN SG had a meeting last week and is proceeding with updates to the manual. The updates include those reflecting the recent updates to the MASPS and MOPS, as well as others reflecting experience and issues with the manual and its navigation specifications.

## Plenary Adjourned

## Closing Plenary

Sam Miller summarized the Working Group 3 work session as follows:

1. Dave Nakamura provided a brief summary of the work required for Section 1. That will progress along with the requirements update process.
2. Brad Miller and Jeff Meyers lead a discussion/explanation of the history of the AMMD error budget as it exists in TSO-165A and recommended for DO-257B. Latency and Display Error require better definition in 257B and Brad will begin work on Appendix G - RASTEL/PIXEL-TYPE (E.G., NON-STROKED) DISPLAY ERROR CONSIDERATIONS, and also look at Appendix F - RASTER AERONAUTICAL CHARTS.
3. Appendix H - RECOMMENDED SYMBOLOGY was briefly discussed. Further discussion is required to determine which sources should be listed.
4. Hasan Haq and colleagues at Boeing will review Section 2.4 – Equipment Performance Requirements – Vertical Situation Display.
5. Change Proposals
  - a. M16-02, Section 2.1.5 CONTROLS was reviewed and accepted as written.
  - b. M16-01, Section 2.1.5.1 CONTROLS GENERAL was reviewed and accepted as amended.
  - c. M16-03, Section 2.1.5.5 CURSOR CONTROL was reviewed and accepted as amended.
  - d. M16-04, Section 2.1.5.6 TOUCH SCREENS was reviewed and accepted as amended.
  - e. M16-07, Section 2.2.1.1 SYMBOLS was reviewed and accepted as amended.
  - f. M17-09, Section 2.2.1.3 DISPLAY OF ADDITIONAL INFORMATION ON THE EMD was reviewed and accepted as written.
  - g. M16-16, Section 2.2.2 LABELS was reviewed and accepted as amended.
  - h. M16-10, Section 2.2.4, DISPLAY OPERATING CHARACTERISTICS was reviewed and accepted as amended with the understanding that further work may be required to characterize priorities of processes to be acted upon by the watchdog.
  - i. The following Change Proposals were reviewed and require additional work:



- 1) M16-06, Section 2.2.1 MAP DEPICTION
- 2) M17-17, Section 2.2.3 DISPLAY
- 3) M17-18, Section 2.2.4, DISPLAY OPERATING CHARACTERISTICS

**New Business**

The results of the ICC briefing to the PMC on Advanced Interval Management and Time of Arrival Control were reviewed. The ICC briefing noted that SC186 is continuing their work in these areas and have Embry Riddle and Mitre performing studies that are expected to impact the SC227 MASPS/MOPS requirements for TOAC. Mike Cramer reported that work is in progress. SC227 will do nothing until SC186 has recommendations to discuss.

Next meeting

The meeting plan for the next year is:

June 13, 2016, Working Group 3

September 19, 2016

December 5, 2016

Telecon schedule – The Working Group 3 telecon schedule will be managed by Sam Miller.

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CERTIFIED as a true and accurate summary of the meeting.

Michelle Yeh, Acting Secretary

Dave Nakamura, Chairman

Attachment, Working Group 3 Notes



## **Attachment**

### **Notes: Working Group 3, Day 1**

#### General Discussion

Thatch Vandenburg (Jeppesen) requested clarification in the MOPS with regard to the applicability of the performance standards relative to alternative presentations of information, e.g., EFB functions. The nature of an already defined Type B EFB function as a minor failure because it supplements approved functions is not always acknowledged in standards.

The discussion raised a number of thoughts. For example, if the information on the electronic display is used for navigation, whatever the platform, the standard will apply. In meeting the TORs, what is really being added to the MOPS is a higher bar standard for electronic map displays used by the flight crew to navigate. There remains the current standard where the aircraft system and architecture uses instruments and displays other than the electronic map to navigate. This electronic map is a convenience for the flight crew but not essential to the navigation operation. However, the standards here will also be raised a little e.g. display of RF legs. With the update, the MOPS is intended to be a credible standard that can be used for the presentation of navigation information supporting RNP operations.

Thatch will submit a change proposal with recommended text for the clarification he was suggesting.

Richard Jenkins clarified that part of the scope of this revision is to consider future display capabilities.

The group discussed whether classes of systems are needed. A manufacturer provided the example that when they show compliance to RTCA DO-257A, they must show compliance to all the sections (e.g., Airport moving map and vertical situation display), even if they have only one function. It's not clear that the standards are being applied correctly.

### **Notes: Working Group 3 Day 2 Walkthrough**

Sam Miller reviewed the current RTCA DO-257A with the special committee. Richard Jenkins noted that RTCA DO-257A was developed when technology was just transitioning to displays that support GPS.

Comments:

- The intended function of “situation awareness,” which was appropriate when this document was created, may not be as applicable now. Some distinction may be needed between those systems that are needed to support PBN/RNP and those that are “situation awareness” only.
- Data quality requirements may be needed.
- Embedded requirements in notes need to be removed.
- Discussion addressed the currency of the appendices
  - Appendix A. Abbreviations – this needs to be updated to be consistent with the RTCA DO-283A Chg 1

- Appendix C. Bibliography and References – this needs to be updated
- Appendix E. Color - Sam Miller and Michelle Yeh will review this appendix.
- Appendix F. Raster aeronautical charts – Brad Miller, Jeff Meyers, Jeff Williams, and Thatch Vandenburg will discuss and determine whether the information in this appendix can be moved into Section 2. They will also discuss whether there is a need to discuss data driven charts. Based on their recommendation, the SC leadership will need to discuss whether this content is appropriate given the current TOR or whether an update to the TOR is needed.
- Appendix G. Raster/Pixel-Type Display Error Considerations – this appendix needs to be updated. If the formulas constitute part of the error budget, which is a quantitative part of Section 2, then this needs to be moved up to Section 2.
  - The SC discussed whether the information in this section constitutes a minimum standard. This appendix is relevant to airport moving maps but may not be relevant for PBN/RNAV. Currently, update of guidance for airport moving maps is not within the TOR.
- Appendix H. Recommended Symbology – this appendix needs to be updated. The original table was excerpted from SAE ARP 5289, which has since been updated, and no longer shows the range of symbols in use. Dave Nakamura commented as background that it was important for manufacturers to have their symbols depicted in RTCA DO-257A because some symbols will not change due to system and flight deck consistency, as well as costs. A US DOT Volpe Center report has since documented the symbols in use for navigation aids and airports as well as lines and linear patterns for manufacturers and chart providers. The SC will consider the various sources and determine the best way for updating this appendix.
- Appendix I. Aerodrome Characteristics – this appendix needs to be updated but it is not clear if it is within the scope of the TOR.

## Change Proposal

Several change proposals have been drafted. The intent is not to make a decision about the proposals at this meeting but to present these papers for understanding and discussion. These change proposals have been prepared to reconcile RTCA DO-257A with the requirements in TSO-C165A and to update of human factors material.

It was requested that for any working group members who would like to present a change proposal, that they please provide the chair with advanced notice of the topic to be addressed.

## Notes: Working Group 3, Day 3

Sam Miller led the working group through a few change proposals that have been prepared for RTCA DO-257A to provide the working group with examples of how to put together a change proposal.

- M16-01HF Section 2.1.5.1 General
  - Define “soft control”
- M16-02 HF Section 2.1.5 Controls



- M16-03 HF Section 2.1.5.5 Cursor Control Devices
- M16-04 HF Section 2.1.5.6 Touch Screens
  - Touch screen guidance should be coordinated with new SAE group addressing touch screen controls (new ARP 60494). Jeff Williams will provide this link.

#### General Discussion

- Use of “should” vs. “shall”. A “should” is a recommendation and represents “good” guidance. A “shall” is a testable requirement. A question was raised regarding whether the use of “should” vs. “shall” should be influenced by whether the application is appropriate for maneuvering vs. not appropriate for maneuvering.
- Dave Nakamura and Richard Jinkins will revise Section 1 (the introduction and scope) to address how this working group intends to distinguish between displays intended for maneuvering and those that are not.