



Welcome to RTCA Program Management Committee Meeting

Chairman

Dr. Chris Hegarty, MITRE

December 14, 2023



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- 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.
 - Approved 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.



Recording both video and audio of the meeting is not allowed



Introductions

Chairman Hegarty





RTCA President Remarks

Terry McVenes





Proxy to Chair Hegarty for
Today's Meeting:

Nancy Mendonca

Andy Roy

Heidi Williams

December 14, 2023





Agenda Item 2A:
Review/Approval Meeting
Summary
September 21, 2023

RTCA Paper No. 278-23/PMC-2487





Agenda Item 2B:

Administrative TOR Changes

- SC-223 – Chair Change and Clean up





Agenda Items 3A and 6D:

RTCA SC-186 – ADS-B

ADS-B In Discussion Group
Deliverable and
Revised ToR

Lesley A. Weitz

SC-186 Working Group 4 Task Lead

Jessie Turner

SC-186 Chairman

December 14, 2023

RTCA Paper Nos. 297-23/PMC-2493
and 305-23/PMC-2499



RTCA SC-186 WG-4

Leadership & Key Contributors

- RTCA SC-186 WG-4 Chair – Lesley Weitz (MITRE)
 - EUROCAE WG-51 SG-3 Chair – Bogdan Petricel (EUROCONTROL)
 - Key Contributors
 - FAA Team
 - Doug Arbuckle, FAA AJM
 - Greg Comstock, Belmont Group and RTCA SC-186 WG-4 Secretary
 - Brenda Perez, Regulus
 - Eltzafan Mark, FAA AJM
 - EUROCAE
 - Nico de Gelder, NLR and EUROCAE WG-51 SG-3 Secretary
- | | Industry |
|--|---|
| | <ul style="list-style-type: none">• Airlines: American, Alaska, United• Manufacturers: ACSS, Airbus, Boeing, Collins Aerospace• Pilot Unions: ALPA, APA |

SC-186 Automatic Dependent Surveillance – Broadcast (ADS-B)

- Seeking approval for RTCA Paper No. 197-23/PMC-2493, “Summary of ADS-B In Discussion Group Activities.”

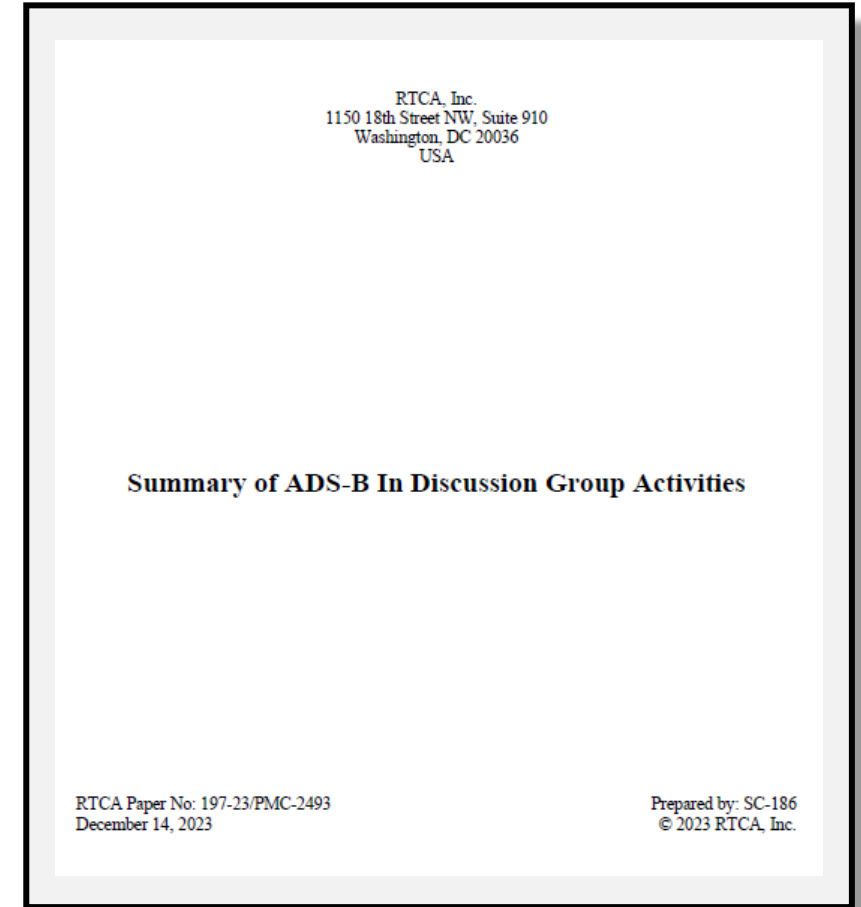


ADS-B In Discussion Group Deliverable: Background

- In August 2021, SC-186 and WG-51 approved the ADS-B In Discussion Group to provide a forum for discussing ongoing ADS-B In activities
 - Monthly three-hour meetings
 - Agenda topics based on FAA, EUROCONTROL, NLR, and industry requests
 - Delivered a white paper to RTCA PMC in December 2022 documenting activities and industry survey on ADS-B In
- In September 2022, SC-186 and WG-51 agreed to continue the ADS-B In Discussion Group for another year
 - Provide FAA/industry venue for sharing results from the ADS-B In Retrofit Spacing (AIRS) Evaluation in partnership with American Airlines and ACSS
 - White paper deliverable again documents activities and highlights archival references for future ADS-B In efforts

ADS-B In Discussion Group Deliverable: Deliverable Content

- Background
- Proposed Updates to DO-317C/ED-194B and DO-361A/ED-236A
- Summary of Meeting Topics and Outcomes
- Recent Research for ADS-B In Operations in the NAS
- Applications Using ADS-B Weather Messages
- Recommended Next Steps



Proposed Updates to DO-317C/ED-194B

- Proposed Changes to DO-317C/ED-194B (ASA MOPS)
 - Editorial updates for clarification or to remove redundant requirements (details are documented in WP407-01)
 - New requirements to enable CDTI-Assisted Separation (CAS) for Departures. These requirements have been included in TSO-C195c
 - Corrections to ASSAP surveillance processing TIS-B test vectors. Changes address data discrepancies and document deficiencies (details in WP416-01)
- **Outcome:** recommend a *Change 1* revision to DO-317C/ED-194B to address TIS-B test vector issues
 - Other proposed changes will be addressed at the same time
 - Proposed TOR changes to be discussed

Proposed Updates to DO-361A/ED-236A

- Proposed Changes to DO-361A/ED-236A (FIM MOPS) (details in WP418-01)
 - Clarify requirement IM.055 (specifies a tolerance on calculating an IM Special Point as a distance to/from a waypoint) to ensure testability
 - Align Appendix C (Sample Algorithm) with the codebase
 - Align FIM MOPS Aircraft and Control Model (FMACM) text with the codebase
 - Add details to Appendix L (BADA Data for Testing Purposes) to clarify acquisition process from EUROCONTROL
 - Update Appendix F (Transitions between IM and Other ASAs) to include new operational applications defined since publication
 - Further analysis on lead trajectory calculations and waypoint sequencing to determine whether additional requirements or changes are needed
 - Consider updating terminology to align with latest terminology and phraseology used for the ADS-B In Retrofit Spacing (AIRS) Evaluation
- **Outcome:** the proposed changes to DO-361A/ED-236A do not warrant a document update currently

Recent Research for ADS-B In Operations in the NAS


- Intent is to archive documents needed if, and when, the FAA resumes funding for ADS-B In operations in the NAS
- Recent Research on Proposed ATC Automation
 - Automation for CAS-A
 - Cited the CAS-A Aware Scheduling Operational Description
 - Automation for IM Operations
 - Cited Integrated Required Time of Arrival (RTA) and IM Concept of Operations, Tactical En Route and Terminal IM Operational Descriptions and Human-in-the-Loop (HITL) Reports
- Recent Benefits Analyses
 - Cited recent CAS-A and IM benefits analyses and analysis of incremental benefits of flight-deck capabilities over use of ATC automation alone
- AIRS Evaluation Objectives and Results
 - Noted the CAS-A and Initial-IM (I-IM) reports will be publicly available
 - Expected in Q4 FY24

Applications Using ADS-B Weather Messages

- Optional ADS-B Weather (ADS-B Wx) messages included in 1090 MHz ADS-B MOPS (DO-260C/ED-102B) and UAT MOPS (DO-282B)
 - Air Reports (AIREPs)
 - Pilot Report (PIREPs)
- Potential applications using ADS-B Wx messages
 - For example, pilot alerting applications to adverse or hazardous weather conditions
 - FIM MOPS requires use of AIREPs for the lead aircraft (when available)
- We recommend updates to DO-317/ED-194 to include applications enabled by ADS-B Wx message when operational concepts have been matured

Recommended Next Steps

- We propose continuing the ADS-B In Discussion Group until DO-317C/ED-194B can be updated to address changes on slide 6
- After that, we recommend SC-186 WG-4/WG-51 SG-3 remain in “Active Monitor Status”
- We recommend the FAA ADS-B In Team brief the final AIRS Eval Reports to a joint SC-186/WG-51 plenary (expected Q4 FY24)
- Proposed TOR changes follow

- 
- SC-186 Requests PMC approval of RTCA Paper No. 197-23/PMC-2493, “Summary of ADS-B In Discussion Group Activities”

Terms of Reference Update (Rev. 29) Approval Request

TOR Changes:

- Update contact and organization information for SC-186 Leadership
- Remove completed deliverables from Deliverables table
- Add Change 1 update to DO-317C ASA MOPS with FRAC completion date in April 2024 to Deliverables table
- Add information/scope regarding DO-317C, Change 1 to the Scope section

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SAFER SKIES THROUGH COLLABORATION





Agenda Items 3B, 3C, 3D, and 6G: Minimum Performance Standards for Unmanned Aircraft Systems SC-228

PMC Meeting – December 14, 2023

James H. (Jim) Williams

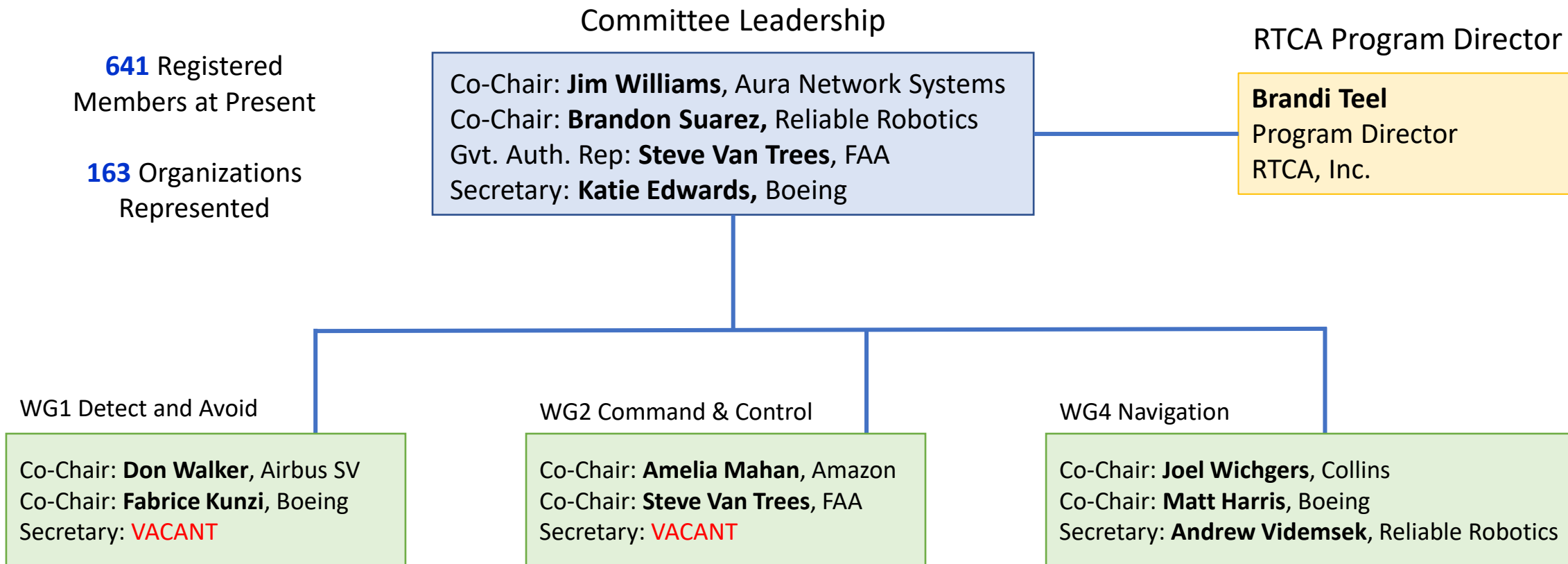
Brandon Suarez

Co-Chairs

RTCA Paper Nos. 298-23/PMC-2494,
301-23/PMC-2497, 299-23/PMC-2495,
and 306-23/PMC-2500)



- Established in 2013 to work on Minimum Operational Standards for Uncrewed Aircraft Systems, works in conjunction with EUROCAE WG-105
- Leadership
 - RTCA Co-Chair: Jim Williams, Aura Network Systems
 - RTCA Co-Chair: Brandon Suarez, Reliable Robotics
 - GAR – Steve Van Trees, FAA
 - Secretary – Katie Edwards, Boeing
- Participation
 - Participants included members from 163 organizations.

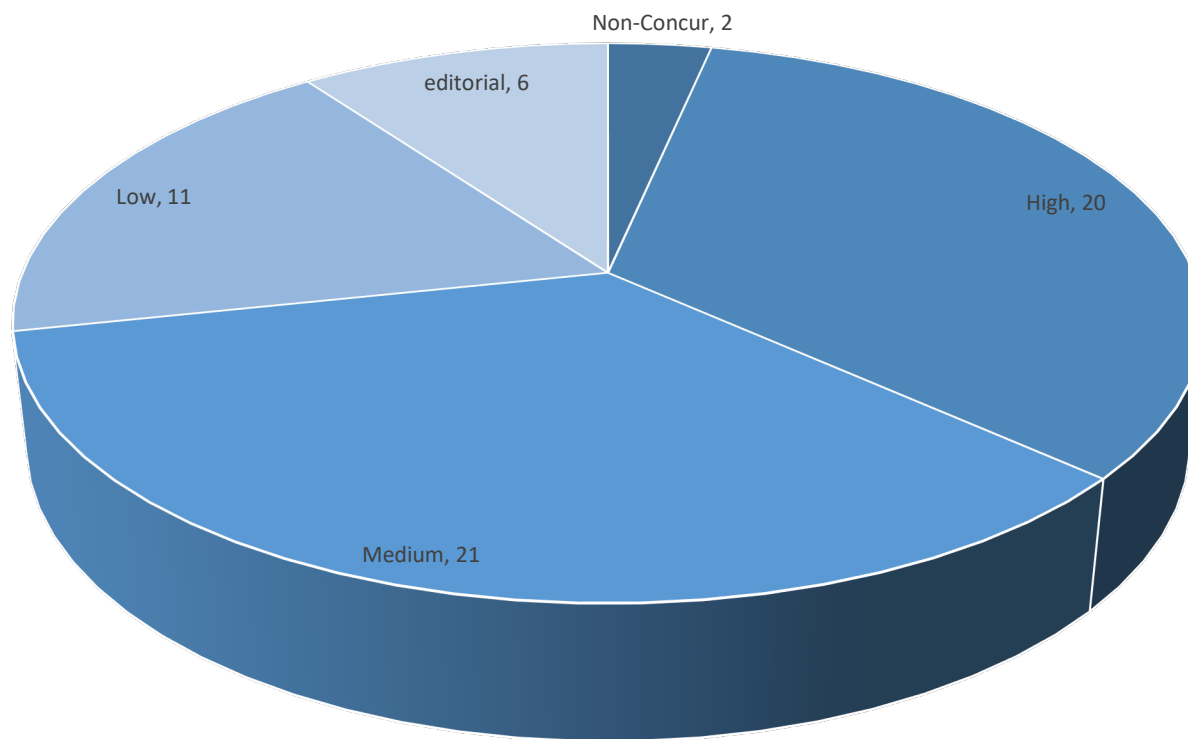


- Completed Documents:
 - DO-381A
 - DO-398A
 - DO-377B
- Proposed TOR Changes:
 - DO-366B
 - DO-377 Whitepaper

DO-381A:

- DO-381 contains Minimum Operational Performance Standards (MOPS) for the Ground Based Surveillance System (GBSS) for Traffic Surveillance systems implemented with Unmanned Aircraft Systems (UAS) transiting and performing extended operations in Class D, E and G airspace, along with transiting Class B and C airspace.
- Revision A to DO-381 adds requirements for use of Ground Based Surveillance Systems during enroute flight operations

DO-381A Comments



| Category | # Rcvd |
|--------------|-----------|
| Non-concur | 2 |
| High | 20 |
| Medium | 21 |
| Low | 11 |
| Editorial | 6 |
| Total | 60 |

WG1 has implemented all agreed-to comment resolutions.

Summary of Non-Concur (and resolution)

- DO-381A FRAC Summary
 - Total of 60 comments, resolution for all identified and accepted
 - Implementation of edits completed and resolved
 - Initially 3 Non-Concurs, but one was downgraded
 - Non-Concur 1: Request to include flexibility for Army version of GBSS design approach
 - Non-Concur 2: Incorrect table reference made standard unachievable

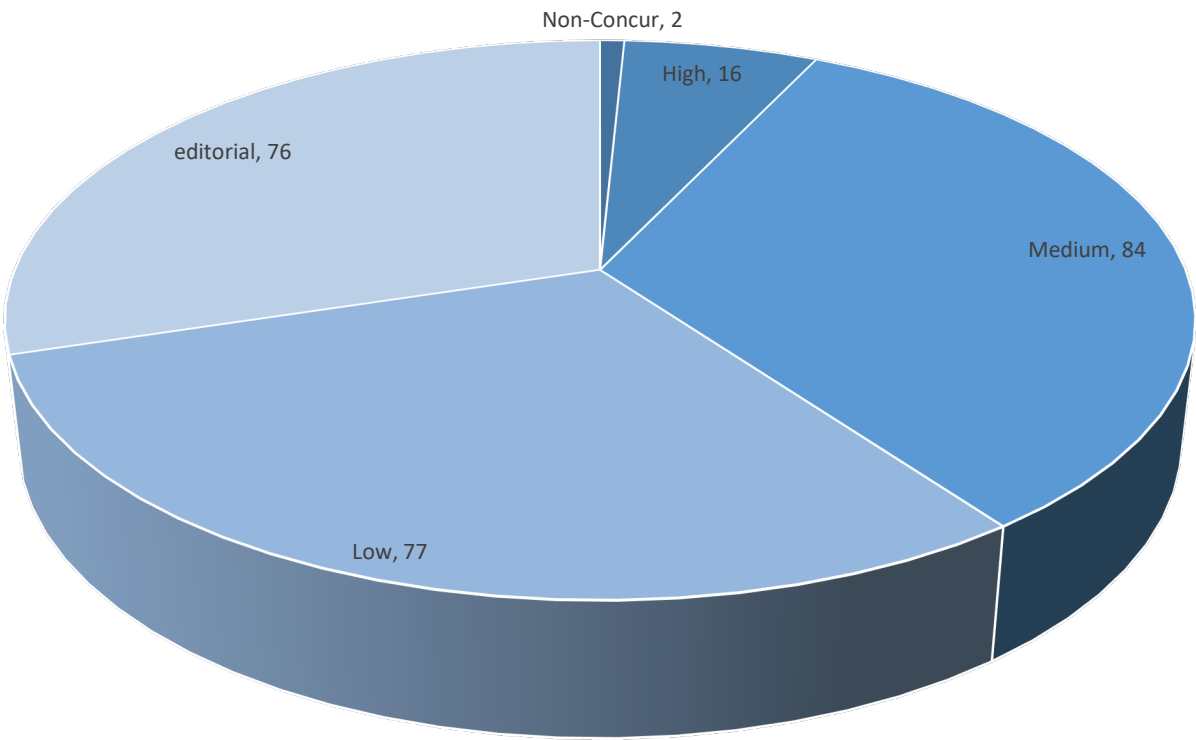
Conclusion

- SC-228 Recommends approving DO-381A as submitted for publication

DO-398A:

- DO-398 is a standalone Operational Services and Environment Definition (OSED) document that accompanies DO-365, Minimum Operational Performance Systems for Detect and Avoid (DAA) Systems.
- Updates to DO-398 include operations relevant to ACAS Xr
 - High density operational environments
 - Hover, slow flight, vertical flight segments
 - Low altitude operations, obstacle and terrain proximity
 - Example: Fly a remotely piloted rotorcraft through the Hudson River VFR corridor

DO-398A Comments



| Category | # Rcvd |
|--------------|------------|
| Non-concur | 2 |
| High | 16 |
| Medium | 84 |
| Low | 77 |
| Editorial | 76 |
| Total | 255 |

Summary of Non-Concur (and resolution)

- **DO-398A FRAC completed, all comments resolved**
 - All comments resolved
 - Both non-concurs were resolved by accepting the commenters proposed resolution.

Conclusion

- SC-228 Recommends approving DO-398A as submitted for publication

DO-377B:

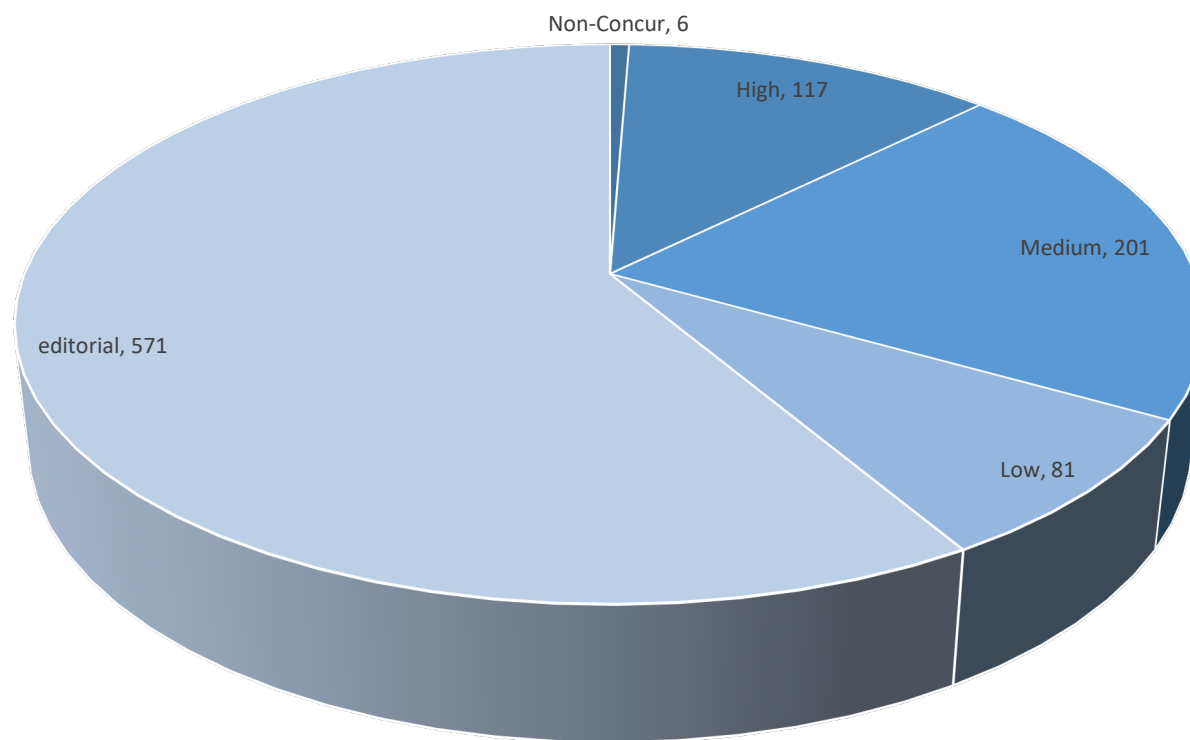
- DO-377 details the Minimum Aviation System Performance Standards (MASPS) for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems in U.S. Airspace. Revision B additional scope addresses safety risk and performance requirements for air taxi, surface operation at public use airports, and low altitude small package delivery.



FRAC/OC Comment Summary

Comment period: August 11 – September 9 2023

DO-377B Comments



| Category | # Rcvd |
|--------------|------------|
| Non-concur | 6 |
| High | 117 |
| Medium | 201 |
| Low | 81 |
| Editorial | 571 |
| Total | 976 |

Summary of Non-Concur (and resolution)

- All comments were resolved prior to or during the October Face To Face (F2F) meetings of the working group except for three from Honeywell
- During the F2F meetings, discussions were held with the Honeywell commenters that to resolve their single N-C and two High comments.
 - Non-concur comment was downgraded to a high.
 - The resulting 3 high comments from Honeywell **were resolved** by agreeing to develop a RTCA Report to provide clarifying guidance material on use of DO-377B as a means of compliance (MOC).
- During the October plenary, SC-228 members agreed to request PMC approval to:
 - Publish DO-377B as approved by SC-228 and
 - Add a new deliverable to SC-228's ToR to develop an RTCA Report to address:
 1. Deferred comments from Honeywell and
 2. Application of DO-377B as a MOC

Conclusion

- SC-228 Recommends approving DO-377B as submitted for publication

Requested TOR Changes

- Summary of changes in revision 17
 - Revision of DO-366A
 - Author a RTCA Report to resolve comments from DO-377B FRAC

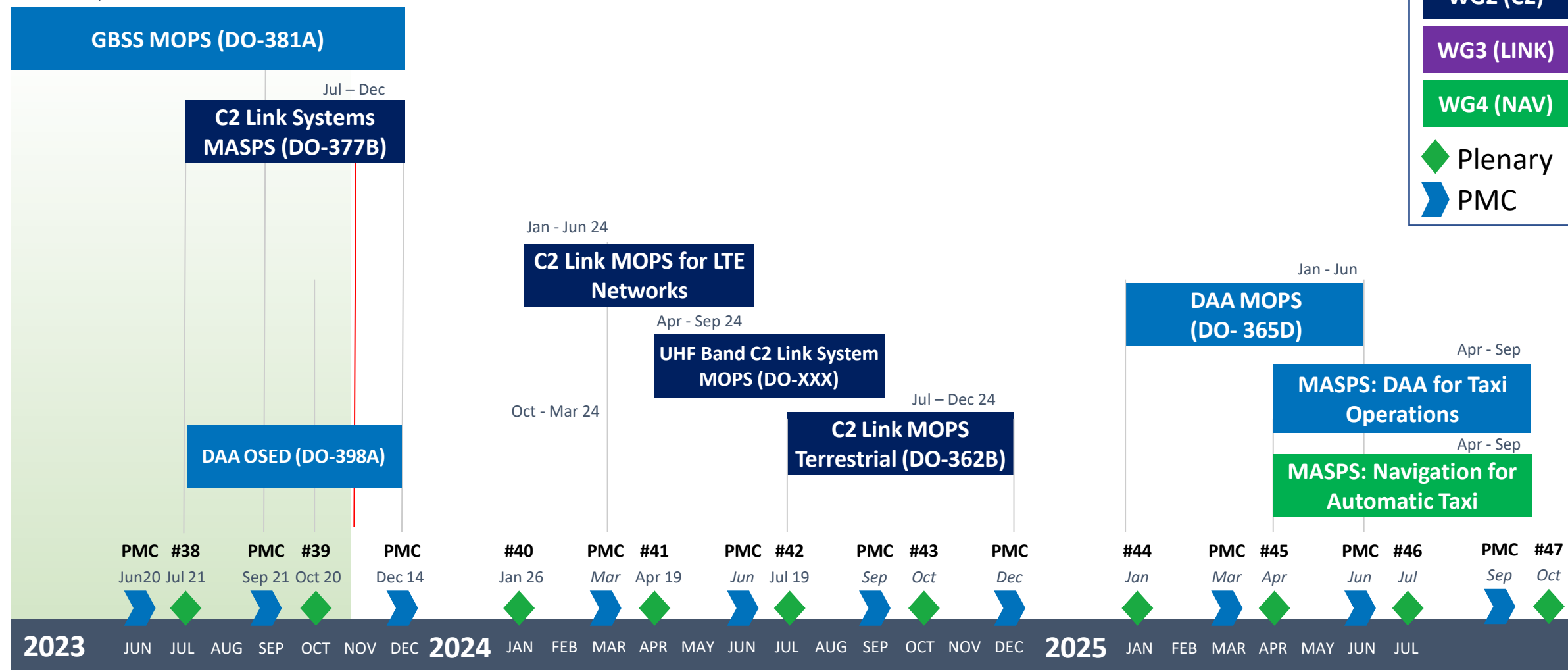
- Update DAA radar requirements for ACAS Xr and Xu
- Radar Declaration Range (RDR) reduction
 - Higher Turn & Roll Rates
 - Smaller Lag Times via automatic maneuvers / No coordination etc.
- Update Low Closing / Low Altitude requirements for all sensor Classes
 - RDR Requirements
 - Minimum Alt of UAS and Intruder
 - Radar Cross Section and Elevation Separation Changes
- Verify same encounter set can be used for tracker requirements/compliance if ownship speed is 291kts
- Improved compliance process definition where possible
- Possible interest with EUROCAE WG-105 to work this document as a joint effort – will request PMC approval if agreement reached with WG-105 leadership
- Proposed Exit FRAC in July 2024

- Topics to address
 - Address the concerns about the definition of availability and continuity (performance parameters) within DO-377B that were raised by Honeywell
 - Describe methods that can be used by UAS OEM, UAS operators and C2CSPs when deriving C2 Link System Quality of Service Requirements from DO-377B
- Report completion in April 2025

| Product | Description | FRAC Completion Due Date* | Change |
|--|---|-----------------------------------|----------------------------|
| <u>DAA Radar MOPS Update (DO-366B)</u> | <u>Update DAA radar requirements for ACAS <u>Xr</u> and Xu, as well as additional clarity improvements</u> | <u>July 2024</u> | <u>New</u> |
| <u>PaperRTCA Report (RR) for Users of DO-377B for Deriving C2 Link System Requirements</u> | <u>Address the concerns about the definition of availability and continuity raised in DO-377B FRAC and describe methods that can be used by UAS OEM, UAS operators and C2CSPs when deriving C2 Link System Quality of Service Requirements from DO-377B</u> | <u>April 2025</u> | <u>New</u> |

Each bar timeline shows document enter FRAC – PMC delivery and subsequent publication

Jul 2021 - Sep 2023



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Agenda Item 3E:

DO-405: Minimum Operational
Performance Standard for
Onshore Helicopter Terrain
Awareness and Warning System
(HTAWS)

Mike Deer, Chair SC-237

December 14, 2023

RTCA Paper No: 300-23/PMC-2496



- Established in May 2019 to work with EUROCAE WG-110 on a new MOPS for HTAWS addressing Offshore operations
- TORs revised to develop MOPS for HTAWS addressing Onshore operations after completion of DO-376
- Leadership
 - RTCA Chair – Mike Deer, Bell
 - EUROCAE Chair – Yasuo Ishihara, Honeywell, Inc
 - GAR – Rich Adler, FAA
 - Secretary – Mark Prior, Prior Consulting (UK CAA)
- Participation
 - Participants included members from HTAWS/TAWS manufacturers, FAA, EASA, TCCA, UK CAA and major helicopter OEMs

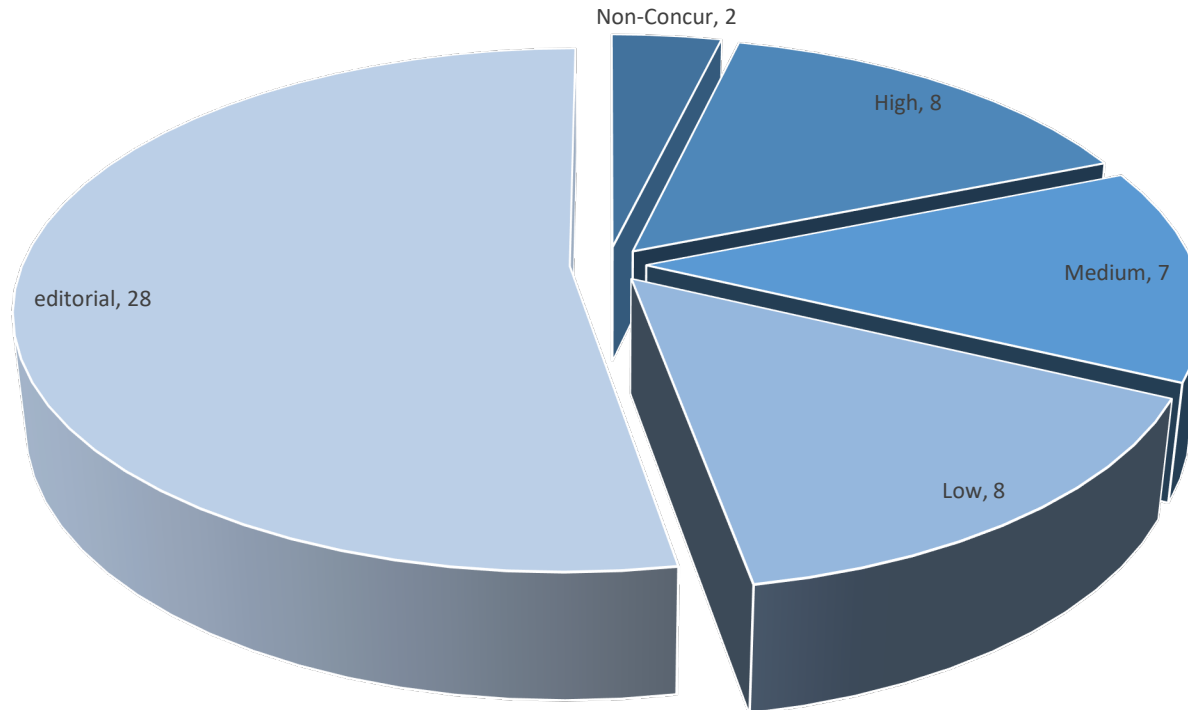
DO-405:

- Defines the Minimum Operational Performance Standards (MOPS) for an Onshore Helicopter Terrain Awareness and Warning System (Onshore HTAWS)
- Implements “classic” alerting modes like DO-376 Offshore HTAWS
 - DO-376 introduced “classic” TAWS alerting based on recommendations in UK CAA CAP1519 - Offshore Helicopter Terrain Awareness Warning System Alert Envelopes
- MOPS includes Onshore HTAWS functional requirements and not specific equipment requirements
 - Functionality can be imbedded within existing aircraft systems or in dedicated equipment

FRAC/OC Comment Summary

Comment period: *June 5-July 31, 2023*

DO-405 Comments



| Category | # Rcvd |
|--------------|-----------|
| Non-concur | 2 |
| High | 8 |
| Medium | 7 |
| Low | 8 |
| Editorial | 28 |
| Total | 53 |

Summary of Non-Concurs (and resolution)

- Two Non-Concur comments from Airbus Helicopters were received regarding the Mode 1 envelope:
 - Concerned the envelope did not reflect all potential onshore operations and introduce excessive nuisance alerts.
 - SC-237 had agreed to only address specific operations and exclude those where envelope exceedances would be common.
 - MOPS includes an option for a “reduced protection mode”.
 - Operational rules will determine which operations would require Onshore HTAWS.
- The above rationale was discussed with the Airbus representative during the plenary and after internal Airbus deliberations an agreement was reached to reduce the “Non-concur” to “High”.

Additional changes

- Final MOPS was provided for review.
- Changes were required to the MOPS after the last Plenary to address miscellaneous formatting errors:
 - Missing requirement references
 - Incorrect paragraph numbers
 - Addition of reference hyperlink.
- No changes were made to the agreed text in the MOPS

Conclusion

- SC-237 Recommends approving **DO-405** as submitted for publication

Follow on work (subject to RTCA/EUROCAE/FAA agreement)

- TORs for SC-237 included recommendations for improvements to DO-309 HTAWS MOPS in the following areas:
 - Terrain database and obstacle database accuracy requirements.
 - Database update frequency requirements.
 - Evaluation of the FLTA envelope size (warning times). This will require the use of FDM and accident data to optimise the envelope(s).
 - Add landing exclusion for 100ft level off during descent requirements.
 - Add scenarios to bound the maximum size envelopes to reduce nuisance alerts.

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Agenda Items 3F:

DO-292A – Assessment of Radio
Frequency Interference Relevant to
the NSS L5/E3A Frequency Band

Chris Hegarty
Co-Chair, SC-159

December 14, 2023



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Agenda Items 3G, 3H, and 7E:

Out of cycle requests for: DO-352:
Interoperability Requirements Standard for
Baseline 2 ATS Data Communications, FANS
1/A Accommodation (FANS 1/A - Baseline 2
Interop Standard) and DO-353:
Interoperability Requirements Standard for
Baseline 2 ATS Data Communications (ATN
Baseline 1- Baseline 2 Interop Standard)

ToR Updates

Claire Robinson

Chair, SC-214

Dec 14, 2023

RTCA Paper No: 317-23/PMC-2506 and
310-23/PMC-2502



- SC-214
 - Chair: Claire Robinson
 - GAR: Thomas Mustach
 - Secretary: [Rochelle Perera](#)
- SC-214/WG-92/AEEC Datalink Systems Subcommittee
 - Joint working group working to ensure VDL Mode 2 standards by RTCA/EUROCAE/SAE-ITC are harmonized
- SC-214/WG-78
 - Revised SPR and B2 data communication standards, re-activated in July 2021
 - Creating new ATS Data Communication Verification Test Standard

OUT OF CYCLE PUBLICATION REQUEST

Out of Cycle Publication

- DO-352: FANS 1/A Accommodation
 - 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.
- DO-353B: ATN B1 Backward Compatibility
 - 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 for both documents focused on maintaining consistency with DO-350B/DO-351B and the ICAO GOLD



Out of Cycle Publication

- SC-214/WG-78 approved both DO-352B/ED-230B and DO-353B/ED-231B on November 3rd
- The B1 backwards compatibility document and the FANS 1/A accommodation document are necessary to support the transition to B2
 - Due to the upcoming 2027 B2 mandate, these documents are needed by ground system developers as soon as possible
- Documents are expected to be delivered early January 2024

SC-214 ToR UPDATES

- Summary of changes in revision 20
 - New secretary
 - Todd Kilbourne had to step down in October
 - Rochelle Perera, the Boeing Company, will return to the role
 - Updated language related to the new Test Verification Document
 - New language aligned with the WG-78 ToR
 - Emphasizing the goal of testing operational scenarios developed per DO-350B/ED-228B at the application layer
 - Added DO-280B Change 2 to the list of deliverables
 - Change to ground requirements requested by EUROCONTROL:
 - Update the ground requirement in section 3.3.7.6.4.10.2 regarding UM79 content;
 - Update the ground requirements in Tables 4-3 and 4-5 and associated figures regarding message concatenation in CPDLC end requests.

| Product | Description | FRAC Completion Date |
|---|--------------------------|----------------------|
| DO-281D, Minimum Operational Performance Standards (MOPS) for Aircraft VDL Mode 2 Physical Link and Network Layer | See MOPS Drafting Guide | December 2024 |
| DO-224E, Signal-in-Space Minimum Aviation System Performance Standards (MASPS) for Advanced VHF Digital Data Communications Including Compatibility with Digital Voice Techniques | See MASPS Drafting Guide | December 2024 |
| DO-383A, Guidance on VDL Mode 2 Air/Ground Interoperability | Guidance Document | December 2024 |

| Product | Description | FRAC Completion Date |
|---|--|----------------------|
| DO-280B Interoperability Requirements Standard for Aeronautical Telecommunication Network Baseline 1 (ATN B1 Interop Standard) Change 2 | Change | May 2024 |
| DO-XXX, ATS Data Communication Verification Test Standard | Verify Aircraft and Ground Implementations | December 2025 |
| DO-352B, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, FANS 1/A Accommodation (FANS 1/A - Baseline 2 Interop Standard) | See INTEROP Drafting Guide | December 2023 |
| DO-353B, Interoperability Requirements Standard for Baseline 2 ATS Data Communications, ATN Baseline 1 Accommodation (ATN Baseline 1 - Baseline 2 Interop Standard) | See INTEROP Drafting Guide | December 2023 |

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Agenda Item 3I:

DO-402: Minimum Operational Performance Standard (MOPS) for Wireless Avionics Intra-Communication Equipment operating within the 4200-4400 MHz band.

Steve Rines and Uwe Schwark
SC-236 Chairs

December 7, 2023

RTCA Paper No: 314-23/PMC-2503



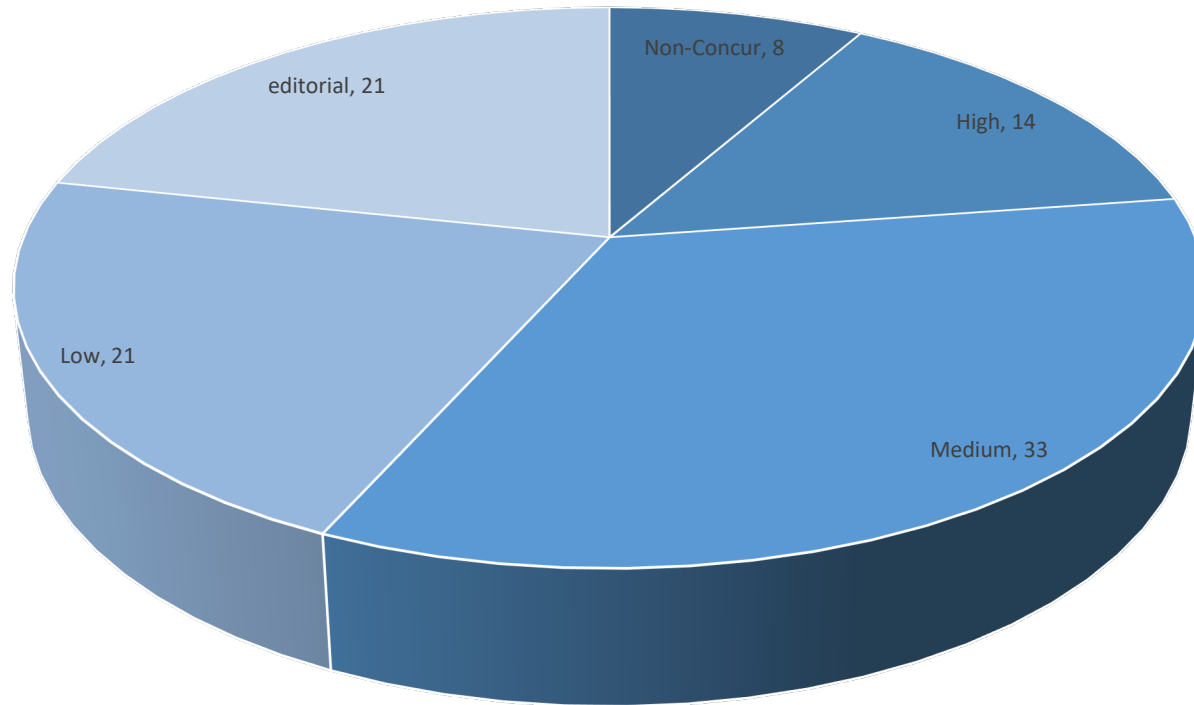
- SC-236 was established in 2016 to work together with EUROCAE WG-96 on the development of a MOPS for WAIC.
- During the work, the need for system-level guidance material was identified which led to the interposed development of a corresponding MASPs (DO-378A / ED-360A)
- Leadership
 - RTCA Chair – Steven Rines, Safran
 - EUROCAE Chair – Uwe Schwark, Airbus Operations GmbH
 - GAR – Rich Adler, FAA
 - Secretary – Dr. David Redman, Aerospace Systems Vehicle Institute
 - RTCA Program Director – Rebecca Morrison
- Participation
 - Participants included members from ~20 manufacturers, 6 research organizations / universities, FAA and EASA

- Basic purpose of the document:
 - provision of certification guidance
 - basis for TSO / ETSO authorization
- Major aspects covered by the document
 - Crucial RF-requirements to establish conditions for safe coexistence of WAIC and own-ship Radio Altimeter systems
 - General requirements on Cyber Security for the design of certain kind of WAIC equipment
- Document has undergone FRAC/OC and all member comments have been successfully resolved

FRAC/OC Comment Summary

Comment period: July 20 – September 29, 2023

DO-402 Comments



| Category | # Rcvd |
|--------------|-----------|
| Non-concur | 8 |
| High | 14 |
| Medium | 33 |
| Low | 21 |
| Editorial | 21 |
| Total | 97 |

- 16 comments received from members of the public with 6 comments marked as “non-concur”
- Comments were resolved at a September 2023 plenary, and public commentors appeared to accept their comments were out-of-scope for a MOPS.
- All comments by members including two non-concurs have been resolved.
- Awaiting to hear if the public commentors accept “non-concurs” answered with “No Change”

The “non-concurs” of the members of the public in detail:

- The spectrum use in the bands adjacent to the band 4200 – 4400 MHz has changed / will change and no compatibility studies were performed.
- The requirement on “Receiver Desensitization” (section 2.2.2.2.6.1) of a tolerable in-band interference level of **-120dBm/MHz** is too low, instead values around -90 ... -96 dBm/MHz were proposed.
- The requirement on “Receiver Blocking” (section 2.2.2.2.6.2) with a level of **-20dBm** is too low, instead values of up to 0dBm were proposed.

- Background information on public comments:
 - Comments were made by two representatives of the cellular industry (CTIA and GSMA) who did some analysis regarding potential interference from cellular network deployments into WAIC equipment.
 - Commenters were of the view, that if not more stringent interference tolerance and blocking limits were imposed onto WAIC radio equipment, interference from cellular systems into WAIC receivers could occur.
 - SC-236 members are fully aware of the upcoming cellular deployments using the bands immediate adjacent to the 4200 – 4400 MHz band. The analyses used by the cellular industry that resulted in their non-concurs was based on their understanding that the WAIC MOPS documented system requirements. In fact, the WAIC MOPS documents only equipment level requirements and therefore does not address mitigations and system constraints that will be applied as part of the aircraft installation process (e.g., antenna discrimination, exploitation of fuselage attenuation, proper link budget design, etc.).

Summary Position of SC-236 / WG-96 members regarding the comments from the public

- Compatibility studies with respect to adjacent band users: The comment raised and the suggestion to perform additional sharing studies is out-of-scope of this MOPS and lies in the responsibility of the ITU. RTCA SC-236 and EUROCAE WG-96 base their technical work on the existing regulatory situation, which is that the AM(R)S allocation exclusively made for WAIC by WRC-15, including all related ITU-R Recommendations and Reports.
→ **No Change**
- In-band interference level: The value of -120dBm/MHz is consistent with ICAO SARPs for WAIC developed in response to Resolution 424 (WRC-15). The purpose of the MOPS is to provide the minimum information to allow system suppliers to develop compatible systems within the allocated spectrum.
→ **No Change**
- Receiver blocking level: The value of -20dBm is consistent with WAIC ICAO SARPs developed in response to Resolution 424 (WRC-15). Any technical proposals offered by the commenters attempting to justify higher blocking levels are out of scope with respect to MOPS requirements.
→ **No Change**

Conclusion

SC-236 believe our work is done but we await response on non-concurs from public commenters and guidance from the PMC on how to proceed.

Follow on work

- Recommend putting the committee in Active Monitor Status when publication is approved

RTCA



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Agenda Item 3J:

DO-403: SPR/INTEROP for non-cooperative UAS detection systems

Adam Robertson

Chair, SC-238

December 14, 2023

RTCA Paper No: 294-23/2492



- Established in 2019 to work with EUROCAE 115 to develop standards for Counter Unmanned Aircraft Systems (CUAS) technology, focusing on detection and mitigation standards to ensure the safe integration of UAS into the aviation ecosystem
- Leadership
 - RTCA Chair – Adam Robertson, Fortem Technologies
 - EUROCAE Chair – Assaf Monsa, D-Fend Solutions
 - GAR – Tricia Fantinato, FAA
 - Secretary – Juan Lopez Campos, Indra
- Participation
 - 219 members from 100+ members of industry, and 53 members of government & regulator bodies such as FAA, EASA, TCCA, UK CAA and etc

Focus of DO-403

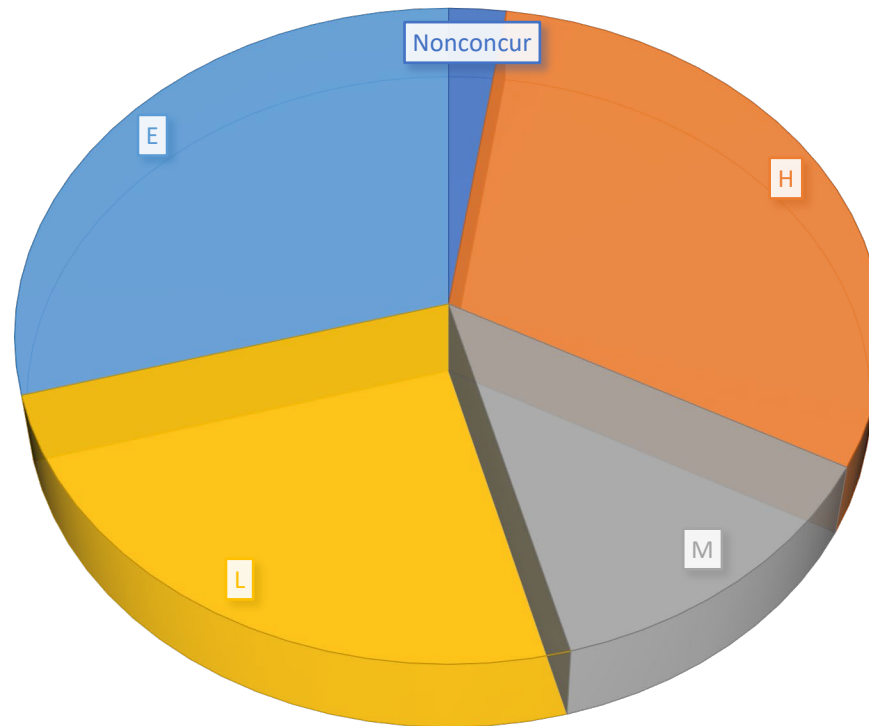
- Establish minimum system requirements for non-cooperative surveillance for detection of UAS in controlled airspace, particularly around airports, and
- Identify key definitions and diagrams illustrating key components of a detection, tracking, and identification system.

Document is a starting point, simple and basic.

FRAC/OC Comment Summary

Comment period: 9 August 2023 – 10 October 2023

DO-403 COMMENTS



| Category | # Rcvd |
|------------|--------|
| Non-concur | 2 |
| High | 28 |
| Medium | 12 |
| Low | 24 |
| Editorial | 25 |
| Total | 91 |

Note: No outstanding matters

Summary of Non-Concur (and resolution)

- All Non-Concur resolved
 - Added more detail buffers zone depictions
 - Non-concur beyond the scope of the document
 - Two comments out of scope of current TOR
 - Concerns to be addressed in future standards work
- Confirmed acceptance of the revised text and the non-concur was closed

Conclusion

- SC-238 Recommends approving DO-403 as submitted for publication

Follow on work

- The DO-403/ED-322 findings warrant an update of the 2021 DO-389/ED-238 OSED
 - FRAC/OC completion date – October 2024
- This update will further inform an INTEROP document to address the overall C-UAS system
 - FRAC/OC completion date – October 2025

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Agenda Item 4:

Integration and Coordination Committee (ICC)

Clay Barber

ICC Chair

December 14, 2023





Agenda Item 5A:

- Action Item:

Assemble List of Possible Documents for Review

Rebecca Morrison

Senior Director, Standards and Technology

December 14, 2023

RTCA Paper No: 324-23/PMC-2513



Published in 2017 (1)

| Committee | Document | Joint? | Status of Update | Who to Review |
|-----------|--|--------|------------------------------------|------------------|
| SC-159 | DO-246E: GNSS-Based Precision Approach Local Area Augmentation System (LAAS) Signal-in-Space Interface Control Document (ICD) | No | Change 1 released in 2019 | Active Committee |
| | DO-253D: Minimum Operational Performance Standards for GPS Local Area Augmentation System Airborne Equipment | No | Change 1 released in 2019 | |
| | DO-368: Minimum Operational Performance Standards for GPS/GLONASS (FDMA + antenna) L1-only Airborne Equipment | No | Need to contact the committee | |
| SC-206 | DO-369: Guidance for the Usage of Data Linked Forecast and Current Wind Information in Air Traffic Management (ATM) Operations | No | Need to contact the committee | Active Committee |
| | DO-370 (with supplement): Guidelines for In Situ Eddy Dissipation Rate (EDR) Algorithm Performance | No | Reviewed part of RTCA paper number | |

Published in 2017 (2)

| Committee | Document | Joint? | Status of Update | Who to Review |
|-----------|--|--------|------------------|---------------------------|
| DO-222 | DO-262C: Minimum Operational Performance Standards for Avionics Supporting Next Generation Satellite Systems (NGSS) | Yes | Rev F in process | Active Committee |
| | 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) | Yes | Rev E in process | |
| DO-225 | DO-311A: Minimum Operational Performance Standards for Rechargeable Lithium Batteries and Battery Systems | No | | PMC? Committee was sunset |



Published in 2017 (3)

| Committee | Document | Joint? | Status of Update | Who to Review |
|-----------|---|--------|---|------------------|
| SC-228 | AWP-3: Detect and Avoid (DAA) White Paper Phase 2 | No | Contact Committee | Active Committee |
| | AWP-4: Command and Control (C2) Data Link White Paper Phase 2 | No | Contact Committee | |
| | DO-365 with Test Vectors: Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems | No | Rev D in process | |
| | DO-366: Minimum Operational Performance Standards (MOPS) for Air-to-Air Radar for Traffic Surveillance | No | Rev A published 2020 | |
| SC-230 | AFS-1: Feasibility Study Weather Radar for Ice Crystal Detection | Yes | DO-220B included information from AFS-1 | Active Committee |



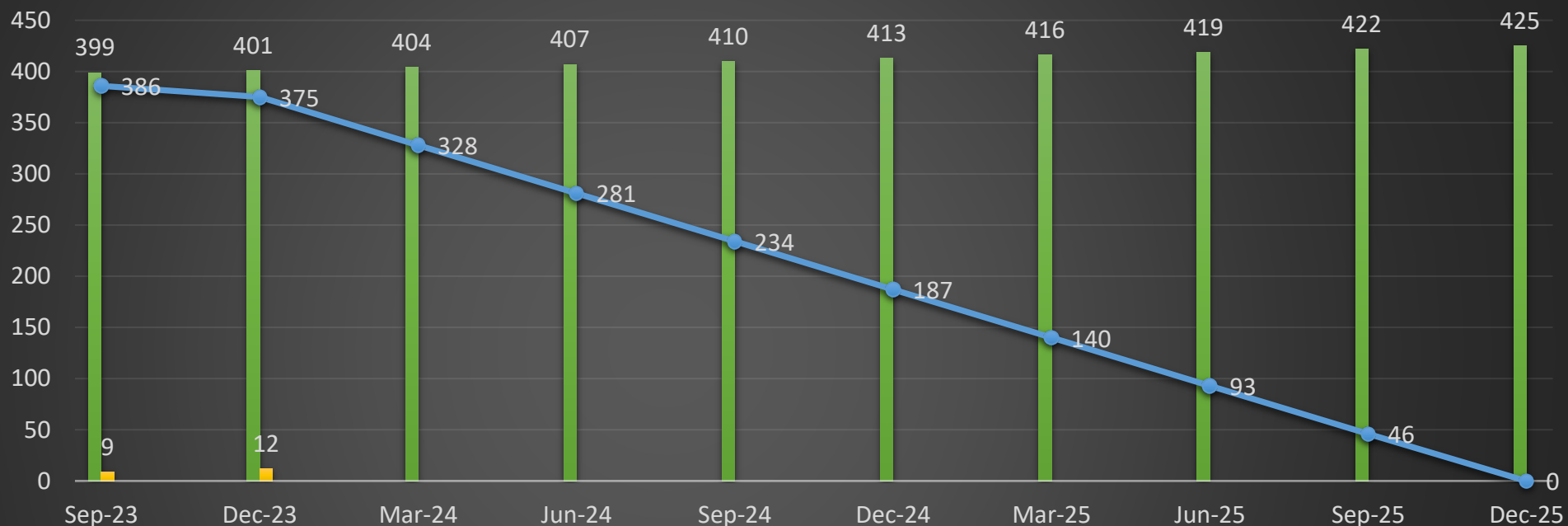
Published in 2017 (4)

| Committee | Document | Joint? | Status of Update | Who to Review |
|-----------|--|--------|------------------------------|---------------------------|
| SC-231 | DO-367 with Supplement: Minimum Operational Performance Standards (MOPS) for Terrain Awareness and Warning Systems (TAWS) Airborne Equipment | No | In discussions to update TOR | Active Monitor Committee |
| SC-233 | DO-372: Addressing Human Factors/Pilot Interface Issues for Avionics | No | | PMC? Committee was Sunset |
| SC-235 | DO-227A: Minimum Operational Performance Standards (MOPS) for Non-Rechargeable Lithium Batteries | No | In process for Rev B | Active Committee |

Path Forward

- Need to work with the ICC for the right information to request from the committee about potential updates
- Question: Should we only be looking at DOs? Or Also include AWP, AFSs, RRs, ETC?
- Need to contact: SC-159, SC-206, SC-216, SC-228, SC-229, SC-230, SC-231
- Who should review for SC-225 and SC-233?

Status of DO Review by RTCA



| | 23-Sep | 23-Dec | 24-Mar | 24-Jun | 24-Sep | 24-Dec | 25-Mar | 25-Jun | 25-Sep | 25-Dec |
|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Library of DOs | 399 | 401 | 404 | 407 | 410 | 413 | 416 | 419 | 422 | 425 |
| DOs Review complete | 9 | 12 | | | | | | | | |
| DOs to Review | 386 | 375 | 328 | 281 | 234 | 187 | 140 | 93 | 46 | 0 |

Library of DOs DOs Review complete DOs to Review

Follow up from Documents Published in 2018

| Committee | Document | Joint? | Status of Update | Who to Review |
|-----------|--|--------|---|--------------------------|
| SC-216 | DO-356A -Airworthiness Security Methods and Considerations | Yes | Need to contact the committee | Active Committee |
| SC-229 | DO-204B - Minimum Operational Performance Standard for Aircraft Emergency Locator Transmitters 406 MHz | Yes | Change 1 published – Need to contact the committee | SC-229 in Active Monitor |
| SC-230 | DO-213A Change 1 - Minimum Operational Performance Standards for Nose-Mounted Radomes DO-220A Change 1 - Minimum Operational Performance Standards (MOPS) For Airborne Weather Radar Systems DO-220A Change 1 Ref Suppliment | No | DO-220B published June 2023 DO-213A need review Need to contact the committee | Active Committee |

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Agenda Item 5B:

- Action Item:

ICC Assist with Request of Review of Documents

Rebecca Morrison

Senior Director, Standards and Technology

Clay Barber

ICC Chair

December 14, 2023





Agenda Item 5C:
Action Item:
Public Commenting Ad Hoc

Brett Eastham
RTCA Chief Operating Officer

December 14, 2023

RTCA Paper No: 320-23/PMC-2509



Ad Hoc Meetings and Actions

- November 8, 2023
 - Met with Terry McVenes and Anna von Groote as part of the RTCA/EUROCAE coordination meeting
- Review of the Open Consultation/Final Review and Comment Processes in WG-119/SC-239 and SC-236/WG-96
 - Review of Process Followed
 - Lessons Learned and Potential Improvements
- Review of current status of and recommendations for support of comment resolution and help finding a path forward
 - Ad Hoc Members requested to handle SC-239/WG-119 before addressing SC-236/WG-96
- December 4, 2023
 - Information was provided for detailed review of SC-239/WG-119 comment resolution status. Backup slides include timeline.

Preliminary recommendations from Meeting - Process

- In the current OC/FRAC process
 - Keep Public Commenting
 - Public Commentors would follow the Dissent Process if a non-concur is not resolved HOWEVER...
 - If a comment is not resolvable, engage the PMC (RTCA) and the TAC (EUROCAE) early to determine if an outside independent technical reviewer may help resolve the comment.

Note: RTCA does not have independent reviewer available but could explore options if PMC deemed necessary.



Potential Path Forward for SC-239/WG-119

- European Ad Hoc members seek to discuss directly with public commentors if their comments may be resolved regarding the technical position.
 - CTIA has 1 unresolved non-concur
 - All telecom commentors who have expressed they are not satisfied with the status of the comments

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Closed Action Item Agenda Items:

5D – Ad Hoc Questions to PMC

5F – ICC Charter to Wes

5G – Change Examples to PMC

5J – SC-214 ToR Clean Up

5K – DataCom Papers to PMC

5M – NASA Digital Stds Link to
PMC

December 14, 2023





Agenda Item 5E:

Action Item:

Draft Charter for Possible
Technical Pilot Advisory
Committee

Wes Googe

Technical Pilot

American Airlines

December 14, 2023





Agenda Item 5H:

Action Item:

RTCA and EUROCAE Discuss
Change Formatting

Will be covered as part of Agenda Item 6N





Agenda Item 5I:

Action Item:

SC-242 and WG-124 Consider
Document Name Change

Still Open





Agenda Item 5L:

Action Item:

Update on SC-235's Progress
on DO-227B

Will be covered under Agenda Item 6H





Agenda Item 5N:

Action Item:

SC-231 Provide Chair Report

Completed and will be covered under Agenda
Item 6M





Agenda Item 6A: Out of Cycle Actions since last PMC Meeting

- SC-222 – DO-262F Change 2 – Approved Oct 27, 2023
- SC-242 – RR #1 – Approved Nov 17, 2023
- SC-214 – DO-351B Vol I Errata – Approved Dec 4, 2023

Karan Hofmann

RTCA PMC Secretary





Agenda Item 6B: SC-239 (joint with WG-119) Update

Seth Frick, Jean-Luc Robin

SC-239 Co-Chairs

December 14, 2023

RTCA Paper No. 318-23/PMC-2507



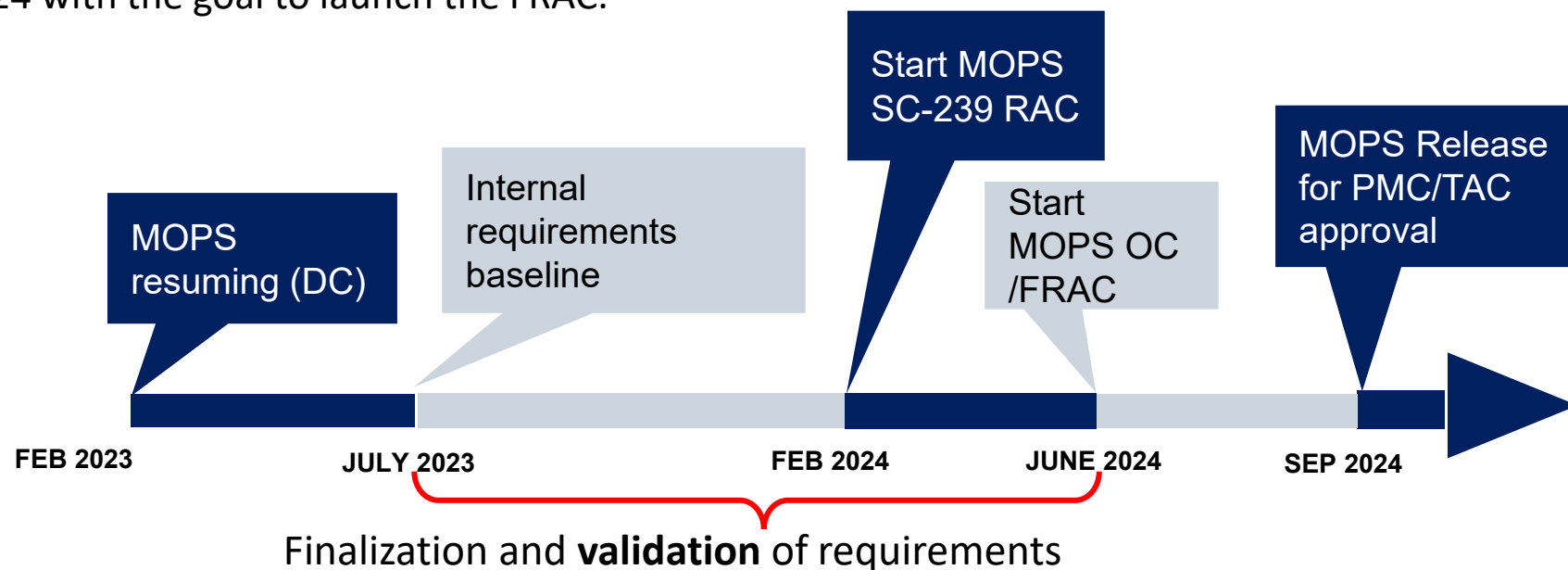
- SC-239 (Joint with WG-119)
 - Chairs: Seth Frick, Jean-Luc Robin
 - Secretary: Sai Kalyanaraman
 - Program Director: Rebecca Morrison
 - GAR: Barbara Clark
- High level Summary of Committee Purpose
 - Deliver the LRRRA MOPS with long term RA and RF Performance


- 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) ; 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.
 - 1st Ad hoc group meeting occurred in November 2023

DO-155a/ED-30a LRRRA MOPS Status

- In-person meeting dedicated to SG4 (RA performances) in December is organized by Garmin in Kansas with the goal to complete all SG4 requirements ready for RAC and to start test procedures.
- In-person meeting dedicated to SG5 (RFI tolerance) has been ran the week of the 6 November 2023 hosted by AVSI at Texas A&M. **A new ITM proposal has been made by an RA manufacturer, which is above the highest from DO-399 that is supportable by at least two RA manufacturers.** Need another RA manufacturer agreement for validation
- SG7 dedicated to RA Antenna (best rejection assessment) has started and is co-chaired by Thales and Free Flight. **Good** participation from RA Antenna Manufacturers. Aircraft manufacturers have been tasked to indicate their installation constraints.
- Next Plenary is planned the 8 February 2024 during which the RAC will be considered to be opened. Conditions to open the RAC have been decided within the committee leadership meeting. In a nut shell: all requirements completed (not necessary yet validated). Key parameters of the procedures agreed. At least 2 RA transceiver manufacturers agree for the ITM.
- Plenary in Spring planned in June 2024 with the goal to launch the FRAC.

Schedule on time for Sep 2024;
expect to request out-of-cycle review



- 
- No action requested from PMC

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Agenda Items 6C:

SC-159 – Navigation Equipment
Using the Global Navigation Satellite
System (GNSS)

Revised Terms of Reference

Chris Hegarty
Co-Chair, SC-159

December 14, 2023





Agenda Item 6E:

SC-206 - Aeronautical Information and Meteorological Data Link Services

ToR Revision

Presenters:

Mark Libant, Nav Canada, Co-Chair SC-206

Eldridge Frazier, FAA, GAR SC-206

December 14, 2023

RTCA Paper No. 303-23/PMC-2498



- SC-206
 - Co-Chairs:
 - Mark Libant, Nav Canada
 - Tim Rahmes, The Boeing Company
 - Government Authorized Representative: Eldridge Frazier, FAA
 - Secretary: Joe Bracken, AvMet Applications, Inc.
- High level Summary of Committee Purpose
 - Joint RTCA SC-206/EUROCAE WG-76 effort to identify AIS (Aeronautical Information Services) and MET (Meteorological) data link services for implementation in the next decade

Summary of changes in Revision 22

- ❑ Update delivery schedule of DO-364A / ED-XXX, *Minimum Aviation System Performance Standards for Aeronautical Information / Meteorological Data Link Services*
- ❑ RTCA Report for “Recommendation(s) Regarding Possible Standards to Support Aircraft-Based Meteorological Observation Dependent Applications”
 - ✓ Due: June 2025
 - ✓ Subgroup Task Lead: Matt Wiebold (Honeywell)
- ❑ DO-358C update to “Minimum Operational Performance Standards (MOPS) for Flight Information Services Broadcast (FIS-B) with Universal Access Transceiver (UAT)”
 - ✓ Due: Sep 2025
 - ✓ Proposed Subgroup Leads: Paul Freeman (Harris/L3) and Jim Mills (DoD)

Modify DO-364A/ED-XXX Delivery Schedule from December 2023 to December 2024

- ☐ Harmonize DO-364A with EUROCAE; update DO-364 with 8 new Aeronautical Information/Meteorological Services; and update DO-364 Eddy Dissipation Rate Turbulence Service (ETS)
 - ✓ Developed Service Descriptions for each of new services and updated ETS
 - ✓ Developed Operational Performance (OPA) and Operational Safety (OSA) Assessments for each Service to derive the operational and safety data link systems requirements
 - ✓ Currently developing Appendix B OPA and Appendix C OSA results
 - ✓ Current document is over 450 pages
- ☐ Team is attempting to prepare Document for FRAC Release mid-April 2024



RTCA Report for “Recommendation(s) Regarding Possible Standards to Support Aircraft-Based Meteorological Observation Dependent Applications”

- ☐ Recommendation(s) to the PMC regarding possible standards development work associated with aircraft-based meteorological observations and supported existing and emerging applications, including those for wake turbulence proximity, air traffic management and control, and weather forecasting purposes.
- ☐ The study team shall consider the performance of applications and systems providing aircraft-based meteorological observations and any requirements for supported applications.
- ☐ SC-206 will recommend to the PMC what standards development work may be needed to support such applications.
- ☐ SC-206 will coordinate with other aviation and weather community stakeholders as necessary to determine the best path forward.



Modify DO-358B MOPS for FIS-B UAT to include:

- ☐ Update current FIS-B products with higher resolution and update rates:
 - In-flight Icing – Current Icing Products and Forecast Icing Products
 - Turbulence - Turbulence Nowcast
- ☐ Reactivate Special Use Area (SUA) Product (Product ID #13)
- ☐ Uplink UAS only TFRs as a separate Product ID
- ☐ Improve FIS-B outage descriptions
- ☐ Provide Military Training Area and Routes Status

Correct any errors or deficiencies in DO-358B reported to SC-206 or found by SC-206 during the course of the DO-358B update.

Review and modify DO-358B to match SBS FIS-B system changes since release of DO-358B, if necessary.

Evaluate and consider the following products additions and enhancements to DO-358C:

- ☐ Digital-Automatic Terminal Information Service
- ☐ Add cloud bases to Cloud Tops
- ☐ Military Training Area routes



| Product | Description | FRAC Completion Date |
|-------------|--|----------------------|
| RTCA Report | “Recommendation(s) Regarding Possible Standards to Support Aircraft-Based Meteorological Observation Dependent Applications” | June 2025** |
| DO-358C | Minimum Operational Performance Standards (MOPS) for Flight Information Services Broadcast (FIS-B) with Universal Access Transceiver (UAT) | Sep 2025 |

** This is the completion date for the RTCA Report and not a FRAC completion date
IFRAC is not required for this internal RTCA Report

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Agenda Item 6F:

SC-224 – Standards for Airport Security Access Control Systems Revised ToR

Presenter(s):

Dr. Christer Wilkinson, Co-Chair SC-224

Dr. Jonathan Branker, SC-224 Task Lead

Date: 14 December 2023

RTCA Paper No. 286-23/2490



- SC-224
 - Chair(s): Christer Wilkinson (AECOM) and Alan Paterno (TSA)
 - GAR: Djhanice Neric (FAA)
 - Secretary: Art Kosatka (TranSecure)
- High level Summary of Committee Purpose
 - To defined standards for Airport Access Control Systems

- Summary of changes in revision 10
 - Deliverable DO-230L was delivered in December 2022
 - Deliverable DO-230M has had final FRAC review and will be presented at the next PMC meeting (March 2024)
 - Completion of DO-230N is planned for May 2025 with updates to the following sections
 - Facilitation
 - Procurement
 - Cyber Security
 - Minor updates as required by technical progress on all other sections.
 - Completion of DO-230O is planned for December 2026 with potential updates to the Cyber Security, Credentialling and Video and minor updates as to all other sections.

- In the event of changes in TSA regulations other sections may require updates as necessary
- In the event of significant technology breakthroughs such as AI, additional sections may require updates as necessary or the introduction of a standalone AI section



| Product | Description | FRAC Completion Date |
|---|---|----------------------|
| DO--230M Standards for Airport Access Control Systems | Updates in Facilitation, cyber security, communications and minor changes to all other sections | December 2023 |
| DO-230N Standards for Airport Access Control Systems | Updates in Facilitation, procurement, cyber security, and minor changes to all other sections | May 2025 |
| DO-230O Standards for Airport Access Control Systems | Updates in video, cyber security , credentialing, and minor changes to all other sections | September 2026 |

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Agenda Item 6H: SC-235: Non-Rechargeable Lithium Batteries

John Trela
Technical Fellow, The Boeing Company
SC-235 Chairman

December 14, 2023

RTCA Paper No. 287-23/PMC-2491



- SC-235
 - Chair: John Trela
 - GAR: Norman Pereira
 - Secretary: Jeff Densmore
- High level Summary of Committee Purpose
 - This committee was established to update DO-227, Minimum Operational Performance Standard for Lithium Batteries, that was published June 23, 1995. DO-227A was published as Minimum Operational Performance Standard for Non-Rechargeable Batteries on September 21, 2017.

- Summary of changes in revision 7
 - Update deliverable due date for FRAC completion of DO-227B “Minimum Operational Performance Standard for Non-Rechargeable Lithium Batteries” from March 2023 to June 2024
 - Reaching consensus on document update has taken longer than initially thought and changes were significant enough to warrant a second round of FRAC

Updated Schedule: Key Dates

- Plenary #32 November 6, 2023 to open second FRAC (Completed)
- Second FRAC Start: November 14, 2023
- FRAC comments due: January 12, 2024
- Plenary #33 TBD (tentative for early February)
- Comment (FRAC) Resolution Completed target date: April 12, 2024
- Document to RTCA by May 1, 2024
- RTCA PMC Approval June 2024





SC-235 Deliverables

| Product | Description | FRAC Completion Date |
|---------|---|----------------------|
| DO-227B | Minimum Operational Performance Standard for Non-Rechargeable Lithium Batteries | June 2024 |
| | | |
| | | |
| | | |
| | | |
| | | |

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Agenda Item 6I:

- AAM Workshops

Terry McVenes

President and CEO, RTCA, Inc

December 14, 2023

RTCA Paper No: 329-23/PMC-2516



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
- Will be establishing dedicating priorities in early 2024

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Agenda Item 6J:

- Digital Flight Operations Activity

Brandon Suarez
SC-228 Co-Chair
December 14, 2023





Agenda Item 6K:

- FAA Actions Taken on Previously Published Documents

FAA to Present
RTCA Paper No. 325-23/PMC-2514



Agenda Item 6L: Rulemaking Update

November 2023

Rodrigo PRIEGO

Initial Airworthiness Standards and Specifications

RTCA Paper No. 331-23/PMC-2518

Your safety is our mission.

CS 25– upcoming changes

EDD expected before end of 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 in Q1 2024

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



CS-ETSO Amendment 18

New ETSO

ETSO-C219a Airborne Collision Avoidance System (ACAS) Xa/Xo

- 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

| ETSO | Title | Reason |
|-----------|---|------------------|
| Subpart A | § 2.4 Failure Conditions Classification and Development Assurance | Clarification |
| C90e | Cargo Pallets, Nets and Containers (Unit Load Devices) | Align with FAA |
| C112f | Secondary Surveillance Radar Mode S Transponder | Align with FAA |
| C132b | Minimum Operational Performance Standards for Geosynchronous Orbit Aeronautical Mobile Satellite Services (AMSS) Avionics (receiver) | Align with FAA |
| C159e | Next Generation Satellite Systems (NGSS) Equipment | Align with FAA |
| C164a | Night Vision Goggles | Align with FAA |
| C166c | 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) | Align with FAA |
| 2C169b | VHF Radio Communications Transceiver Equipment Operating Within The Radio Frequency Range 117.975 To 137.000 Megahertz | Antennas and HMI |
| 2C502a | IIS - Integrated Immersion Suit | Updated MOPS |
| 2C503a | IS - Immersion Suit | Updated MOPS |
| 2C504a | Life Jacket | Updated MOPS |
| 2C519a | Emergency Breathing Systems EBS | Updated MOPS |
| 2C521 A1 | Electronic Flight Bag (EFB) | Clarification |

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

easa.europa.eu/connect



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An Agency of the European Union 



Agenda Item 6M:

- Chair Reports

Rebeca Morrison

Senior Director, Standards and Technologies

December 14, 2023

RTCA Paper Number: 315-23/PMC-2504





Agenda Item 6N:

- RTCA/EUROCAE Annual Coordination Meeting
- and
- International Coordination

Terry McVenes, President and CEO of RTCA

Rebecca Morrison, Senior Director Standards and Technologies at RTCA

December 14, 2023

RTCA Paper No: 326-23/PMC-2515



- November 7-8, 2023, at RTCA
- Attended by:
 - RTCA: Terry McVenes, Brett Eastham, Chris Hegarty, Rebecca Morrison, Andrea Berry and Karan Hofmann
 - EUROCAE: Anna von Groote and Eric Bouchard

- Potential New Activity Topics
 - New GBAS Standard
 - Runway Weather Information Systems
 - Take off performance monitoring
- Policy Updates
 - Committees are not allowed recording meetings
 - Committees are not allowed to use AI applications their work
 - This wording is being coordinated for a future policy slide update
 - Hope to finalize in January 2024
- Additional Topics
 - Met with the Public Commenting Ad Hoc Members to kick off activity
 - Met with the FAA and EASA about how RTCA and EUROCAE can best support them

- EUROCAE convened a workshop for all EUROCAE datalink committees to discuss the status of standards, across all organizations, related to datalink
- EUROCAE coordinated with RTCA to invite RTCA Chairs for groups that were joint
- First meeting was on November 22, 2023
- Follow on workshop planned in 2024 which will also include the FAA GAR's

| Reference | Title | Publication date | Joint document reference | WG |
|---------------------------|--|------------------|--------------------------|------------|
| ED-228B Corr.1 | Safety and Performance Requirements Standard for ATS Data | 04/12/2023 | N/A | WG-78 |
| ED-229B Corr.1 | Interoperability Requirements Standard for Baseline 2 ATS Data Communications | 04/12/2023 | DO-351B Errata 1 | WG-78 |
| ER-028 | Survey of Radio Frequency (RF) Performance Standards for Aeronautical RF Systems | 29/11/2023 | RR-001 | WG-124 |
| ED-243C Ch.2 | MOPS for Avionics Supporting Next Generation Satellite Systems (NGSS) | 07/11/2023 | DO-262F Ch.2 | WG-82 |
| ED-129C | Technical Specification for a 1090 MHz Extended Squitter ADS-B Surveillance System | 19/10/2023 | | WG-51 SG-4 |
| ED-259A | Minimum Operational Performance Standard for Dual-Frequency Multi-Constellation Satellite-Based Augmentation System Airborne Equipment | 11/10/2023 | DO-401 | WG-62 |

Upcoming EUROCAE Events

- TAC 97 16-17 January 2024 at EUROCAE
- Symposium 24 & 25 April 2024 in Lucerne
- TAC 98 26 April 2024 in Lucerne

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Agenda Item 7A:

- AI/ML Workshop

Terry McVenes

President and CEO, RTCA

December 14, 2023

RTCA Paper No: 330-23/PMC-2517



Background

- Workshop conducted based on conversations with RTCA industry members and FAA
- Focus: what needs to be done vs. what is already being done
- November 28, 2028
- ~200 participants
 - U.S and European industry
 - FAA
 - NASA
 - DOD
 - MITRE

Presentations

- FAA
- MITRE (2)
- NASA
- US Naval Research Lab
- xWing
- Daedalean
- Collins
- Joby
- AVSI

Primary Outcomes

- Do Not Duplicate Efforts with SAE SG-34/EUROCAE WG-114
- Don't Establish Standards too Early
 - May damage transition to AI/ML technology
 - Will engineer technological debt/set back to the entire aviation industry
- Need for More Foundational Work
- Narrow Boundaries Scope
 - Separate and Sort
 - Don't boil the ocean
- Separate Process for Performance

Call to Action

- Develop one or more standards providing examples on capability specification, verification procedures and safety assurance for AI/ML based systems
- Develop measures and guidelines addressing trustworthiness of AI/ML in flight critical applications
- Perform a survey of its existing standards to evaluate the impact of AI/ML
- Assess existing efforts supporting incorporation of AI/ML in aviation systems design and development assurance to identify where it should coordinate with other groups and where it can make unique/complementary contributions.
- Operationalize the use of future AI/ML Documents

Next Steps

- Development of RTCA Report
 - Identifies needed foundational work
 - Recommendations for boundaries/scope of work
- Survey of Existing Standards
 - Impact of AI/ML
- Evaluate for Future Work

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Agenda Item 7B:

- RTCA Document Types

Rebecca Morrison

Senior Director, Standards and Technologies

December 14, 2023

RTCA Paper No. 321-23/PMC-2510



| Type | Basic Purpose |
|---------|---|
| OSD | Understand environment in which equipment will operate |
| SPR | Safety Assessment, Ops Performance Assessment (Comm, Nav, Surv) |
| INTEROP | Ensure capability among system elements to exchange and make use of information |
| MASPS | Assuring system will perform its intended functions in the overall airspace ecosystem. |
| MOPS | Assuring equipment will perform its intended functions to a minimum level |
| Other | Guidance documents and other deliverables that follow the full process for creating a . The structure and content should be captured in the executive summary. |

| | DO | Other* |
|--|-----|--------|
| Listed in the SC's ToR | R | R |
| Developed to an existing type of RTCA Standard | R | N/A |
| Completes full FRAC process | R | O |
| Approved by the PMC | R | O |
| Placed in the store | R | O |
| Assigned an alternative designation if placed in the store | N/A | R |

R – Required

O – Optional

N/A – Not Applicable

*Designators can be created for specific situations depending on the document produced. An explanation of the pedigree of review for the document will be clear in the document description for the store.

| Type | Basic Purpose |
|---|--|
| White Paper (split into AWP versus RTCA PN) | Statement of a Problem and a Solution (more of a position paper vs. a research paper) |
| RTCA Report (RR) | Similar to White Paper; equivalent to EUROCAE Report (ER). FRAC Optional. Yes store |
| Feasibility Report (AFR) | Research viability/practicability of a proposed plan or method or defined technology or new concept. Yes FRAC, Yes Store |
| Guidance Document | Provide general recommendations or piece of advice on how to do something related to a future action |
| Industry Consensus Paper | New type of document being worked by the RTCA Advisory Board with more details to follow |

| Type of modification | Corrigendum/Errata | Change | Revision |
|----------------------|---|---|--|
| Allowed scope | <p>Removal of low impact mistakes</p> <p>Correction of minor procedural / editorial errors</p> <p><i>Cannot, with the exception of editorial updates, add, remove or modify a requirement or test</i></p> | <p>Addition, modification, deletion of a limited part of the document</p> <p><i>The WG/SC extracts the information that need to be changed and provide the information in the context of the whole document.</i></p> <p><i>If the document being changed is referenced in a regulatory document, coordination is needed with the regulator.</i></p> | <p>Significant technical/technological changes</p> |

| Type of modification | Corrigendum/Errata | Change | Revision |
|----------------------|---|---|--|
| Procedure | <p>Prepared by WG/TAC or EUROCAE Secretariat</p> <p>No specific consultation / approval necessary</p> <p><i>RTCA requires at a minimum PMC approval and also SC approval if the committee is still active</i></p> | <p>Prepared by WG + subject to Open Consultation and Council approval</p> <p><i>RTCA requires PMC approval to initiate the work. Must have a formal FRAC prior to PMC approval for publication</i></p> <p><i>WG/SC needs to provide explanation of why it is necessary.</i></p> | <p>Prepared by WG + subject to Open Consultation and Council approval</p> <p><i>RTCA requires PMC approval to initiate the work. Must have a formal FRAC prior to PMC approval for publication</i></p> |

| Type of modification | Corrigendum/Errata | Change | Revision |
|----------------------|---|--|--------------------|
| Publication as | ED-000 incl Corr 1 <i>RTCA issues as RTCA PN and attaches to new document deliveries</i> <i>Need to include the relationship to the other organizations Corr/Errata in the forward information.</i> | ED-000 incl Ch 1 <i>DO-000 Change 1</i> | ED-000A DO-000A |

Summary of Document Type Definitions

- Errata:
 - Corrections that would be classified as administrative or minor edits (misspellings, punctuation, alignment)
 - An error in printing or writing (found in a printed work after printing)
- Change:
 - Addition, modification, deletion of a limited part of the document
 - A relatively minor modification of main-body content
 - A modification of any kind to a technique – specific appendix that affects only that appendix
 - Correction of detail
 - Scope (to possibly include specific sections or appendices) included in TOR
- Revision:
 - A significant change to main-body content – significant technical/technological changes
 - An addition of a significant new element to the appendices
 - Fundamental change

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Agenda Item 7C:

- Updates to Publications
Post September PMC

Rebecca Morrison

Senior Director, Standards and Technologies

December 14, 2023

RTCA Paper No: 323-23/PMC-2512



- DO-401 Changes requested from the Document Editor
 - RTCA Version to support cross referencing
 - Minor changes to the numbering caused by EUROCAE/RTCA Style conversions
 - Some loss of superscripts
 - Changes to the numbering of Notes

Result: Will publish with Integrated Errata because the Errata cannot be done as a separate sheet
- DO-350B Changes requested from EUROCAE after formatting the document for EUROCAE publication
 - Very minor changes to document
 - Was submitted and withdrawn twice from the EUROCAE store
 - Because DO-350B was never officially in the RTCA store, no errata issued

Result: DO-350B is technically equivalent with ED-228B with Corrigendum 1

- DO-351B Changes requested from EUROCAE after formatting the document for publication by EUROCAE
 - Very minor changes to document
 - Because DO-351B changes have a modification of a numerical value, this errata was submitted to the PMC for an OOC approval and has been published

Result: Quick turn errata approval from PMC

- DO-404 Directly References DO-350B and DO-351B
 - Since they were not available, DO-404 was removed from the store for ~2 weeks
 - After DO-350B and DO-351B were approved, DO-404 as made active in the store again

Result: An errata for DO-404 will be issued changing the reference from ED-228B/DO-350B to ED-228()/DO-350()

- Many changes were generated during the RTCA/EUROCAE conversion process
- Modification to the preparation for publication process
 - RTCA PDs must wait until the EUROCAE PDF is ready to review by committee leadership to take next steps (need to work specifics with EUROCAE TPMs)
 - RTCA PDs must submit the RTCA PDF and the EUROCAE PDF to leadership concurrently to approve before sending to the PMC (need to work specifics with EUROCAE TPMs)

TAKE AWAY: RTCA will need to defer to the next PMC if it is received less than 45 days before the next PMC meeting

Request – Does the PMC have other suggested ways to address these issues or corrections on how we have addressed for these four documents?

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Agenda 7D: SC-147 Status Update

Julia Code Availability
New Schedule Risk

Stuart Searight & Ruy Brandao
Co-chairs, SC-147

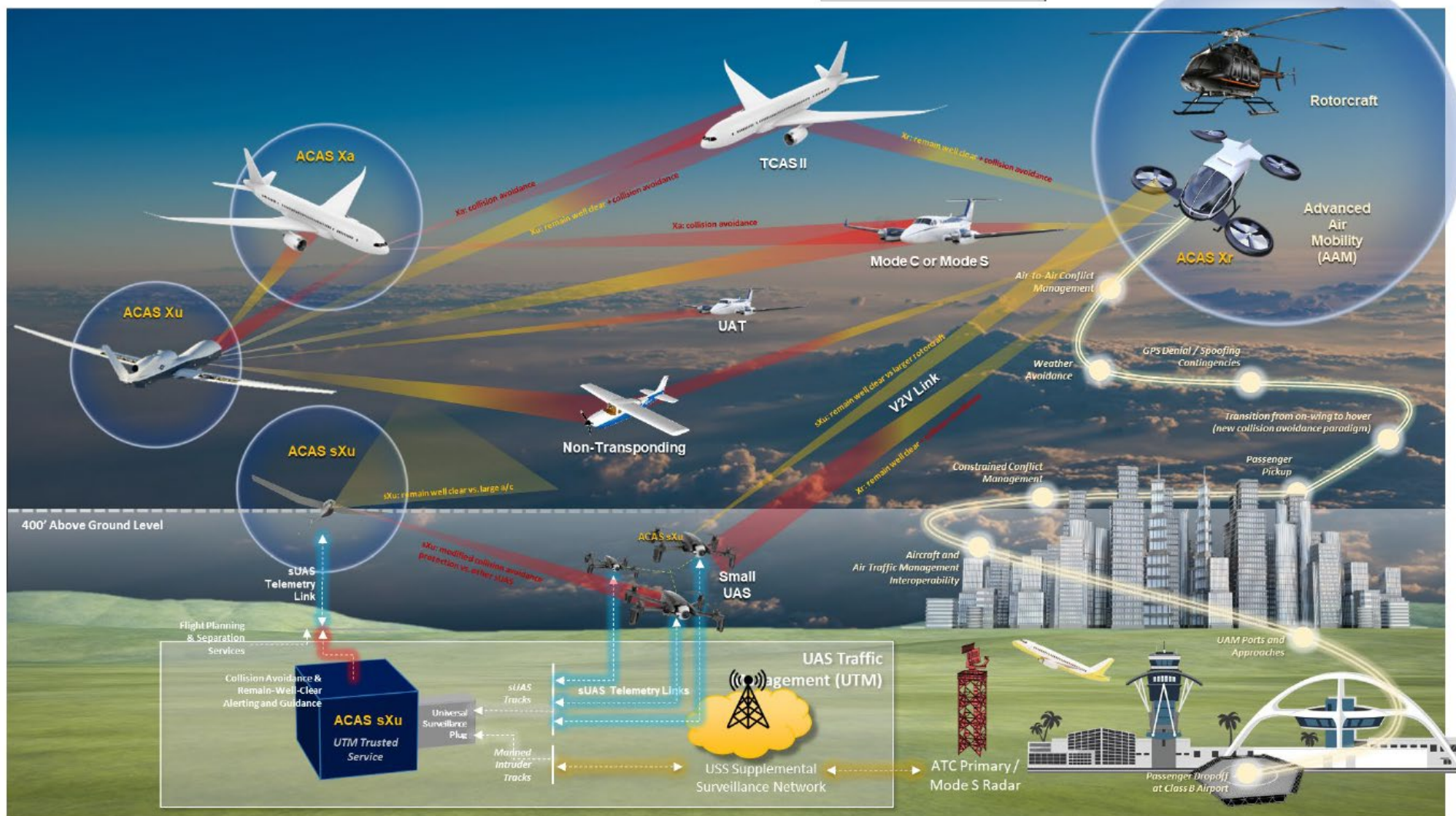
December 14, 2023

RTCA Paper No: 308-23/PMC-2501



- Reconstituted in 2007 to work with EUROCAE WG-75 on Collision Avoidance Standards
- Leadership
 - RTCA Co-chair – J. Stuart Searight, FAA (ANG)
 - RTCA Co-chair – Ruy Brandao, Honeywell International
 - EUROCAE WG-75 Chair – Guido Manfredi, Volocopter
 - GAR – Matt Haskin, FAA (AIR)
 - Secretary – currently *vacant*
- Participation
 - Participants included members from all major avionics manufacturers (Honeywell, ACSS, Collins, Sagetech, Thales, Garmin), EASA, Boeing, Airbus, ALPA, etc.
 - Work in close coordination with SC-228








[illegible]

**Airborne Collision
Avoidance System
X (ACAS X)
improves aviation
safety, enables full
integration of
unmanned aircraft,
and is flexible and
adaptable to meet
future airspace
challenges**

Airborne Collision Avoidance System X

- ACAS X is the next evolution of collision avoidance capabilities being developed to support future airspace requirements, new user classes, and to address TCAS II Shortfalls (RTCA DO-337)

- Transitions from **Explicit Programming** (TCAS) to **Decision Theoretic Planning** (ACAS X)
 - Optimal Threat Resolution Logic produced from **Probability Models (Logic Tables)** vs **Deterministic Models (Heuristic Logic)**
- Decouples Surveillance and Threat Resolution Logics – enabling plug and play surveillance

| | User Group | Surveillance Technology | Advisories | STDs |
|---|---|--|--|------------------------|
|  ACAS X_A (Active Surveillance) | Current TCAS II users (large manned aircraft) | Active supplemented with ADS-B | Resolution Advisories (RAs): Vertical Same as current TCAS II | RTCA 2018 DO-385 |
|  ACAS X_O (Operation Specific) | Users of specific operations (e.g., closely-spaced parallel operations) | Active supplemented with ADS-B | Procedure-specific alerts for selected aircraft, global RAs against all others | |
|  ACAS X_U (Unmanned Aircraft System) | Phase II / Class 3 DAA Harmonizes DRWC and CA Alerting | Active, ADS-B, & Primary Radar EO/IR Augmentable | Vertical and/or Horizontal (DRWC + Blended CA) | RTCA 2020 DO-386 |
|  ACAS X_S (Smaller UAS) | Part 91, 135, 107 BVLOS / Class E Extendable Class D, G / Part 107 VLOS | ADS-B supplemented with low SWaP & ground sensors | Vertical and/or Horizontal (Scaled DAA Separation Volumes) | RTCA 2022 DO-396 |
|  ACAS X_R (Rotorcraft) | Rotorcraft | ADS-B & Reduced Active Reduced Validation / Omni Only | Blended RAs: Vertical, Horizontal, and/or Speed | RTCA ~2025 |

All ACAS X variants detect conflicts with intruder aircraft, issue Resolution Advisories (RAs), and coordinate maneuvers with other CA systems. They share an underlying common design but have hardware, surveillance, and threat logic tailored for different user groups.

Request to include Julia Code with all ACAS X MOPS (1/2)

- Follow-up item from June 2023 PMC Meeting
- ACAS X Logic formally defined in Volume II of each ACAS X MOPS.
 - Algorithm Design Description (ADD)
 - Currently the ADD is made available by FAA Program Office when requested.
- Julia Code is the code used by the FAA Program Office team for **part of** their implementation of ACAS X logic
 - Available Julia Code is not complete ACAS X system implementation, just core logic
 - Implementors prefer to have Julia Source Code to either “jump start” or help to verify their instance of the ACAS X logic

Request to include Julia Code with all ACAS X MOPS (2/2)

- SC-147 has formally agreed that it would be beneficial to include Julia Code with MOPS for each version of ACAS X (*June Plenary*)
 - Will be included in the “Supplementary Material” that is available to those who have purchased the MOPS but was not directly included in the FRAC process
 - Other Supplementary material includes Logic Look-up Tables, Path Coverage Test Suite.
 - Ensures availability of these materials for all purchasers of the MOPS.
 - README will describe:
 - Associated ADD
 - Julia version
 - File organization
 - Caveat: Source code provided as a convenience; the published ADD takes precedence in the event of any disagreement.

Supplemental and Supporting Materials for ACAS X MOPS

| Deliverable | | OneDrive Location |
|--|---|-------------------|
| ACAS sXu FRAC Volume I Text (.pdf) | Materials directly commented on and approved. | Primary |
| ACAS sXu FRAC Volume II Text (.pdf) | | Primary |
| ACAS sXu FRAC Volume II Horizontal Logic Tables (.dat) Includes horizontal coordination table (.bin) | Extensions of the primary materials, not directly commented on during FRAC. <u>Available with Purchase of MOPS</u> | Supplemental |
| ACAS sXu FRAC Volume II Vertical Logic Tables (.dat) Includes entry tables (.dat) | | Supplemental |
| ACAS sXu FRAC Parameters File (.txt) | | Supplemental |
| ACAS sXu FRAC Test Suite Text (.pdf) | | Supplemental |
| ACAS sXu FRAC Test Suite Encounters (compressed .txt) | | Supplemental |
| ACAS sXu FRAC ASIM User Guide (.pdf) | Used to help understand/justify MOPS. Briefed as part of final System approval, but are FAA Documents not formally approved by RTCA. <u>Available to all SC-147/WG-75 Members</u> | Supporting |
| ACAS sXu FRAC ASIM Encounter Sets (.zip) | | Supporting |
| ACAS sXu FRAC ASIM App (includes executable ACAS library) (.msi) | | Supporting |
| ACAS sXu FRAC Operational Validation Report | | Supporting |
| ACAS sXu FRAC System Safety Assessment | | Supporting |
| Requirements Management and Justification Matrix (RMJM) (.xlsx) | | Supporting |
| Requirements Management and Justification Report (RMJR) (.pdf) | | |

Julia Source Code

Request

- SC-147 Requests PMC Approval to add the Julia Code to the set of supplemental material for each ACAS X MOPS

Schedule Risk for remaining MOPS

- SC-147 and WG-75 are currently working on MOPS for
 - ACAS Xr
 - Crewed/Uncrewed Rotorcraft with look towards UAM/AAM operations
 - Cooperative Surveillance Systems
 - Separate some surveillance requirements so that they can be directly cited by other DAA systems
- ToRs call for both to be approved in September 2025
- Recent Budget Cuts to FAA Program Office is forcing delays on completion of next ACAS Xr logic version and completion of initial draft of both MOPS
 - Spring iRAC delayed at least 6 months
- **SC-147 will bring new completion dates to PMC as soon as full impact is understood and accounted for**

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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-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)*

NOTE: Will be OOC approval requests prior to March 2024 Meeting

- SC-224, Standards for Airport Security Access Control Systems
 - DO-230M – *Standards for Airport Security Access Control Systems*
- SC-236, Standards for Wireless Avionics Intra-Communication within 4200-4400 MHz
 - DO-402 – *MOPS for Wireless Avionics Intra-Communication within 4200-4400 MHz*

NOTE: Will be OOC approval request prior to March 2024 Meeting

- March 14, 2024
- June 20, 2024
- September 26, 2024
- December 12, 2024???



December Action Item Review





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