RTCA- 228
Summary of Plenary #23- RTCA Paper No. 110-20/SC228-070

VIRTUAL
1:05 PM EST, April 23, 2020

The twenty-third plenary of RTCA Special Committee 228 was called to order by SC-228 Co-Chair, John Moore at 1:05 PM (EST) on April 23 2020, using WebEx audio and web conferencing only due to COVID-19 stay at home orders.

1. Agenda Item #1- Call to Order: Welcome
   1.1. John Moore, co-chair welcomed everyone to the Plenary and stated the purpose of the meeting was to approve two documents to the PMC and review status of working groups.
   1.2. John called for any items to be added to new business; no response.

2. Agenda Item #2- Review RTCA meeting guidelines
   2.1. Al Secen started by thanking everyone for making this week's virtual meetings a success.
   2.2. Al reviewed the Anti-Trust Policy, the Proprietary Policy and the RTCA Committee Participation Membership Policy
   2.3. Al also briefed some meeting tips to ensure a successful virtual meeting using Robert's Rules of Order
   2.4. Al then briefed self-rostering feature online at https://workspace.rtca.org/kws. Thank you to all who self-roster!

3. Agenda Item #3- Opening remarks
   3.1. SC-228 Leadership update to welcome Brandon Suarez as co-chair. Brandon is with Global Atomics and an advisor to the ICAO RPAS panel.
   3.2. This committee currently has 640 registered members from 142 organizations
   3.3. Roll Call- the list of session participants is listed in Appendix A

4. Agenda Item #4- Approve meeting minutes from Plenary Meeting #22
   4.1. Christina Westover stated she received no responses for updates/clarifications.
   4.2. Acceptance of plenary #22 minutes; motion by Marvin Hammond seconded by Jim Williams. Minutes unanimously approved.

5. Agenda Item #5- Air-to-Air Radar MOPS, DO-366A FRAC- Approval to Submit to PMC
   5.1. Don Walker provided an overview of the MOPS from Phase 1 and need for revision regarding well clear defintion.

5.2. This document provides a new definition for well clear for non-cooperative aircraft and introduces new classes of performance to support the new definition

5.2.1. 2200 ft HMD, 450 ft VMD, no Tau component

Radar Class	DAA Class	Ownship Maximum Speed (KTAS)	Ownship Minimum Speed (KTAS)
A1	1 and 2	291	100
A2	1 and 2	200	100
A3	4	110	40
B	3	291	100

5.2.2. Radar Ranges

Class	Turn Rate (deg/sec)	RDR (NM) (Small)
A1	1.5	5.0
A2	3	3.8
A3	7	2.6
B	3	5.4

Class	Turn Rate (deg/sec)	RDR (NM) (Medium)
A1	1.5	5.4
A2	3	4.1
A3	7	2.9
B	3	6

Class	Turn Rate (deg/sec)	RDR (NM) (Large)
A1	1.5	5.9
A2	3	4.6
A3	7	3.5
B	3	6.7

5.2.2.1. Changes driven by well clear definition

5.2.2.2. Sensor testing- modeling, simulation and NASA flight tests

5.2.2.3. FAA support required for sensor range reduction for operations

5.3. DO-366A will be ready to enter FRAC no later than May 15th, due to editorial and appendix updates.

5.3.1.1. Don requested approval to enter FRAC. John Moore confirmed there is value in continuing this work. This document will represent the position of the committee. Al asked if any feels this document is not ready to enter Final Review and Comment. Naiel Askar- appendix overview: tracker, and radar integration range. These values were calculated and a final check and integration is needed by Devon. No content changes expected.

5.3.1.2. Subject to completion of these changes no later than May 15, WG1 shall Enter FRAC. A motion was made by Rosemarie Mooney and

seconded by Bruce Eckstein. John asked for any objections, none; motion carries to move to FRAC.

6. Agenda Item #6- Phase 3 TOR- Consensus to Submit to PMC
   - 6.1. John Moore presented
   - 6.2. Reviewed WG1 (DAA) standards completed in Phase 1 and 2
     - 6.2.1. DO-365 Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems, Issued 05-31-17
     - 6.2.2. DO-366 Minimum Operational Performance Standards (MOPS) for Air-to-Air Radar for Traffic Surveillance, Issued 05-31-17
     - 6.2.3. DO-365A Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems, Issued 03-26-20
     - 6.2.4. DO-381 Minimum Operational Performance Standards (MOPS) for Ground Based Surveillance Systems (GBSS) for Traffic Surveillance, Issued 03-26-20
   - 6.3. Reviewed WG2 (C2) standards completed in Phase 1 and 2
     - 6.3.1. DO-362 Command and Control (C2) Data Link Minimum Operational Performance Standards (MOPS) (Terrestrial), Issued 09-22-16
     - 6.3.2. DO-377 Minimum Aviation System Performance Standards for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems in U.S. Airspace, Issued 03-21-19
   - 6.4. Reviewed WG1 (DAA) standards in-work
     - 6.4.1. DO-366A Minimum Operational Performance Standards (MOPS) for Air-to-Air Radar for Traffic Surveillance
     - 6.4.2. DO-365B Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems
     - 6.4.3. DO-XXX Minimum Operational Performance Standards (MOPS) Airborne EO/IR Sensor
   - 6.5. Reviewed WG2 (C2) standards in-work
     - 6.5.1. DO-362A Command and Control (C2) Data Link Minimum Operational Performance Standards (MOPS) (Terrestrial)
     - 6.5.2. DO-377A Minimum Aviation System Performance Standards for C2 Link Systems Supporting Operations of Unmanned Aircraft Systems in U.S. Airspace
   - 6.6. Phase 3 Planning
     - 6.6.1. Planning began in November 2019. Thank you to Don Walker, who facilitated multiple telecons since January 2020 with new topics and use cases proposed.
     - 6.6.2. Two new topics beyond natural C2 and DAA scope were first proposed, based on recommendations from the FAA's UAS in Controlled Airspace ARC.
       - 6.6.2.1. New working group to draft design guidance and "behavior" to follow when a UA enters a Lost C2 Link State.

6.6.2.2. New working group to draft navigation performance requirements for UA that would enable (augmented) GNSS-based systems for all phases of flight.

6.7. Today, John seeks Plenary approval to submit TOR to PMC on June 11th for approval

6.7.1. Creation of a new working groups: Ad Hoc WG, WG3 Lost link and WG4 Navigation

6.7.1.1. Brandon Suarez stated Ad Hoc WG shall:

6.7.1.1.1. AD Hoc WG focused on the operational framework as the foundation for all working groups

6.7.1.1.2. Chaired by SC-228 co-chairs (John and Brandon)

6.7.1.1.3. Include representatives from current and future UAS Operators, FAA Air Traffic Organization, air traffic controllers, airspace user community, research organizations, and UAS OEMs

6.7.1.1.4. Include some members across the current standing working groups to seed the initial Phase Three activity

6.7.1.2. Create a normalized set of use cases for use across the Special Committee in Phase Three. These are expected to include:

6.7.1.2.1. High Altitude Pseudo-Satellite (HAPS) UAS

6.7.1.2.2. Linear Infrastructure Survey / Low Altitude Controlled Airspace

6.7.1.2.3. UAS Cargo Operations Under Part 135

6.7.1.2.4. Advanced Air Mobility (AAM) / Vertical Takeoff and Landing (VTOL) UAS (people and cargo)

6.7.1.3. Use Cases will serve to:

6.7.1.3.1. Clearly link Operation to standardized Technology/Capabilities

6.7.1.3.2. Create common Operational Services & Environment Description (OSED) components to align work of SC-228 WG's

6.7.1.3.3. Identify Operators and OEM's willing to support development, data collection, and operational trails

6.7.1.4. John called for questions

6.7.1.4.1. Bruce Eckstein asked for clarity on AAM. John answered the need for industry to support for this guidance material. The bottom line is there are too many unknowns to really answer this question.

6.7.1.4.2. Marvin Hammond stated AAM is not in current scope of WGs.

6.7.1.4.3. Shelly O'leary- update last 2 words of slide 19 Final Formatting and Editing. Slide 21, change trails to trials. Action: to Christina

6.8. Don Walker stated WG1 (DAA) shall:

6.8.1. Develop DAA capabilities that address more specialized UAS operations that require more tailored performance or constrained guidance

6.8.1.1. These operations are expected to take place in all classes of airspace with the exception of surface operations and Class E above A which remain out of scope
6.8.1.2. These operations will be prioritized according to community needs and support
6.8.2. DO-365B will be revised to incorporate any modifications necessary to accommodate minor changes to Phase 1 and 2 functionality in support of these new use cases
6.8.2.1. Major functions (e.g. ACAS sXu) will be captured in new documents
6.8.3. DO-381 will be revised to add a class of performance to support en-route DWC operations that is less stringent than the performance needed in the terminal environment
6.8.4. Close coordination with SC-147 for future variants of ACAS X:
6.8.4.1. Updates to ACAS Xu
6.8.4.2. ACAS sXu
6.8.4.3. ACAS Xr
6.8.5. Note: This list may not be all inclusive.
6.8.6. John Moore called for questions
6.8.6.1. Ruy asked how new operational concepts would flow into the committee. Don assumes that will flow in from the FAA. WG1 would work on OSED materials and then necessary changes to DO-366 and DO-365
6.8.6.2. Marv Hammond asked if this implies a Rev C. Don, yes DO-365C and DO-381B
6.9. Jim Williams stated WG2 (C2) shall:
6.9.1. Update DO-362A to B revision to:
6.9.1.1. Incorporate changes required to harmonize SATCOM compatibility with EUROCAE Standard
6.9.1.2. Add additional C-band waveforms as presented by proponents who bring resources to validate those proposed waveforms
6.9.1.3. Updates required as a result on initial implementation of A revision
6.9.2. Update DO-377A to B revision to:
6.9.2.1. Incorporate needed revisions from DAA system changes/additions.
6.9.2.2. Address safety risk requirements for operations in Class E above A airspace and operations on the surface at public use airports
6.9.2.2.1. Need better understanding between UAV, pilot and controller
6.9.2.3. If additional scope is added by the Ad Hoc team (e.g. C2 Link Systems supporting AAM or small package delivery) the deadline would be assessed and adjusted if necessary with consent of the PMC
6.9.2.3.1. Schedule slides to be discussed in WG2 status report
6.9.3. New C2 Scope
6.9.3.1. Create standard for use of LTE commercial networks for C2 Links used for type certificated UAS

6.9.3.2. Jim is working with GSMA and expects good participation from cellular companies

6.9.4. Jim called for questions

6.9.4.1. Don Nellis- additional frequency bands- suggestion to not to add. Jim, this is for the consideration of Ad Hoc WG to not restrict to existing carriers. Don asked for parameters on network providers, licensing. John, this is an acknowledgment not a commitment. Jim, we are not committed to any deliverables. Don, this is a really bad idea.

6.9.4.2. Cesar Suarez, need heavy involvement from cellular carriers, what is being done to bring them into RTCA. Jim is working this thru GSMA. Al will be inviting them to join RTCA. If they don't support this activity will be discontinued.

6.9.4.3. Art Hinaman, maybe this next iteration should focus on LTE and next iteration. John, noted we need the telecoms to volunteer support/ Art is concerned about multiple standards groups taking pieces and not a comprehensive standard. Al stated there are mostly gaps and not overlaps in standards groups. John invited Art to participate in the Ad Hoc WG; Art appreciated and accepted the invitation.

6.9.4.4. Christopher Nassif- For situational awareness, we (FAA) have started working with the Telcos through CTIA as of last April. We have constructed a set of broadly approved testing metrics for cellular UAS usage. This is critical to the FCC.

6.9.4.5. Don Nellis- thinks we are biting off more than we can chew. He feels this is a serious risk of not supporting a timeline. Jim acknowledged there is not a timeline and acknowledged Ad Hoc needs to be careful what they take on. Al reiterated this potential scope creep would have to be added to the TOR. John confirmed we would do this.

6.9.4.6. Jim Davis- rev 5 of TOR, mentions use of L-band. Jim Williams acknowledged this was in error and is not part of phase 3.

6.10. Brandon stated WG3 (Lost Link) shall:

6.10.1. Begin by standing up a new working group for this new scope after completion of initial plenary level guidance material work

6.10.1.1. This group will have a stronger operational focus than our other groups, so determined not to add the WG1 SOW.

6.10.2. Significant work going on at ICAO for guidance on loss of C2 link. Will build on coming work products from:

6.10.2.1.1. ICAO RPAS Panel and ATMOPS Panel

6.10.2.1.2. FAA-NATCA Working Group and FAA ATO

6.10.3. Develop Guidance Material for Lost Link

6.10.3.1. Guidance material will regularize lost link behavior of UAS operating in controlled airspace. This tasking addresses Recommendation Two from the Unmanned Aircraft System (UAS)

Controlled Airspace Aviation Rulemaking Committee (ARC) dated 30 May 2019

6.10.3.2. This activity will have a more directed operational focus than many RTCA technical standards

6.10.3.3. Strong involvement from FAA Air Traffic Organization, air traffic controllers, non-UAS airspace users and related activities will be the key to timely progress

6.10.3.4. Enable OEM's and Operators by providing "next level" of detailed considerations to build on forthcoming international framework and national policy/procedures

6.10.3.5. Brandon called for questions

6.10.3.5.1. Bruce Eckstein- asked who will lead this group? Brandon- is in discussion with Randy Willis, who was with the FAA and now Northrup Grumman

6.10.3.5.2. Shelly O'Leary- asked for ATMOPS definition; Brandon- Air Traffic Management Operations

6.11. Brandon stated WG4 (Navigation) shall:

6.11.1. Begin by standing up a new working group for this new scope after completion of initial plenary level guidance material work

6.11.2. This work will have a more technical focus similar to WG1 and WG2

6.11.2.1. Will work in close coordination with other RTCA committees

6.11.2.2. SC-227: Performance Based Navigation

6.11.2.3. SC-159: GNSS

6.11.3. Develop Guidance Material for UAS Navigation Systems

6.11.3.1. Navigation Standards Working Group established to enable GNSS-based UAS operations to meet navigation requirements for all phases of flight without the use of legacy ground-based navigation aids, including precision approach capability with auto-takeoff and auto-land features

6.11.3.1.1. This tasking addresses Recommendation Five from the Unmanned Aircraft System (UAS) Controlled Airspace Aviation Rulemaking Committee (ARC) dated 30 May 2019. This will include creation of a standard approach to evaluate equivalent level of safety for Part 91 operations under Instrument Flight Rules(IFR) for all phases of flight

6.11.3.1.2. This activity will also identify and recommend changes to existing RTCA MASPS and MOPS that address navigation system standards that are not consistent with the UAS Navigation Guidance Material, which may address specific technical areas:

6.11.3.1.2.1. E.g., Anti-Jam, Anti-Spoof, Inertial coupling

6.11.4. Call for Questions

6.11.5. Marvin Hammond- Taxi using GPS for centerline tracking versus a perception system, SC-217 is working this. Brandon, taxi is more difficult and we should coordinate with other committee. John stated this is the intent to Lee Nguyen. Action: Add SC-217 to this list.

6.11.6. Don Nellis called for a discussion on taxi. John, surface operations were excluded in previous phases and potential need to address now. Don called for a discussion in Ad Hoc for general discussion.

6.12. Proposed Phase 3 Deliverables

Product	Description	FRAC Complete	WG
Guidance Material & Considerations for UAS (DO-304A)	This guidance material summarizes the operational use case / scenarios to be used by all the standing working groups in conducting Phase Three. This would a major update to DO-304 Guidance Material and Considerations for Unmanned Aircraft Systems.	April 2021	AH
GBSS MOPS (DO-381A)	Revision to include a class of reduced performance consistent with enroute DWC requirements.	April 2021	WG1
GM for Lost C2 Link UAS Behavior	Prepare guidance material that will regularize the lost link behavior of UAS operating in controlled airspace.	April 2022	WG3
GM for UAS Navigation Systems	Create standard equivalent level of safety guidance material for Part 91 operations under IFR.	April 2022	WG4
C2 Link MOPS (Terrestrial) (DO-362B)	Implement L-Band requirements. Incorporate any changes required to harmonize SATCOM compatibility with EUROCAE Standard. Updates required as a result on initial implementation of the A revision.	July 2022	WG2
DAA MOPS (DO-365C)	Future revision of the DAA MOPS to accommodate new functionality from completed SPR and/or OSED material.	October 2022	WG1
C2 Link MOPS for LTE Networks	Create standard for use of LTE commercial networks for C2 Links used for type certificated UAS.	January 2023	WG2
C2 Link Systems MASPS (DO-377B)	Incorporate needed revisions from DAA system changes/additions. Address safety risk requirements for operations in Class E above A airspace.	April 2023	WG2

6.12.1. Real-time change made to: Delete L-Band in DO-362B description, as this is not correct.

6.12.2. John Moore called for comments

6.12.2.1. Shelia Mariano- will Nav group look at vertical? John and Brandon confirmed it Vertical Nav is in-scope.

6.12.3. John thanked everyone for their support and asked for a motion to move for approval to the PMC. Mark Reed made motion. Don Walker seconded. There was no opposition. Motion carries to move to June PMC.

7. After 2 hours, John asked if people want to take a break. Consensus was to continue.

8. Agenda Item #7 WG1 (DAA) Status Report

8.1. Don Walker welcomed Fabrice Kunzi as co-chair.

8.2. DO-381 is now available in the RTCA store

8.2.1. Summary: GBSS MOPS supports performance needed for ground-based surveillance of non-cooperative aircraft within 4-5 miles of an airport. Also

supports en-route use case, but performance may be difficult to achieve over large operational volumes

8.3. DO-365A is now available in the RTCA store
- 8.3.1. Supports terminal area well clear and guidance
- 8.3.2. Supports ground based non-cooperative surveillance sources
- 8.3.3. Supports extended operations in Class D, E, G
- 8.3.4. Supports takeoff/landing operations in Class C, D, E, G
- 8.3.5. Supports transit operations in Class B
- 8.3.6. Digital distribution w/ test vectors NOT included until next PMC

8.4. DO-365B drafting underway
- 8.4.1. Adding Class 3 to support ACAS Xu in conjunction with SC-147; Will include Appendix with detailed compliance matrix
- 8.4.2. Adding Display requirements to support “visual-like” clearances that leverage DAA Well-Clear
- 8.4.3. Adding support for new non-cooperative DWC consistent with DO-366A
- 8.4.4. Internal RAC of Automation Appendix scheduled for 4/27 – 5/18
- 8.4.5. Unclear whether quarantine (virtual environment) will affect schedule at this point. Don uncertain about ability to complete DO-365B by July plenary

8.5. EO/IR MOPS draft underway for over a year
- 8.5.1. Much progress on basic questions
- 8.5.2. Julien with SAFRAN has been a one-man army. His persistence and perseverance was commended by Don. There is a rough draft and identified authors for Appendix material. This is very important, ground-breaking work.
- 8.5.3. Internal RAC scheduled for this July

8.6. No questions for WG1

9. Agenda Item #8- WG2 (C2) Status Report

9.1. Jim Williams presented document schedule changes
- 9.1.1. C-Band C2 Link System MOPS scheduled to Exit FRAC in July 2020 Plenary. Propose to change to January 2021 Plenary Exit FRAC.
  - 9.1.1.1. The DO-362A standard revision requires schedule relief to address the significant delay caused by the near/far issue that led to FCC to not yet consider adopting DO-362/TSO C-213.
  - 9.1.1.2. Team has a proposed technical solution for near/far challenge
  - 9.1.1.3. Working to enter FRAC at July 2020 Plenary, exit FRAC at October Plenary
  - 9.1.1.4. Significant resources lost on October 1, 2020 (NASA and MITRE)
  - 9.1.1.5. DO-365A major changes/updates include:
    - 9.1.1.5.1. DO-362A prioritized over DO-377A, WG2 contributors will shift focus to MOPS
    - 9.1.1.5.2. Move to twice weekly meetings until complete, with option to increase to three times weekly as needed

9.1.1.5.3. Additional test data needed from NASA/Manufacturers
9.1.1.5.4. Issues that are not mature will be deferred to B revision to make schedule
9.1.1.5.5. Updated schedule being developed

9.1.2. C2 Link Systems MASPS is currently scheduled to exit FRAC in the October 2020 Plenary. Propose to change to April 2021 Plenary Exit FRAC. Note: there is not a scheduled April 2021 plenary date.

9.1.2.1. The DO-377A standard revision requires schedule relief to address the significant delay caused by unanticipated increase in scope of OSA and OPA assessments

9.1.2.2. Multiple proponents brought new operational scenarios to the group to support planned operational concepts (i.e. added five new scenarios assessed vs. two assessed in DO-377)

9.1.2.3. Prioritizing shared resources to complete DO-362A as quickly as possible

9.2. DO-377A C2 Link System MASPS Status

9.2.1. RAC #6 complete

9.2.2. Consensus reached on approach to address all Non-concur and High comments (all have status of “in process” within comment matrix)

9.2.3. Significant issues to be resolved:

9.2.3.1. Major changes expected in

9.2.3.1.1. Appendix K [Terrestrial (Backhaul) Network]

9.2.3.1.2. Appendix M (SLA) and O (Payload/C2 Over Same Link)

9.2.3.2. Major updates to Section 3, Section 4, Appendix C (OSA), and Appendix D (OPA)

	Number	Not Started	In Process	Complete
Non-Concur	10	0	6	4
High	53	0	20	33
Medium	40	13	12	15
Low	0	0	0	0
Editorial	30	24	0	6
N/A	*0*	*0*	*0*	*0*
Substantive	*0*	*0*	*0*	*0*
Total	133	37	38	58

10. Agenda Item #9- New Business

10.1. Brandon shared the continued coordination with EUROCAE WG-105

10.1.1. Call between Leadership on April 17th, 2020; general desire by both groups to coordinate and align to ensure harmonized standards and international cooperation. WG-105 has an open co-chair position.

10.1.2. WG 105’s scope is much larger than SC-228’s, but there are areas of common work

10.1.2.1. DAA (except VLL (very low level) [below 400ft AGL])
10.1.2.1.1. OSED Comparison is open item
10.1.2.1.2. Question on other ICAO DAA functions: Terrain, Obstacles, Weather
10.1.2.2. C2- Phase 3 LTE scope is clear overlap
10.1.2.3. ERA (Enhanced RPAS Automation)
10.1.2.3.1. Lost Link = A&ER subset
10.1.2.3.2. Navigation subset = ATOL
10.1.3. ACTION: Agreed to follow-up once SC-228 TOR is updated
10.1.4. Other items of interest
10.1.4.1. DAA VLL MOPS seen as overlap with ACAS sXu (SC-147/WG-75)
10.1.4.2. Unclear how European Union U-Space and JARUS SORA impacts SC-228 Use Cases and OSED

10.2. Phase 2 Remaining FRAC Approval Dates
10.2.1. Working Group 1 (DAA)
10.2.1.1. 24th Plenary: Air-to-Air Radar MOPS, DO-366, Rev A
10.2.1.2. 25th Plenary:DAA MOPS, DO-365, Rev B
10.2.1.3. 26th Plenary: Airborne EO/IR Sensor MOPS
10.2.2. Working Group 2 (C2); assumes Phase 3 TOR accepted
10.2.3. Slide from 24th Plenary to 26th Plenary: C2 Data Link MOPS (Terrestrial), DO-362, Rev A
10.2.4. Slide from 25th Plenary to 27th Plenary: C2 Link System MASPS, DO-377, Rev A

10.3. Future Plenary Meetings
10.3.1. **23 July- 24th Plenary**
10.3.1.1. Air-to-Air Radar MOPS, DO-366A Exit FRAC
10.3.1.2. DO-365B Enter FRAC
10.3.2. **16 October- 25th Plenary**
10.3.2.1. DO-365B Exit FRAC
10.3.2.2. C2 Link MOPS (Terrestrial) DO-362A Enter FRAC
10.3.2.3. EO/IR MOPS Enter FRAC
10.3.3. **28 January 2021 - 26th Plenary**
10.3.3.1. EO/IR MOPS Exit FRAC
10.3.3.2. C2 Link MOPS (Terrestrial) DO-362A Exit FRAC
10.3.3.3. DO-377A Enter FRAC
10.3.3.4. DO-304A Enter FRAC (first document of Phase 3)

10.4. Phase 3 Proposed FRAC Approval Dates
10.4.1.1. AD Hoc Documents
10.4.1.1.1. 27th Plenary: GM for UAS, DO-304A
10.4.1.1.1.1. This is a review and update to the 2007 document. Mark Reed and Rosemarie Mooney concurred leveraging the existing work is desirable
10.4.1.2. WG1 Documents

10.4.1.2.1. 27th Plenary: GBSS MOPS, DO-381A
10.4.1.2.2. 33rd Plenary: DAA MOPS, DO-365, Rev C
10.4.1.3. WG2 Documents
10.4.1.3.1. 32nd Plenary: C2 Data Link MOPS (Terrestrial), DO-362, Rev B
10.4.1.3.2. 34th Plenary: C2 Data Link MOPS (LTE)
10.4.1.3.3. 35th Plenary: C2 Link System MASPS, DO-377, Rev B
10.4.1.4. WG3 Documents
10.4.1.4.1. 31st Plenary: GM for UAS Lost Link Behavior
10.4.1.5. WG4 Documents
10.4.1.5.1. 31st Plenary: GM for UAS Navigation Systems
10.4.1.6. Note: assume other documents may be required.
10.5. Call for new business, no respondents

11. Agenda Item #8- Adjourn
11.1. Jim Williams called a motion to adjourn and Al Secen seconded.
11.2. John Moore adjourned the plenary at 3:40 PM EST.

Respectfully Submitted by,
Christina Westover
Secretary, RTCA SC-228
christina.m.westover@boeing.com
April 23, 2020

CERTIFIED as a true and accurate summary of the meeting by,

Appendix A- List of SC-228 Plenary Participants

John Moore	SC-228 Co-Chair	Collins Aerospace
Brandon Suarez	SC 228 Co-Chair	Global Atomics
Don Walker	SC-228 WG1 for DAA, Co-Group Lead	Airbus, SV
Fabrice Kunzi	SC-228 WG1 for DAA, Co-Group Lead	General Atomics Aeronautical Systems, Inc.
Jonas Trego	SC-228 WG1 for DAA, Secretary	General Atomics Aeronautical Systems, Inc
Steve Van Trees	SC-228 GAR, WG2 for C2, Co-Group Lead	FAA, AIR-130
Jim Williams	SC-228 WG2 for C2, Co-Group Lead	Unmanned Solutions
Lee Nguyen	SC-228 WG2 for C2, Secretary	FAA
Al Secen	SC-228 Program Director	RTCA
Christina Westover	SC-228 Secretary	Boeing

ATTENDEES

Company	Name
A3 by Airbus	Don Walker
ACES, Inc.	Alfonso Malaga Michael Neale
Adaptive Aerospace Group	Keith Hoffler Devin Jack
ALPA	Mark Reed
Aircraft Owners & Pilots Association (AOPA)	Christopher Cooper
Archangel Aero	Rosemarie Mooney
ARCON Corporation	Dennis Colbert Siva Sivananthan
BAE Systems	
Bihrle Applied Research, Inc.	
Calhoun Analytics	Sean Calhoun
Calhoun Systems Inc.	
Cavan Solutions	
Cobham Aerospace Communications	Jeff Knickelbein
Collins Aerospace	Tyler Barney George Elmasry Randy Jacobson John Moore
Electronics & Telecommunications Research Institute (ETRI)	Hee Wook Kim

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