

RTCA- 228
Summary of Plenary #38 RTCA Paper No. 178-23/SC228-110
HYBRID MEETING
9:00 AM EST, July 21, 2023

The thirty-eighth plenary of RTCA Special Committee 228 was called to order by SC-228 Co-Chair, Jim Williams at 9:02 AM EST on July 21, 2023 at RTCA headquarters in Washington, D.C. and using WebEx audio and web conferencing.

1. Agenda Item #1- Call to Order: Welcome
 - 1.1. Jim Williams, co-chair called the meeting to order and stated the purpose for today's plenary through a review of the published and proposed agendas.
2. Agenda Item #2- Review RTCA meeting guidelines
 - 2.1. Brandi Teel, RTCA Program Director, welcomed everyone
 - 2.2. Brandi reviewed the Anti-Trust Policy, the Proprietary Policy and the RTCA Committee Participation Membership Policy
 - 2.3. Brandi also briefed some meeting tips to ensure a successful virtual meeting
 - 2.4. Brandi then briefed the online self-rostering feature. Thank you to all who self-roster!
3. Agenda Item #3- Opening Remarks/ Introductions
 - 3.1. Went around the room and phone, and introduced participants and companies
 - 3.1.1. 13 in person, ~55 online

NOTE: Both WG1 and WG2 are looking for secretaries to fill open positions. Please reach out to anyone on committee leadership if you are interested in this opportunity.

 - 3.2. Participants on the phone stated their names and organizations, and attendance is noted in Appendix A
4. Agenda Item #4- Review and Approve the agenda
 - 4.1. No walk on agenda items.
5. Agenda Item #5 - Approve meeting minutes from Plenary Meeting #37
 - 5.1. Katie Edwards, secretary, stated they received no comments for update/revision.
 - 5.2. Katie called for a motion to approve the minutes. Marv Hammond moved to approve the minutes. Andrew Videmsek seconded.
 - 5.3. There were no objections noted, minutes approved.
6. Agenda Item #6 - Schedule review – high level overview of upcoming document work that remains for 2022-2023
 - 6.1. The schedule will be updated based on the plenary presentations, and uploaded to the schedule folder on AerOpus.

7. Agenda Item #7 – WG-1 Update
 - 7.1. Fabrice Kunzi provided the update for WG-1
 - 7.2. DO-381A on Ground Based Surveillance Systems
 - 7.2.1. Initially had 3 non-concurs, one was downgraded to High.
 - 7.2.2. Agreed with Army non-concur comment to add text in the document to highlight that this is an acceptable design approach, and there are others out there.
 - 7.2.3. Corrected incorrect table reference that made standard unachievable
 - 7.2.4. WG-1 requests to exit FRAC, pending implementation of agreed to comment resolutions.
 - 7.2.5. Jim Williams called for a motion. Andrew Videmsek moved to approve the exit of FRAC for DO-381A. Ali Ferguson seconded the motion.
 - 7.2.6. DO-381 will exit FRAC.
 - 7.3. Completed internal RAC of DO-398A.
 - 7.3.1. Major modifications of the document include: add ACAS Xr scenarios; “Terrain awareness” of collision avoidance alerts; Removal of references to DAA Class equipment.
 - 7.3.2. WG-1 requests to enter FRAC for DO-398A.
 - 7.3.2.1. Andrew Videmsek added that there are some surface operation considerations also relocated from the document. Jose Fuentes requested the WG check that the reference for where the information is going be added to the document.
 - 7.3.2.2. Jim called for a motion, Randal Guendel moved to approve, Andrew Videmsek seconded.
 - 7.3.2.3. Entry to FRAC approved.
 - 7.3.3. SC-147 and SC-228 jointly met for 2 days this week.
 - 7.3.3.1. Terrain Awareness:
 - 7.3.3.2. Decision: ACAS Xr Resolution Advisories will be “Terrain Aware”
 - 7.3.3.3. Decision: Databases used for TAWS adequate for use in ACAS Xr
 - 7.3.3.4. Decision: Include Level-Offs as available RAs in Terminal area
 - 7.3.3.5. Decision: Exclude horizontal maneuvers in Terminal area
 - 7.3.3.5.1. Stu Searight asked if this is consistent with everything in the Xr program office to date. Randal Guendel confirmed it is generally in alignment and there are no concerns with the decisions here.
 - 7.3.3.6. GNSS Only Intruders:
 - 7.3.3.7. Decision: Inclusion of non-certified, GNSS only intruders is handled external to STM/TRM
 - 7.3.3.8. Action: Write white paper identifying policy implications for consideration by FAA
 - 7.3.3.9. Seeking pilot and expert feedback on alerting metrics for functionality of ACAS Xr introduces collision avoidance to operators, operations, and operational environments that currently do not use such systems. Planning to complete this work in second half of year.

- 7.3.4. Other activities
 - 7.3.4.1. Daedalean briefing – real world experience with DO-387.
 - 7.3.4.2. GA briefing – preventative RA downgrade
 - 7.3.4.3. M:N breakout
 - 7.3.4.4. Surface Taxi breakout
- 8. Agenda Item #8 – WG-2 update
 - 8.1. Amelia Mahan provided the briefing for WG-2
 - 8.2. No changes since the last TOR to the current documents.
 - 8.3. After resolving comments from an internal RAC, WG-2 seeks approval for DO-377B to enter FRAC. Jim Williams called for a motion to approve entry to FRAC. Marv Hammond moved to approve. Rose Merchant-Bennett seconded. DO-377B will enter FRAC in the coming weeks.
 - 8.4. UHF Status
 - 8.4.1. Brief this week on verification and validation activities for the UHF MOPS
 - 8.4.2. Focus on validation/flight test planning
 - 8.4.3. UHF MOPS flight test campaign will utilize similar methodological approaches to DO-362A
 - 8.4.4. First flights will occur in early August 2023
 - 8.5. Coordination w EUROCAE WG-105
 - 8.5.1. European Stakeholder Report. Received 8 survey responses on the suitability of DO-377 in Europe. Target completion date of July 2023; Seeking EASA engagement on the survey. Participation is limited from European Stakeholders
 - 8.5.2. C-Band Satcom: Work is ongoing within Airbus to update their designs per the *Compatibility White Paper* to the proposed updates to DO-362B.
Watch item: No meetings with EUROCAE on this topic since early April 2023. Without stakeholder inputs on C-band satcom, the C-band terrestrial will be again blocked for progress
 - 8.5.3. **Action item:** Alex Florin will send invite to SC-228 leadership to establish a meeting to coordinate on this topic.
 - 8.6. Cellular MOPS Joint with EUROCAE WG-105
 - 8.6.1. Completed internal RAC in June 2023
 - 8.6.2. Verification and Validation sections in work
 - 8.6.3. Watch Items: Maybe move delivery of RTCA MOPS by 1-2 cycles depending on participation and progress in 3Q23
 - 8.7. DO-362B
 - 8.7.1. Documented the tradeoffs in choosing a scheme to break the larger 130ms frames into sub-slots in order to meet latency requirements
 - 8.7.2. Watch Item - Potential LEO SATCOM usage of 5030-5091 MHz has been raised in ITU-R by France. Ongoing discussion around the significant challenges that LEO would face in remaining compatible with currently agreed TDD scheme

- 8.8. Additional briefings.
 - 8.8.1. Associated elements overview from Steve
 - 8.8.2. FAA Voice Switch Air-Ground Radio Path Latency Measurements Final Report Highlights
 - 8.9. Thank you to everyone who participated and accommodated the changing schedule for WG-2 as the week went on, while Amelia was not physically present this week.
9. Agenda Item #9 - WG-4 Update
 - 9.1. Joel Wichgers presented the update for WG-4.
 - 9.2. Tentative schedule, to be revised and expanded
 - 9.2.1. OSED to be complete over next few months, SC-228 wide RAC following completion
 - 9.2.2. Estimated MASPS FRAC completion date: July 2025
 - 9.2.3. Estimated MASPS RAC completion date: April 2025
 - 9.3. Joel reviewed the WG-4 Working Session Agenda / Goals, and the Joint WG-1 and WG-4 agenda from the week.
 - 9.4. Noteworthy Open Items from this Week
 - 9.4.1. Scope of the route generation requirements is not fully agreed upon yet
 - 9.4.2. No OPA/OSA champion(s) identified but team has OPA/OSA experience and members have agreed to support
 - 9.5. Joel provided an overview of the OSED Automatic Taxi Navigation Architecture
 - 9.6. Joel provided overview of the current document structure.
 - 9.6.1. Rose Merchant-Bennet asked why OSA is located after the OPA? Joel answered that these analyses will be done in parallel and location in the document can certainly be looked at if the order matters there.
 10. Agenda Item #10 – EUROCAE WG-105 Update
 - 10.1. Alex Florin presented an update for WG-105 on behalf of the committee.
 - 10.2. Alex gave an overview of the committee structure and leadership.
 - 10.3. SG-1 DAA
 - 10.3.1. ED-313 DAA OSED for Airspace Classes A-G completed Mid-April.
 - 10.3.2. ED-271 (for airspaces classes A-C) was assessed to identify what needs to be updated to cover all airspace classes.
 - 10.3.3. Define a structure of the “Minimum Operational Performance Specification for Detect & Avoid [Traffic] under IFR”.
 - 10.3.4. Identify available material that can be used as a starting point for drafting MOPS. The objective is to specify the minimum requirements at equipment level for DAA for non-segregated RPAS operation under IFR, which meet the operational description in the new OSED and the system requirements in the MASPS. The DAA MOPS will standardize functions and sub-systems:

- 10.3.5. For each sensor technology, a whitepaper has been written, to identify gaps and similarities, and define a possible way forward including opportunities for joint activities with RTCA SC-228 and SC-147.
 - 10.4. SG-2 Updates
 - 10.4.1. European Stakeholders Report: Slow progress. A survey to collect the feedback was launched; limited response
 - 10.4.2. C-Band C2 MOPS: Slow progress due to unavailability of the technical leadership on Eurocae side
 - 10.5. SG-3 Updates
 - 10.5.1. ED-318 Technical Specification for Geographical Zones and U-space Data Provision and Exchange: Open Consultation launched, Comments can be raised until 31st of August, 2023
 - 10.5.2. Remote ID: Task Sheet under finalization to launch the development of a protocol specification for exchange of information between the UAS operator and the N-RID USSP compatible of ASTM F3411-22a
 - 10.6. SG-4 Updates
 - 10.6.1. ED-311 Control Unit CORE Layer MOPS: Open Consultation closed in February 2023 after deadline extension. Significant comments on Human Factors, extension of scope to rotary wings and SAIL V and VI of the specific category of operations may request a new consultation
 - 10.6.2. MoC for EASA Specific Condition SC-Light UAS: Eurocae TAC#95 approved an incremental publication with 2 volumes
 - 10.7. SG-6 Updates
 - 10.7.1. Work is focused on the non-design related aspects of the specific category of operations
 - 10.7.2. A new activity (DP008) was just approved by the Eurocae TAC
 - 10.8. Jim asked about the French initiative at the ITU. Alex stated she would be following it and keep us updated, and bring it to the WG-105/SC-228 leadership meeting.
11. Agenda Item #11 – GAR Report: FAA MASPS/MOPS Usage Update
- 11.1. Steve Van Trees presented an update.
 - 11.2. Regulatory Update: FAA addressing changes to regulatory structure for next phase of UAS implementation (Part 21); Rulemaking upon BVLOS ARC report; FAA will entertain exemption/waiver proposals to operate UA in the interim, and applicants may leverage SC-228 products
 - 11.3. FAA/AIR does not intend to update TSOs for TSO-C211 DAA, and TSO-C212 ATAR, or develop a TSO for EO/IR.
 - 11.3.1. GA-ASI activity on TSO-C211/TSO-C212
 - 11.3.2. uAvionix activity on TSO-C213a
 - 11.4. Guidance Material: AIR has an ongoing obligation to work with applicants and stakeholders to develop and refine means of compliance for UAS C2 Link

projects to meet expectations of aviation safety based on kinds and types of UAS designs and CONOPS.

- 11.5. DO-377A has been noted as MoC
- 11.6. DO-400 (Guidance Material: Standardized Lost C2 Link Procedures for Uncrewed Aircraft Systems) is under review by AJV-S
- 11.7. AIR will work on new ideas to improve the MoC concepts currently in the FAA regulatory guidance. Approval methodology material to bridge DO-377A to be added to issue papers.
- 11.8. Associated elements briefing: FAA AIR concerned with aircraft only, everything else is associated elements. UA and AE are functional part of UAS
 - 11.8.1. Control System (CS) can be approved independent of UA
 - 11.8.2. One 'approved CS' could support one or more type of 'certified UA'
 - 11.8.3. AE may include 3rd party services and equipment
- 11.9. Andy Thurling asked if Steve can expand on "AE evolving favorably."
Steve: For example, if an applicant comes in to ask about including AE on a TC, the answer today is no. Right now, within the FAA, the mindset is that the right people will be approving the right artifacts for AE inclusion, even if it is not related to the TC.
 - 11.9.1. Jim clarified that there is a bright boundary currently in legislation where the FAA cannot certificate anything beyond the skin of the airplane. Pushback to ICAO from FAA was consistent with what Congress has directed the FAA. More information is available in WG-2 briefing available on AerOpus.
 - 11.9.2. Steve diplomatically stated: It is reasonable to conclude from consistent information from the FAA that type certificates can only be issued for uncrewed aircraft.
 - 11.9.3. Jim Williams clarified that Control Stations cannot be issued their own type certificate, however limitations regarding the Control Station can be included in the TC and the AFM, but legally speaking it is not part of the TC. Rulemaking does not have to be reasonable.
 - 11.9.4. Steve added that this is all about precedent, and positions are shifting and evolving within the FAA. Statements made are intended to be built upon and are very intentionally scoped.

12. Agenda Item #12 V2V Update

- 12.1. Topic tabled until next plenary. There has been no activity since white paper report to PMC, if there is continued interest in this work please raise to the committee.

13. Agenda Item #13 – New Business

- 13.1. Digital Flight Rules task group met Monday afternoon. Making progress on text of document. Looking like it will be slightly behind schedule, but work

continues. All are welcome to sign up through AerOpus if you'd like to participate.

- 13.2. There is an NPRM on modernization of the special airworthiness certification. Buried on page 190 there is information with proposed changes to 91.113. The FAA did not make changes that would relieve the current COA process for exemptions to 91.113 for DAA. The changes are only regarding clarification for powered aircraft right of way. Our committee would like to see the term "see" replaced by "detect." There is a 90 day comment period. Anyone interested in regularizing UAS operations may wish to comment on that omission.

14. Agenda Item #14 – Adjourn

- 14.1. Meeting look ahead.
- 14.2. Next F2F and plenary October 16-20, 2023 at RTCA in Washington DC
 - 14.2.1. Plenary on Friday morning October 20.
- 14.3. January 2024 TBD – will be announced next month.
- 14.4. April 2024 TBD
- 14.5. No other business
- 14.6. Jim Williams called for a motion to adjourn the meeting. Marv Hammond moved to adjourn. Steve Van Trees seconded. Jim adjourned the meeting at 11:41 AM ET.

SC-228 Leadership

Jim Williams	SC-228 Co-Chair	Aura Network Systems
Brandon Suarez	SC 228 Co-Chair	Reliable Robotics
Katie Edwards	SC-228 Secretary	Boeing
Brandi Teel	SC-228 Program Director	RTCA
Don Walker	SC-228 WG1 for DAA, Co-Group Lead	A3 by Airbus
Fabrice Kunzi	SC-228 WG1 for DAA, Co-Group Lead	Boeing/Skygrid
	SC-228 WG1 for DAA, Secretary	
Steve Van Trees	SC-228 GAR, WG2 for C2, Co-Group Lead	FAA, AIR-130
Amelia Mahan	SC-228 WG2 for C2, Co-Group Lead	Amazon Prime Air
Jennifer Ledford	SC-228 WG2 for C2, Secretary	FAA
Randy Willis	SC-228 WG3 for Lost Link, Co-Group Lead	Northrop Grumman
Paul Albuquerque	SC-228 WG3 for Lost Link, Co-Group Lead	FAA
Kerry Bowers	SC-228 WG3 for Lost Link, Secretary	FAA
Joel Wichgers	SC-228 WG4 for Navigation, Co-Group Lead	Collins Aerospace
Matt Harris	SC-228 WG4 for Navigation, Co-Group Lead	Boeing
Andrew Videmsek	SC-228 WG4 for Navigation, Secretary	Reliable Robotics

Appendix A- List of SC-228 Plenary Participants

ATTENDEES

Company	Name
Air Line Pilots Association (ALPA)	Mark Reed
Amazon Prime Air	Amelia Mahan
Archangel Aero	Rose Mooney
Aura Network Systems	Ally Ferguson
	Jim Williams
Aura Network Systems	John Moore
Capital Sciences, LLC	Dave Stewart
Collins Aerospace	Joel Wichgers
DND DTAES Canada	Tam Vu
Federal Aviation Administration (FAA)	Anthony Long
	Avi Acharya
	David Chen
	Don Nellis
	Gilbert Ceballos
	Jose Fuentes
	Matt Harmon
	Mohammed Rahman
	Pat Maggard
	Ravi Jain
	Ray Mei
	Rose Merchant-Bennett
	Ruth Hirt
	Stephen Van Trees
Stuart Searight	
Federal Communications Commission (FCC)	Kambiz Rahnvardy
Flyvercity	Boris Resnick
Game Change Agency	Waseem Naqvi
Garmin Ltd.	Ben Peetz
General Atomics Aeronautical Systems, Inc.	J. J. Lu
	Joey Neptune
	Tim Bleakley
General Dynamics Mission System Canada	Jean-Pascal Joary
Honeywell International, Inc.	Sara Bauman
Hyundai	Dongkyu Kim
INMARSAT	David Whittleton

	Kristen Mineck
Iridium Satellite LLC	Michael Hooper
Kansas State University	Tom Haritos
Ligado Networks	Samuel Weich
MIT Lincoln Laboratory	Andrew Weinert
	Matthew Edwards
	Randal Guendel
	Wesley Olson
NASA	Andy Lacher
	Kurt Swieringa
	Matt Gregory
	Steve Young
	William Bishop
NextNav	Cristina Seibert
Northeast UAS Airspace Integration Research Alliance (NUAIR)	Andy Thurling
Northrop Grumman Corporation	Lance King
NUAIR	Lee Nguyen
Reliable Robotics	Andrew Videmsek
RTCA, Inc.	Brandi Teel
Sagetech Corporation	Stacey Rowlan
Technology Providers, Inc.	Marvin Hammond
The Boeing Company	Fabrice Kunzi
	Katie Edwards
	Martin Kearney-Fischer
	Nadine Akari
	Scott Blum
The Johns Hopkins University	Benjamin Zintak
Transport Canada	Craig Bloch-Hansen
	Tom Hastie
Universal Aviation	Fairy Pan
Wing Aviation	Alexandra Florin
Wisk	Garv Stephenson
Xwing, Inc.	Michael Mueller