Welcome to RTCA Program Management Committee Meeting

Chairman
Dr. Chris Hegarty, MITRE
September 21, 2023
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• RTCA staff will suspend any discussion that relates to such matters and the Meeting will proceed only after appropriate limitation of such discussions has been advised and agreed.
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  • 2) Evidence that private pecuniary interests have not driven any decision to either include or exclude a system from the market
  • 3) A commitment to license the relevant technology, patent, patent pending, or copyrighted material by completing a Commitment to License (CtL)

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• To participate on RTCA Committees, an individual’s organization is required to be a member of RTCA.

• Individuals from Non-RTCA member organizations may attend Committee Plenary meetings that are announced on the RTCA.org website and in industry publications.
  • Non-member attendees have the option of requesting permission to be recognized to speak during the plenary meeting with prior coordination.
  • Written remarks may be submitted to RTCA at any time.
  • Meeting summaries from previous plenary meetings are available to the public via the RTCA’s website.
  • Members of the public may also submit comments on documents undergoing final review.
Introductions

Chairman Hegarty
Proxy for Today’s Meeting:
Jeff Troy to Chris Hagerty

Karan Hofmann
RTCA PMC Secretary
Agenda Item 2A:
Review/Approval Meeting
Summary
June 22, 2023

RTCA Paper No. 160-23/PMC-2446
Agenda Item 2B: Administrative TOR Changes
- SC-238 – GAR Change and Clean up
Agenda Item 3A:
DO-401/ED-259A
Minimum Operational Performance Standard for Galileo - Global Positioning System - Satellite-Based Augmentation System Airborne Equipment

Laurent Azoulai
Co-chair of RTCA SC-159 WG-2
21 September 2023
RTCA Paper No. 195-23/PMC-2452
• SC-159, Navigation Equipment using the Global Positioning System, established in 1985

• SC-159 has developed a mature suite of single-frequency, augmented GPS standards

• Current SC-159 WG-2 “GPS/SBAS” focus is on dual-frequency, multi-constellation (DFMC) GNSS standards jointly with EUROCAE WG-62

• Leadership:

  • SC-159 Dr Chris Hegarty and George Ligler
    • WG2 “GPS/SBAS”: John Studenny, CMC Electronics (Co-chair) and Laurent Azoulai, Airbus (Co-chair)
    • GAR: Barbara Clark, FAA

  • EUROCAE WG62 “GNSS”: Pierre Bouniol, Thales (Chair) and Mikael Mabilleau, EUSPA (Secretary)
• This document is the avionics standards for GPS / Galileo / SBAS equipment supporting RNP En route and terminal operations, departure operations, RNP approach down to LPV minima and ADS-B.
  • Integrates and updates the single frequency (L1) GPS and SBAS requirements of RTCA/DO-229F MOPS
  • Integrates and updates the class Gamma and class Delta equipment requirements of RTCA/DO-229F MOPS
  • Provides robustness requirements against jamming and spoofing threats, including radio-frequency interference detection
  • Defines approach operations to LP and LPV minima accounting for the updated Final Approach Segment Data Block (FAS DB) definition
  • Defines the Interference environment
  • Describes the test procedures
This version is meant to support validation of airborne requirements...when using Dual Frequency GPS, Galileo and SBAS signals as defined by ICAO SARPs Amendment 93...

Requirements supporting these operations will be addressed by a new Technical Standard Order (TSO or ETSO) referencing revision B of this MOPS.

The revision B of this MOPS will address all the expected functions of future DFMC SBAS equipment, including:

- Navigation in degraded environment (single-frequency L5 mode),
- Horizontal Advanced Receiver Autonomous Integrity Monitoring for new signals (ARAIM),
- Management of the institutional scenarios.
• 776 comments received from Airbus, CMC, Collins, ENAIRE, EUSPA, FAA, Garmin, Honeywell, NAVTAC, RTCA and Thales (Avionics and Alenia Space).
  • Answers to all comments were provided by June 26th.
  • All open comments were discussed in WG2/62#66 meeting.

• Comments leading to significant changes in the MOPS or to new requirement/testing procedure were presented to the group during the meeting.

• Some comments, and in particular NC comments, are closed with action calling for additional work by completion of DO-401 rev.A/ED-259 rev.B and are available through an Appendix in the MOPS.

• By the closure of the WG2/62#66 meeting, all comments raised during DO-401 FRAC/ED-259A OC have been addressed by the group

• Last editorial actions identified in the comment resolution or comment disposition were resolved and led to the delivery of the document to EUROCAE and RTCA on July 12th after the approval of the document during the SC-159#117 Plenary on July 5th.
DO-401 FRAC Resolution Summary

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<td>229</td>
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<tr>
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<td>294</td>
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<td><strong>Total</strong></td>
<td><strong>769</strong></td>
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Comment Severity

- Non-concur: 1%
- High: 7%
- Medium: 24%
- Low: 30%
- Editorial: 38%
• WG2/62 considered the DO-401/ED-259A FRAC/OC successfully closed and WG62 has approved ED-259A
• SC-159 has approved DO-401 on July 5th

SC-159 recommends approving of DO-401 as submitted for publication!
DO-401 Next Steps

• The current plan is to develop DO-401A/ED-259B at a level of maturity that supports a TSO/eTSO, closing all validation actions identified in the development of DO-401/ED-259A and integrating H-ARAIM and provisions to handle institutional scenarios.
  • The revision B is currently expected 18 months after completion of revision A.

• WG2/62 plans to confirm the work plan (scope and date) knowing the amount of validation activities to be performed as per actions identified during the meeting during the next RTCA SC-159 Plenary on October 27th.

• EUROCAE WG62 and RTCA SC-159 WG2 ToRs will be updated after the October’2023 meeting based on the discussion’s outcome.
Agenda Items 3B and 7C: Internet Protocol Suite (IPS) and AeroMACS

SC-223

Aloke Roy
Chair – SC-223
September 21, 2023
RTCA Paper No. 205-22/PMC-2456
and 226-23/PMC-2465
• SC-223
  • Chair(s): Aloke Roy, VisionAR Systems, LLC
  • GAR: Brent Phillips, FAA
  • Secretary: Dongsong Zeng, MITRE
  • Program Director: Rebecca Morrison, RTCA

• High level Summary of Committee Purpose
  • SC-223 is working jointly with EUROCAE WG-108 to:
    • Develop the MASPS for the IPS to be used in Aviation Air/Ground Communication Systems
    • Develop the Technical Standard of Aviation Profiles for the IETF Internet RFCs to be used by the Aviation Air/Ground Communication System
• IPS MASPS Scope and Objective
  • Supports FAA’s plans to transition to end-to-end digital communications using INTERNET suite of protocols
  • The MASPS will provide the interoperability and performance requirements and guidance material necessary for Global system interoperability through harmonized US and EU air/ground communication standards
  • The MASPS will provide the necessary standards to support the successful design, development and implementation of future IPS based Aviation Communications Systems.

• SC-223 / WG-108 MASPS Review Process
  • Conducted 2 internal reviews (RAC)
  • Final Review and Comments (FRAC) concluded at the June 2023 Joint Plenary with all FRAC comments satisfactorily resolved and submission approval to PMC/TAC
• The IPS MASPS (DO-404) have been developed by SC-223. It completed the FRAC and has been approved by SC-223 for submission to PM for publication approval

• Summary of changes in TOR revision 9
  • To align the MASPS title with the EUROCAE version, a change is proposed for the MASPS title:
    • From “MINIMUM AVIATION SYSTEM PERFORMANCE STANDARD FOR ATN/IPS” to “MINIMUM AVIATION SYSTEM PERFORMANCE STANDARD on ATN-IPS end-to-end interoperability and certification”
  • Change the FRAC Completion due date for Revision A of the Profiles Document (RTCA DO-379) from “December 2022” to “June 2024”
Agenda Item 3C: DO-350: Safety and Performance Requirements Standard for ATS Data Communications

Agenda Item 3D: DO-351: Interoperability Requirements Standard for Baseline 2 ATS Data Communications

Agenda Items 5C and 6D: ToR Updates

Claire Robinson
Chair, SC-214

September 21, 2023

RTCA Paper Nos: 202-23/PMC-2454,
203-23/PMC-2455,
and 197-23/PMC-2453
• SC-214
  • Chair: Claire Robinson
  • GAR: Thomas Mustach
  • Secretary: Todd Kilbourne

• SC-214/WG-92/AEEC Datalink Systems Subcomittee
  • Joint working group working to ensure VDL Mode 2 standards by RTCA/EUROCAE/SAE-ITC are harmonized

• SC-214/WG-78
  • Revising SPR and B2 data communication standards, re-activated in July 2021
  • Active ISRA with SC-186 for Advanced Interval Management requirements
DO-350: SAFETY AND PERFORMANCE REQUIREMENTS STANDARD FOR ATS DATA COMMUNICATIONS
DO-350: Safety and Performance Requirements Standard for ATS Data Communications

• This document defines and allocates the set of minimum requirements for the operational, safety, and performance aspects for implementations of data communications services supporting ATS.

• Revision B work focused on the inputs from the Very Large-Scale Demonstration using revision A and the ICAO Operational Data Link Working Group (OPDLWG).
DO-350B Comments

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Note: All of the non-concur, high, and medium comment resolutions were reviewed and agreed by the group during the July 10-14 plenary. The low and editorial comment resolutions were provided to the group 2 weeks prior to the plenary for review. The accepted changes have been coordinated with the ICAO OPDLWG leadership.
Summary of Non-Concur (and resolution)

• One Non-Concur from ALPA regarding Conditional Clearances
  • ALPA opposes incorporation of conditional clearances, which have been the source of many pilot deviations historically. The concern is heightened for legacy aircraft that may not provide pilot alerting for the conditional clearance.

• This comment required coordination with the ICAO OPDLWG, and this discussion was added to the OPDLWG agenda on May 17, 2023. ALPA representatives were present for the discussion. The OPDLWG opposed removing Conditional Clearances from the B2 message set and emphasized that the related safety requirements apply to legacy aircraft as well as new aircraft.

• ALPA confirmed that they maintain operational concerns about Conditional Clearances but that they accept leaving them in DO-350B unchanged, and the non-concur was closed.
SC-214 Recommends approving DO-350B as submitted for publication
DO-351: INTEROPERABILITY REQUIREMENTS STANDARD FOR BASELINE 2 ATS DATA COMMUNICATIONS
DO-350: Safety and Performance Requirements Standard for ATS Data Communications

• The purpose of this document is to define the set of requirements for the interoperability aspects of Baseline 2 data link systems.

• Revision B work focused on the inputs from the Very Large-Scale Demonstration using revision A and the ICAO Operational Data Link Working Group (OPDLWG).
FRAC/OC Comment Summary

Comment period: March 24 – May 8, 2023

**DO-351B Comments**

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Note: All of the non-concur, high, and medium comment resolutions were reviewed and agreed by the group during the July 10-14 plenary. The low and editorial comment resolutions were provided to the group 2 weeks prior to the plenary for review. Comments primarily dealt with maintaining consistency with DO-350B.
• SC-214 Recommends approving DO-351B as submitted for publication
Follow on work

- Two additional B2 documents in work, plan to publish by the end of the year:
  - DO-352B: Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation
  - DO-353B: Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation
- The new document, ATS Data Communication Verification Test Standard, is currently being re-planned.
- SC-214/WG-92 continue to meet and work on:
  - DO-224E: Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications
  - DO-281D: Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer
  - DO-383A: Guidance on VDL Mode 2 Air/Ground Interoperability
SC-214 ToR Updates
During Plenary #45, the group discussed the options for tagging requirements in the MASPS and MOPS

1. Use a formatting style in MS WORD to number the sentences. This method is used by SC-223, SC-228 and others
2. Use a numbering scheme directly with the shall statement. This method has been used by SC-217, SC-231 and others
3. Remove the text from the TOR that says they will number shalls in the next revision of the document. EUROCAE’s TOR does not address numbering shalls, and RTCA only requires committees to number shalls for new documents

The group agreed to option 3
• Summary of changes in revision 19
  • Removed the text related to requirement tagging in DO-281D and DO-224E
  • Updated completion due date for DO-281D and DO-224E
    • One year addition to the schedule, planned completion in December 2024
    • Delay primarily driven by work to support IPS over AVLC
  • Updated completion date for DO-352B and DO-353B
    • Changed from April 2023 to December 2023
    • The documents are currently in FRAC/OC
  • Updated completion date for DO-XXX, ATS Data Communication Verification Test standard
    • Work on this new standard was delayed while DO-350B/DO-351B/DO-352B/DO-353B were being updated
    • We are still working to identify a document editor
    • Current plan is for December 2025
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<td>DO-281D, Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer</td>
<td>See MOPS Drafting Guide</td>
<td>December 2024</td>
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<td>DO-224E, Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques</td>
<td>See MASPS Drafting Guide</td>
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<td>DO-352B, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation (FANS 1/A - Baseline 2 Interop Standard)</td>
<td>See INTEROP Drafting Guide</td>
<td>December 2023</td>
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<td>DO-353B, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)</td>
<td>See INTEROP Drafting Guide</td>
<td>December 2023</td>
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<td>DO-XXX, ATS Data Communication Verification Test Standard</td>
<td>Qualify Aircraft and Ground Implementations</td>
<td>December 2025</td>
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Agenda Item 4:
Integration and Coordination Committee (ICC)

Clay Barber
ICC Chair
September 21, 2023
Agenda Item 5-A:
Way Forward for Topics on Software Advancement and Forum for Aeronautical Software (FAS)
SC-240

Russ Uthe
Co-Chair, SC-240

September 21, 2023

RTCA Paper No. 210-23/PMC-2460
• SC-240 (Joint with WG-117)
  • Co-Chair(s): Russ Uthe & Burak Ata
  • GAR: Mike Vukas
  • Secretary: Kat Grady & Andy Hoag
  • Program Director: Rebecca Morrison
  • EUROCAE TPM: Thuc Nguyen

• High level Summary of Committee Purpose
  • Current work is focused on Integration of COTS, Open Source, and Service History into Software. At the previous PMC meeting we presented a TOR with the removal of software considerations in lower risk applications document and the combination with FAS. During the PMC we discussed descoping Service History from the COTS and Open Service Software supplement.
• Summary of changes in revision 4, approved by SC-240 in plenary Aug 28th
  • Presented in June 2023 TOR Draft to PMC
    • Descope Software Considerations in Lower Risk Applications, Equipment Certifications and Approvals
    • Add FAS Scope, including Report on Plans for Deliverables and Future Work
      • Added current FAS chair, Patty Bath, as a co-chair to SC-240
  • Discussed in June 2023 PMC meeting and June SC-240 Plenary
    • Remove Service History from supplement
    • Added Report on Product Service History
  • Changed in Plenary
    • Changed title of supplement to Incorporation of Commercial Off the Shelf Software and/or Open Source Software
    • Removed language prescribing what subgroups to create
• Change name of the committee to Aviation Software Standards to align with the new scope

• Change the name of the RR-ZZZ as follows: Report on Plans for Deliverables and Future Work for the Development of Aviation Software Standards
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<td>Report on Product Service History</td>
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SAFER SKIES THROUGH COLLABORATION
Agenda Item 5B: DO-361A Change 1 Test Case on Document Change Format

Doug Arbuckle
FAA PMC Member

Greg Comstock
SC-186 Document Editor
Agenda Item 5D: Rulemaking Update

September 2023

Hette Hoekema
Chief Expert – Avionics and Electrical Systems
RTCA Paper No. 236-23/PMC-2473
CS 25– upcoming changes

EDD expected in October 2023

- Ditching survivability
- AMC 25.1309 System design and analysis – Development assurance and AMC 20 references
- Installed systems and equipment for use by the flight crew
- Performance and handling characteristics in icing conditions
- Brakes and braking systems certification tests and analysis
- Oxygen equipment and supply
- Air conditioning ‘off’ – maximum time period
- Cabin crew portable oxygen equipment

EDD expected before December 2023

- To mitigate the risks of incidents and accidents caused by airframe ground icing contamination or inadequate de-acing/anti-icing operations
New ETSO

- First issue at revision “a” to keep aligned with FAA TSO counterpart
- NPA 2023-04 “Introduction of ACAS Xa for operations in the single European sky (SES) airspace & PBN specifications for oceanic operations”
  - Published and comments period closed on 06/09
  - ED decision expected in 2024

NPA 2023-04 - Introduction of ACAS Xa for operations in the single European sky (SES) airspace & PBN specifications for oceanic operations | EASA (europa.eu)
## CS-ETSO Amendment 19

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<td>C90e</td>
<td>Cargo Pallets, Nets and Containers (Unit Load Devices)</td>
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<td>C164a</td>
<td>Night Vision Goggles</td>
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<td>Extended Squitter Automatic Dependent Surveillance-Broadcast (ADS-B) and Traffic Information Service-Broadcast (TIS-B) Equipment Operating on the Radio Frequency of 1090 Megahertz (MHz)</td>
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NPA planned for **Q1 2024**
CS-ACNS

NPA published in May 2023

• Certification specifications for the installation of ACAS

NPA published in July 2023

• to support aircraft operators required to provide ADS-C EPP (Automatic Dependent Surveillance - Contract Extended Project Profile) part of ATS-B2 (ATS baseline 2), in accordance with AF6 (ATM functionality 6 - initial trajectory information sharing) of Commission Regulation (EU) 2021/116 Common Project One (CP1).
Thank you for your attention
Agenda Item 5E:
  • Assemble List of Possible Documents for Review

Rebecca Morrison
Senior Director, Standards and Technology

September 21, 2023
RTCA Paper No: 233-23/PMC-2471
<table>
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<td>SC-147</td>
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<td>Standards for Airborne Collision Avoidance System X (ACAS X) (ACAS Xa</td>
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<td>DO-371 - Minimum Aviation System Performance Standards (MASPS) for</td>
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<td>DO-374 - Safety, Performance and Interoperability Requirements Document</td>
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<tr>
<td>SC-214</td>
<td>DO-224D - Signal-In-Space Minimum Aviation System Performance Standards (MASPS) For Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques</td>
<td>Yes</td>
<td>DO-224E and DO-281C in process</td>
<td>N/A</td>
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<td>SC-216</td>
<td>DO-356A - Airworthiness Security Methods and Considerations</td>
<td>Yes</td>
<td></td>
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<td>DO-217</td>
<td>DO-201B - User Requirements for Navigation Data</td>
<td>Yes</td>
<td>In TOR to update by SC-217 in 2024</td>
<td>N/A</td>
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## Published in 2018 (3)

<table>
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<tr>
<th>Committee</th>
<th>Document</th>
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<tr>
<td>SC-224</td>
<td>DO-230I - Standards for Airport Security Access Control Systems</td>
<td>No</td>
<td>Already published DO-230I, J and K and DO-230M in work</td>
<td>N/A</td>
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<td>SC-227</td>
<td>DO-257B - Minimum Operational Performance Standards for the Depiction of Navigational Information on Electronic Map</td>
<td>No</td>
<td>Rev C in process</td>
<td>N/A</td>
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<td>SC-229</td>
<td>DO-204B - Minimum Operational Performance Standard for Aircraft Emergency Locator Transmitters 406 MHz</td>
<td>Yes</td>
<td>Change 1 published</td>
<td>SC-229 in Active Monitor</td>
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Path Forward

- Ask the ICC to work with RTCA to create a committee request to SC-216 and SC-230 (Active) and SC-229 (AM)
- Work Backwards each PMC to check status
- Record status in our master list of documents of last review
- Create a burndown chart for the PMC to status that all documents are evaluated – Goal EOY 2025
Agenda Item 5F:
SC-230 TOR Revision

Jeff Finley
Chair, SC-230

September 21, 2023

RTCA Paper No. 185-23/PMC-2450
• Established in 2014 to provide updates to weather radar and radome MOPS

• Leadership
  • Special Committee Co-Chairs –
    • Jeff Finley (Collins Aerospace)
    • Dawn Gidner (SeaTec Consulting)
  • GAR – Moin Abulhosn (FAA)
  • Secretary – Mohammed Ahmed (Boeing)
  • RTCA Program Director – Karan Hofmann

• Participation
  • Participants included members from radar manufacturers Collins, Honeywell, Garmin, OEMS Boeing, Airbus, and other organizations including FAA, MITRE, NASA, University of Oklahoma
• Committee has completed:
  • DO-220A (Jan 11, 2016 FRAC resolution)
  • DO-213A (Jan 11, 2016 FRAC resolution)
  • FS-1 (Aug 4, 2016 Approval with EUROCAE)
  • DO-220A Change 1 (May 2, 2018 FRAC resolution)
  • DO-213A Change 1 (May 2, 2018 FRAC resolution)
  • FS-2 (April 7, 2020 FRAC resolution)
  • DO-220B (April 12, 2023 FRAC resolution)

• SC-230 requested by June 22, 2023 PMC to analyze and document airborne weather radar susceptibility to spectrum interference.
  • SC-230 approved draft ToR revision to document weather radar spectrum susceptibility in August 1 plenary session.
• Scope of ToR Revision 12
  • Determine susceptibility of airborne weather radar to spectrum interference including
    • Future adjacent-band international mobile telephony
    • Other X-band airborne and ground-based transmission sources
  • Characterize existing RF interference and describe operational impact of increased interference
  • Create recommendations for spectrum interference levels

• Deliverable is white paper documenting analysis and recommendations which may be used to develop future X-band telephony and radar standards including power levels and siting requirements

• Schedule: FRAC completion December 2024
• SC-230 Recommends approving TOR Revision 12 as written
Agenda Item 5G: Ad Hoc on FRAC Comment Handling for Non-Member Comments

Terry McVenes
President and CEO, RTCA, Inc
September 21, 2023
Agenda Item 5H:
Incorporating Operational Input into Special Committee Documents

Wes Googe
Technical Pilot, American Airlines

September 21, 2023
RTCA Paper No: 223-23/PMC-2463
• A potential flow chart for collaboration
Steps for RTCA and the PMC to take to support

• PMC should weigh-in on the appropriate lead and composition of who is reporting status and coordinating to the PMC

• RTCA PD Team will add this responsibility into the Special Committee Guidance to communicate to chairs engaging all stakeholders is necessary

• PMC can add a recurring agenda item for the TP Lead to report on process and coordinate any changes in points of contact
• Potential Ideas:
  • Add an item on the chair report to identify operational impact – work on how to solicit design decisions that are based on flight operational assumptions or goals
  • Be sure the TP Community is aware of the committees working on the issues and documents in OC/FRAC
  • Provide some access to TP Community to the works in process
• Provide Technical Pilot Community representative to the RTCA PMC
• Work with SC Chairs to present potential assumptions and design decisions that could be reconsidered
• Provide support to give SC’s input and participation to achieve consensus in the documents
• Any requests change requests from the Technical Pilot community needs to work within the existing Special Committee process
• Operational Impact was identified for documents being reviewed for publication today for DO-350B and DO-351B
• TP Community will evaluate and come back to SC-214 if there are concerns and a revision needs to be planned for
• Requesting DO-352B and DO-353B (currently in OC/FRAC) to see if input can be included before comment resolution is complete
• Tech Pilot group seeks harmonization between the needs of the flight deck operation and the equipment standards that will support them
• Tech Pilot/Operational Flight Deck input is valuable
• Organized engagement is crucial for this group to be effective in any SC work
Agenda Item 6A: Out of Cycle Actions since last PMC Meeting

• SC-222 ToR

Karan Hofmann
RTCA PMC Secretary
Agenda Item 6B:
SC-239 (joint with WG-119)
Update

Presenters: Seth Frick, Jean-Luc Robin

SC-239 Co-Chairs

September 21, 2023
RTCA Paper No. 230-23/PMC-2468
• SC-239 (Joint with WG-119)
  • Chair(s): Seth Frick, Jean-Luc Robin
  • Secretary: Sai Kalyanaraman
  • Program Director: Rebecca Morrison
  • GAR: Barbara Clark

• High level Summary of Committee Purpose
  • Deliver the LRRA MOPS with long term RA and RF Performance
• SC-239/WG-119 is focused 100% on the MOPS DO-155a/ED-30a

• REPORT from RTCA and EUROCAE Leadership to SC-239:
  • Ad hoc group (6prs) finalized; tasked with an independent review and to recommend a process for handling the DO-399 “dissent” received and closing OC/FRAC; tasking also includes a broader process review and committee generic clarifications on the full FRAC process including the “dissent” process for public reviewers.
  • RTCA/EUROCAE leadership will subsequently provide direction to SC-239 with respect to disposition of comments and further development of DO-399, as appropriate.
• 2 dedicated in-person meetings dedicated to SG4 were organized during the summer by Garmin in Kansas (All RA performance except RFI tolerance). Very good progress.

• 1 meeting dedicated to SG5 (RFI tolerance) is planned for the week of the 6 November 2023 hosted by AVSI at Texas A&M. The goal is to finalized the requirements. Initial requirements based on the 2\textsuperscript{nd} best RA manufacturers as per DO-399 have been developed.

• Sub-group leads have been tasked with generating requirements burn-down lists to track progress.

• Plenary Friday 22th Sept 2023 here in DC.

• Next Plenary is planned for the week of 5th February 2024 in Cologne with a goal of launching the RAC.

• Plenary in Spring planned in June 2024 in Hamburg with the goal to launch the FRAC.

• Schedule on time for Sep 2024; \textit{expect to request out-of-cycle review}

Start MOPS SC-239 RAC

Start MOPS OC/FRAC

MOPS Release for PMC/TAC approval

MOPS resuming (DC)

Internal requirements baseline

Finalization and \textit{validation} of requirements

FEB 2023

JULY 2023

FEB 2024

JUNE 2024

SEP 2024

Internal requirements baseline

Finalization and \textit{validation} of requirements

MOPS Release for PMC/TAC approval

Start MOPS SC-239 RAC

Start MOPS OC/FRAC

MOPS resuming (DC)
There are two parallel approaches being implemented by the committee:

1. Determination of the RA Antenna OOB rejection, which is necessary to finalize the received RF performance for the RAC.

2. Investigation on a potential ‘enhanced’ RA antenna that would be able to provide significant OOB rejection. An “ask document” has been sent out to RA antenna manufacturers several months ago. Some Q&A on it has occurred.

Further collaboration with the RA antenna manufacturers is required to establish the antenna’s contribution to “best achievable” performance, determine appropriate compliance demonstration methods, and confirm a TSO/manufacturing path exists for at least 2 OEMs.

In addition, we believe that the topic deserves the creation of a Sub Group (SG-7). No volunteer so far.
• No action requested from PMC
Agenda Item 6C: Spectrum Compatibility
SC-242

Ed Hahn, Air Line Pilots Association, Int’l
Sr Engineer, ATM & Technology
SC-242 Chairman

21 September 2023
RTCA Paper No. 194-23/PMC-2451
• SC-242
  • Chair: Ed Hahn, ALPA
  • GAR: Chris Tourigny, Office of Spectrum Engineering
  • Secretary: Clay Barber, Garmin
  • Program Director: Rebecca Morrison

• Assess current RTCA/EUROCAE standards and provide guidance for future SC/WG authors for RF requirements to help ensure spectrum compatibility with adjacent band systems
  • Joint with EUROCAE WG-124
• Schedule for Remainder of 2023
• Current Status and Revised Delivery Dates
  • Report 1
  • Report 2
  • DO-XXX Guidance Material
• TOR Revision to Version 4
• International Telecommunications Union – Radio (ITU-R) is holding the World Radio Conference 2023 (WRC-23) from mid-November to mid-December

• Much time is being spent finalizing member state and the ICAO positions on WRC-23 agenda items
  • Key contributors from SC-242/WG-124 are heavily involved

• Recognizing the reality that WRC-23 will greatly impact the availability of key personnel, SC-242/WG-124 have agreed to reduce the meeting schedule and planned progress through end 2023
  • Deliverables affected: Report 2, DO-XXX Guidance Material

• Ongoing engagement with ICAO and communication of spectrum survey findings with Frequency Spectrum Management Panel (FSMP)
• Current TOR due date: December 2022
  • Delivery Date missed

• Status
  • Completed “coordination draft” of report
  • Draft provided for Review and Comment by other RTCA/EUROCAE committees
    – review period ended 18 September 2023

• Completion Plan
  • Reviewed received comments 19 September; agreed to resolutions
  • Virtual Plenary October 24, 2023 to review/approve final version for delivery to PMC
  • TOR date change to November 2023 in case there are any significant issues to resolve
• Assist non-aviation stakeholders understand how aeronautical RF systems are used and the necessary performance. Discuss aviation equipment lifecycles and timelines for upgrades.
  • Original TOR due date December 2023, proposed new date June 2024

• Progress and Plans
  • Initial material on how aviation operates and uses aeronautical systems is drafted
  • Complete initial draft to be developed by early 2024
  • Review and finalize report with new delivery date of June 2024
• Original TOR Due Date: June 2024; proposed new date June 2025

• Capucine Amiehl (task lead) was reassigned by Airbus to work GNSS; thank you to Capucine for leading this effort through April 2023!
  • New task lead is Olivier Pellay from Airbus

• Progress and Plans
  • Near-term focus on developing the initial 5 of 9 Information Papers
  • SC-242/WG-124 will reach out for RF expertise in RTCA and EUROCAE for participation; desire to have experts in various types of systems assist in developing guidance material
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<th>Description</th>
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<tr>
<td>Report #1</td>
<td>Survey on Radio Frequency (RF) Performance of Standards for Aeronautical RF Systems</td>
<td>December 2022, November 2023**</td>
<td>Title Change Date Change</td>
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<tr>
<td>Report #2</td>
<td>Report on Aeronautical Radio Frequency Systems, their Regulatory Framework, and Operational Considerations</td>
<td>December 2023, June 2024**</td>
<td>Title Change Date Change</td>
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<td>DO-XXX</td>
<td>Spectrum Guidance for the Developers of Standards for Aviation Wireless Systems</td>
<td>June 2024, June 2025</td>
<td>Date Change</td>
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Agenda Item 6E:
Standards of Navigation Performance
SC-227

Ellen McGaughy, Chair SC-227

Extension for extra MASP update

September 21, 2023

RTCA Paper No. 208-23/PMC-2459
• **SC-227**
  - Chair: Ellen McGaughy
  - GAR: Barry Miller
  - Secretary: Ad hoc
  - Program Director: Rebecca Morrison

• **High level Summary of Committee Purpose**
  - MASP and MOPS for Performance Based Navigation (Joint EUROCAE WG-85)
    - Strengthen RNP system requirements for RNP navigation through use of multiple DME facilities, and updates based on lessons learned and needed improvements.
    - Coordinate with SC-186/WG-51 to determine what new or revised requirements may apply to the MOPS. Ensure operational compatibility between Flight-deck Interval Management (FIM) and Time of Arrival (RTA) / Time of Arrival Control (TOAC), expected to be deferred

  - MOPS DO-257C for electronic maps: Update to add first public standards for presentation of Data Driven Charts on electronic displays installed in the flight deck equivalent to carriage of paper charts
• Summary of changes in revision 16
  • Add scope to address EMD lessons learned as part of updating EMD MOPS (already under revision) to add Data Driven Charts
Clarification for expanding MOPS scope

• To date, proposed changed EMD material have been editorial to make it consistent with new material for DDC

• Given it’s already under revision, it’s more efficient to mutually resolve other proposed changes, such as for EMD symbols
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<th>Product</th>
<th>Description</th>
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Agenda Item 6F: MOPS Drafting Guide – Suggested Addition

Rebeca Morrison
Senior Director, Standards and Technologies

September 21, 2023
Agenda Item 6G:

• AAM Workshops

Terry McVenes
President and CEO, RTCA, Inc

September 21, 2023

RTCA Paper No: 237-23/PMC-2474
Workshops – Advanced Air Mobility

• Workshop - January 11, 2023 –
  • First workshop was in-person only with members splitting into 5 groups to identify what is needed to move forward with standards for AAM

• Workshop - March 14, 2023 –
  • Focus on CONOPS and Spectrum Discussion

• XPONENTIAl Working Group – May 10, 2023 –
  • Solicited input from larger group of stakeholders at AUVSI

• May 23, 2023 –
  • DOT gave a presentation on their RFI and path forward with the Interagency Working Group for AAM
    • RTCA responded to the RFI

• September 13, 2023 –
  • DOT gave a follow up presentation on the RFI
  • FAA Presented update on the I28 plan (no longer Innovate 2028)

https://www.rtca.org/about/technical-initiatives-aam/
Path Forward

• Writing Assignments organized around the DoT RFI were made in May
  • Initial drafting still in progress
  • Will combine inputs and review internally with AAM Workshop Participants

• Another white paper was suggested by AAM Workshop Participants
  • An outline and initial draft is being worked by a small group
  • Will review internally with AAM Workshop Participants
Agenda Item 6H:
• Digital Flight Operations Activity

Brandi Teel
SC-228 Program Director
September 21, 2023
Agenda Item 6I:

• FAA Actions Taken on Previously Published Documents

FAA to Present
RTCA Paper No. 243-23/PMC-2472
Agenda Item 6J:
Chair Reports

Rebeca Morrison
Senior Director, Standards and Technologies

September 21, 2023

RTCA Paper Number: 224-23/PMC-2464
Agenda Item 6K: International Coordination

Rebecca Morrison
Senior Director, Standards and Technology

September 21, 2023
RTCA Paper No: 232/PMC-2470
## Approvals and Publications since June 2023

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<tr>
<th>Working Group</th>
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<tr>
<td>WG-123</td>
<td>ED-317</td>
<td>Guidance Document for aeromedical handling and transport of infectious passengers</td>
<td>Published</td>
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<td>WG-118</td>
<td>ED-112B</td>
<td>Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems</td>
<td>Published</td>
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<td>WG-105 SG-1</td>
<td>ED-313</td>
<td>OSED for Detect and Avoid (Traffic) in Class A to G Airspaces under IFR</td>
<td>Published</td>
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<td>WG-100</td>
<td>ED-240B</td>
<td>Minimum Aviation System Performance Standard for Remote Tower Optical Systems</td>
<td>Published</td>
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<td>WG-76 SG-1</td>
<td>ED-89A Ch. 1</td>
<td>Change 1 to ED-89A Data-Link Application System Document (DLASD) for the “ATIS” Data-Link Service</td>
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<td>WG-75</td>
<td>ED-256A</td>
<td>MOPS for ACAS Xa with ACAS Xo Functionality</td>
<td>Published</td>
<td>RTCA SC-147</td>
<td>28/06/2023</td>
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WG-31  Electromagnetic Hazards

- New Report, “Guidance material supporting the application of ED-14H Section 22”
- ED-14H Section 22 is technically equivalent to DO-160H Section 22
- Proposed from WG-31 to deliver to WG-14 for publication

EUROCAE would like this report to also be delivered to SC-135 and publish the report concurrently with an RR-XXX to be approved by SC-135 jointly with WG-14

The update to the DO-160H/ED-14H User’s guide is going to be later than the delivery of DO-160H/ED-14H

- Update to User’s guide scheduled for 2028
Will be held in November 2023 at RTCA

An update will be provided at the December PMC
• RTCA and EUROCAE are coordinating their efforts on moving to digital publications

• Currently exploring what is available and what digital publishing, or also publishing a digital twin, would mean to the work at RTCA

• Plan to do parallel surveys of the RTCA and EUROCAE membership to see what the needs and desires of our members are
  • Digital Twins?
  • Import into Requirements Management Tool?
  • Existing PDF publication sufficient?
ICAO Coordination

• RTCA and EUROCAE provided a joint Issue Paper to the ICAO FSMP in August 2023
• The purpose of the IP is to keep ICAO informed of upcoming deliveries related to the work of the FSMP
• The paper was well received, and we will plan to deliver a follow up for the next FSMP meeting in 2023
Standards Digitization for RTCA PMC

Tony Facciolo, Aerospace Engineer, NASA AAM Mission Integration Office (via Crown Consulting, Inc.)

September 21, 2023

RTCA Paper No. 227-23/PMC-2466
Purpose and Agenda

Purpose

• Demonstrate the value of Model-Based Systems Engineering (MBSE) in the standards development process

Agenda

• Introduction to MBSE
• MBSE model products and RTCA DO-376 example
• Value of digitizing standards
What is MBSE?

Definition
“MBSE is the formalized application of modeling to support system requirements, design, analysis, verification and validation activities beginning in the conceptual design phase and continuing throughout development and later life cycle phases.” (INCOSE)

Modeling Languages
• Provide syntax and governance for expressing information
• Object-oriented and visual format
• Unified Modeling Language (UML) and extensions – e.g., System Modeling Language (SysML) are prevalent

Frameworks
• Organize expressed information, usually along multiple dimensions at multiple levels
• Enable re-use of models
• Examples include Unified Architecture Framework (UAF), DoD Architecture Framework (DoDAF), NATO Architecture Framework (NAF)

https://www.incose.org/incose-member-resources/working-groups/transformational/mbse-initiative
https://sebokwiki.org/wiki/Model-Based_Systems_Engineering_(MBSE)
Example of MagicDraw use case description for Emergency Response air mission

- Example diagram portrays actors, actions, events, and information flow
- Other diagrams show requirements, behaviors, and structure among elements at various levels
- Data summaries include tabulations and matrixes summarizing M x N relationships
- Inputs, outputs, definitions, etc. for each diagram can be exported from the model in plain language
- Diagrams can be produced linking standards to design, development, testing, certification, production, and operations activities or requirements
RTCA DO-376 Example

Context Diagram

Requirements and Glossary

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<td>17</td>
<td>Offshore HTAWS</td>
<td>For a specific level Mode 1 alert, Offshore HTAWS shall be capable of generating or triggering an alert message of ‘Pull Up’.</td>
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<td>18</td>
<td>Offshore HTAWS</td>
<td>For a specific level Mode 1 alert, Offshore HTAWS shall repeat the alert message periodically for the duration of the Mode 1 alert and condition, or until cleared by the flight crew or a higher priority alert.</td>
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<td>For the duration of a specific level Mode 1 alert, Offshore HTAWS shall be capable of generating or triggering an alert message of ‘Pull Up’.</td>
<td>Verifies that an Offshore HTAWS output is added to the Mode 1 alerting level and condition.</td>
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<td>For the duration of a specific level Mode 1 alert, Offshore HTAWS shall be capable of generating or triggering an alert message of ‘Pull Up’.</td>
<td>Verifies for the duration of a specific level Mode 1 alert, the Offshore HTAWS provides an output to trigger a specific indication.</td>
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<td>Offshore HTAWS shall provide an output for a specific level Mode 1 alert.</td>
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Referenced Figures

1. Initialize
2. Height Above Terrain (ft)
3. Rate of Descent (ft/m)
Digitizing standards is not a problem to solve, it is a way forward to aligning standards development with the best practices of systems engineering.

A digital standard enables the end user to integrate material from the standard (e.g., requirements, data) into a requirements tracking, simulation, or a Product Lifecycle Management (PLM) tool

Benefits of digitization include:

• Identifies areas where the proposed system does not meet the standard
• Clarifies linkages between requirements and product or process attributes
• Permits rapid access to relevant supporting information (e.g., glossary, regulations)
• Streamlines making revisions when dependencies exist between standards
• Simplifies identification of implicit assumptions (e.g., metric vs. imperial)
BACKUP
Digital Adaptation vs. Digital Creation of Standards

**Adaptation**

- Develop Paper Standard
- Translate to Digital Format

**Drawbacks**

- Potential errors in translation to the model
- Need SME guidance around useful metrics and viewpoints

**Creation**

- Develop Digital Standard
- Output Paper Products

**Drawbacks**

- Requires modeling knowledge or support for standards development committees
Context Diagram and Requirement Allocation

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<td>Minimum Operational Performance Standard for Offshore Helicopter</td>
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*Representative, not real metric
# NASA MBSE Tool Decision Matrix:

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<th>Importance Weight Legend:</th>
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MagicDraw Differentiators:
- Extensive plugins available for purchase to add additional capabilities
- Flexible tool after overcoming learning curve
- Well supported at the agency
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<th>#</th>
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<td>17</td>
<td>OHTAWS_REQ16</td>
<td>For a warning level Mode 1 alert, Offshore HTAWS shall be capable of generating or triggering an aural message of “Pull Up”.</td>
<td>Verify for a warning level Mode 1 alert, the Offshore HTAWS generates or triggers an aural message of “Pull Up”.</td>
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<td>18</td>
<td>OHTAWS_REQ17</td>
<td>For a warning level Mode 1 alert, Offshore HTAWS shall repeat the aural message periodically for the duration of the Mode 1 warning alert condition, or until silenced by the flight crew or a higher priority alert.</td>
<td>Verify for a warning level Mode 1 alert, the Offshore HTAWS repeats the aural message periodically for the duration of the Mode 1 warning alert condition, or until silenced by the flight crew or a higher priority alert.</td>
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<td>19</td>
<td>OHTAWS_REQ18</td>
<td>An Offshore HTAWS attention (Ref. 2.2.1) shall be added to the Mode 1 warning level alert.</td>
<td>Verify that an Offshore HTAWS attention is added to the Mode 1 warning level aural message.</td>
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<td>20</td>
<td>OHTAWS_REQ19</td>
<td>For the duration of a caution level Mode 1 alert, Offshore HTAWS shall be capable of generating a caution indication.</td>
<td>Verify for the duration of a caution level Mode 1 alert, the Offshore HTAWS provides an output to trigger a caution indication.</td>
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<td>21</td>
<td>OHTAWS_REQ20</td>
<td>For the duration of a warning level Mode 1 alert, Offshore HTAWS shall be capable of generating a warning indication.</td>
<td>Verify for the duration of a warning level Mode 1 alert, the Offshore HTAWS provides an output to trigger a warning indication.</td>
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<td>22</td>
<td>OHTAWS_REQ21</td>
<td>Offshore HTAWS shall arm Mode 3A when a warning level alert is received.</td>
<td>Verify that the Offshore HTAWS arms Mode 3A on take-off or go-around.</td>
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<td>23</td>
<td>OHTAWS_REQ22</td>
<td>Offshore HTAWS shall disarm Mode 3A when not in take-off or in go-around.</td>
<td>Verify that the Offshore HTAWS disarms Mode 3A when not in take-off and not in go-around.</td>
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<td>24</td>
<td>OHTAWS_REQ23</td>
<td>Offshore HTAWS shall provide a Mode 3A caution alert less than 2.0 seconds after the combination of accumulated altitude loss and height above terrain is within the Must Alert envelope prescribed in Figure 3-6.</td>
<td>Verify the Offshore HTAWS provides a Mode 3A caution alert less than 2.0 seconds after the combination of accumulated altitude loss and height above terrain is within the Must Alert envelope prescribed in Figure 3-6 when Mode 3A is armed, Mode 3A is not inhibited, and the aircraft is not in autorotation.</td>
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Figure Simulation and Instance Evaluation

Offshore Mode 1 Caution Envelope

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<th>π</th>
<th>Name</th>
<th>RoD</th>
<th>HAT</th>
<th>Response</th>
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<td>600</td>
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<td>4</td>
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<td>10</td>
<td>Trial 10</td>
<td>200</td>
<td>100</td>
<td>May Alert</td>
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```
x = float(RoD)
y = float(HAT)
if y < 10 or y > 868:
    Response = "Must Not Alert"
else:
    if x < 950 and y > 850 + 0.0268*x:
        Response = "Must Not Alert"
    elif x < 950 and y > 10 + 1.975*x:
        Response = "Must Not Alert"
    elif y < 90 or x > 700 + y and y < 700 + 0.0241*x:
        Response = "Must Alert"
    else:
        Response = "May Alert"
print(Response)
```
Agenda Item 7B:

- FCC NPRM on Certain FM Station Power Increases

Chris Hegarty
PMC Chair
September 21, 2023
Agenda Item 8:
• Next Meeting Documents

Karan Hofmann
RTCA PMC Secretary
• SC-159, Navigation Equipment Using the Global Navigation Satellite System (GNSS)
  • DO-292A – Assessment of Radio Frequency Interference Relevant to the GNSS L5/E3A Frequency

• SC-186, Automatic Dependent Surveillance-Broadcast (ADS-B)
  • White Paper: *Summary of Activities and Potential Changes to DO-317C and DO-361A Change 1 – Year 2*

• SC-214, Standards for Air Traffic Data Communication Services
  • DO-352B - Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation (FANS 1/A Baseline 2 Interop Standard)
  • DO-353B - Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard)
- **SC-222, Aeronautic Mobile Satellite (Route) Services (AMS(R)S)**
    NOTE: Will be OOC approval request prior to December 2023 Meeting.
- **SC-228, Minimum Performance Standards (MPS) for Uncrewed Aircraft Systems**
  - **DO-381A - MOPS for GBSS for Traffic Surveillance**
- **SC-236, Standards for Wireless Avionics Intra-Communication within 4200-4400 MHz**
  - **DO-402 – MOPS for Wireless Avionics Intra-Communication within 4200-4400 MHz**
• SC-237, Helicopter Terrain Awareness Warning System
  • DO-405 – Minimum Operating Performance Standard (MOPS) for Helicopter Terrain Awareness Warning System (HTAWS) for Onshore Helicopter Operations

• SC-238, Counter UAS
  • DO-403 – System Performance and Interoperability Requirements for Non-Cooperative UAS Detection Systems
• December 14, 2023
• March 14, 2024
• June 20, 2024
• September 20, 2024
September Action Item Review
SAFER SKIES THROUGH COLLABORATION

RTCA