RTCA Paper No: 252-24/SC147-847
EUROCAE Ref No. EUR 303-24/WG75-133

October 3, 2024

Special Committee 147

MINIMUM OPERATIONAL PERFORMANCE STANDARDS FOR TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEMS AIRBORNE EQUIPMENT

The 107th meeting of RTCA SC-147 and 83rd meeting of EUROCAE WG-75 was held on 3 October 2024; this Plenary was held at RTCA Offices in Washington DC and was also attended virtually via WebEx.

The following Leadership was present:

J. Stuart Searight	Co-Chair, Federal Aviation Administration
Ruy Brandao	Co-Chair, Honeywell International
Guido Manfredi	Chair, EUROCAE WG-75
vacant	SC-147 Recording Secretary
Matt Haskin	Government Authorized Representative
Brandi Teel	Program Director RTCA

1. Chairmen's Opening Remarks / Introductions

   Mr. Stuart Searight opened the meeting by welcoming everyone to the joint Plenary of SC-147 and WG-75. Stuart mentioned there was a busy agenda focusing on the schedules for all the deliverables being worked on by the committees, the potential of some new deliverables, and the need to update the Terms of Reference to reflect the changes and additions in the SC-147 Work Plan. Garfield Dean indicated WG-75 anticipated requested corresponding changes to its Terms of Reference based on the decisions made in today's joint Plenary. Stuart noted that most people at RTCA and on the WebEx had been active during the Working Group meetings earlier in the week, so he suggested the introductions were not needed. Both quickly welcomed everyone and also shared their appreciation for the work done earlier in the week.

2. Anti-Trust Statement & RTCA Policy

   With Alex Engle's absence, Brandi Teel presented all RTCA and EUROCAE policy statements regarding membership, participation in meetings, and use of proprietary information in approved documents. A few new policies were introduced to the group, included one on the exportation of technology.

   - Mr. Searight updated the group that this new policy did not prohibit the inclusion of Julia source code based on the ADD's of each ACAS X variant, and that those would soon be

available from RTCA for those who had purchased an ACAS X MOPS. Ms. Teel concluded these statements with instruction for everyone to record their attendance via RTCA AerOpus.

3. Approval Of Meeting Minutes (FINAL SC147-WG75 Minutes 2023-09-21.pdf)

   Mr. Searight noted that the last plenary was a relative short, focused session back in September 2023. Stuart also reminded everyone that the minutes were written by him and Ruy since SC-147 had been without a Recording Secretary for the last few years. Stuart implored everyone to consider volunteering for the role as it would be a huge help to all of leadership and the committee's work efforts. The Minutes were approved without comment.

4. Approval Of Agenda

   Ruy Brandao gave a brief review of the agenda. Ruy noted that there were two agenda items he wanted to add to the Plenary in which Charlie Leeper could provide an overview of the planned updates for Terminal Area capabilities into ACAS Xu, and Randy Jacobson could go through a set of questions he had while reviewing 2.2.7.5 "Combined STM/TRM Input Interfaces." Stuart noted that with the busy Agenda, the committee would not take a formal morning break, and that there will be focused Cooperative Surveillance MOPS Working Group discussions held in the afternoon.

5. MOPS Schedule Discussion (MOPS Approval Schedules and SC-147 ToR Revisions.pdf)

   a. Stuart presented a master schedule that had bee coordinated with SC-147, WG-75, and SC-228 Leadership. Stuart noted the complexities of the schedules because they all have strong interdependencies with the other MOPS and that most will be referencing each other. Overall, Stuart showed that the priority would be to complete committee approval of the ACAS Xr and Cooperative Surveillance MOPS by December of 2025. SC-147/WG-75 would then perform final review and comment and approve Revision A for ACAS Xu (DO-386A/ED-275A) in the first half of 2026, while SC-228 would defer final review and approval of Revision D of the Detect and Avoid MOPS (DO-365D) until at least November 2025.
   b. Randy Jacobson, Collins Aerospace, noted there was no "free time" allocated for committee members to work on the ACAS Xu Volume I revision while ACAS Xr and CS MOPS were being finalized and reviewed. Stuart took the action to point this situation out to SC-228 WG1 and to try to solicit some help in working the Volume I updates for ACAS Xu. After further discussion, everyone agreed this is an aggressive schedule with some real risks, but that it was best to strive to make this schedule than to further delay ACAS Xu Rev A as that might mean the delay of publishing all four documents.
   c. It was agreed the committee was committed to ACAS Xu Revision A, and very much looked forward to the release of the ADD from the Program Office. It was noted that the Xu ADD will likely need minor updates to correspond to the final release of the ACAS Xr logic once that MOPS gains final approval.

6. Future Meeting Schedule (MOPS Approval Schedules and SC-147 ToR Revisions.pdf)

   Based on agreed to schedule for finalizing and approving the ACAS Xr, Cooperative Surveillance MOPS and Revision A of the ACAS Xu, the following meeting dates were agreed upon:

- Dec. 10-12, 2024: Pre-FRAC Xr and CS comment adjudication (Virtual WG Mtgs)
- June 10-12, 2025: ACAS Xr V5 Logic Briefings, Commence Xr & CS FRAC/WC (RTCA)
  *June 12 will include a joint SC-147/WG-75 Plenary session
- Oct./Nov. 2025: SC-147/WG-75 Meetings for comment resolution and MOPS approvals
- December 2025: Final Agreement that all comments resolved for ACAS Xr & CS MOPS

7. Terms of Reference Revisions (MOPS Approval Schedules and SC-147 ToR Revisions.pdf)
   (DRAFT SC-147 ToRs v21 2024-10-03.pdf)

   a. Stuart led then walked through proposed changes to the Terms of Reference for SC-147. Stuart noted these changes would need formal approval by the committee so that they could be submitted to the PMC for consideration at their December meeting. Changes included:
      i. Showing that the Recording Secretary is vacant.
      ii. Removing ACAS sXu MOPS and Revision A for ACAS Xa from the committee's deliverables since those were completed and published.
      iii. Updating the Delivery Dates for the ACAS Xr and Cooperative Surveillance MOPS from September 2025 to June 2026.
      iv. Adding as a new deliverable Revision A of the ACAS Xu MOPS that incorporates the DAA DO-365C Terminal Area functionality, along with other minor changes found by manufacturers, with a delivery date of June 2026.
      v. Adding as a new deliverable a Guidance document for the Validation of Collision Avoidance Systems, with a delivery date of December 2026.

   b. Stuart introduced the concept for the Guidance Document for validating future CA systems, and reminded folks this was originally briefed by Garfield Dean in April 2024. Garfield then presented an overview of the document's objectives and anticipated content. (CAS Validation Guidance Material.pdf) Garfield explained this document could be an important tool for implementors who might develop CA systems outside of the EUROCAE or RTCA processes and for regulators to use as a check-list to help in the determination of the robustness of a applicant's system's safety and suitability performance. The paper will include the types of metrics that should be used to determine a system's effectiveness and the types of encounter sets and models that should be used to evaluate those metrics. There was strong agreement that this document has much potential usefulness, but also some concern it would take away resources from the committee's already challenging workload and schedule. After some discussion, it was agreed to include this new deliverable in the proposed Terms Of Reference, and that this activity – if approved by the PMC and TAC – would be led by WG-75, and specifically Garfield.

   c. With all proposed updates to the ToRs reviewed and discussed, the committee approved the as written and agreed to send them to the PMC for their consideration. Parallel changes to the WG-75 ToRs will be made and submitted to the EUROCAE TAC.

8. Pre-FRAC Schedule and Process for ACAS Xr and Cooperative Surveillance MOPS

   Ruy Brandao led a discussion on the Pre-FRAC process about to commence for the Xr and CS MOPS. There are a few areas not quite ready for review, which will be documented in the email announcing the availability of all materials that are to be reviewed. Also noted where the few already identified comments that will be submitted by WG leadership to help highlight a few known issues that need resolved or further work. Alan Sigman, FAA NextGen stated he will be working

with Brandi Teel to have all materials in their proper PDF formats with line number available as soon as he can, and that Brandi will have the Comment Sheet available in the same method as would be done for a formal FRAC process.

9. EUROCAE Update

   Guido Manfredi, Volocopter and WG-75 Chair gave a brief update regarding the plan to develop a completely revised version of ED-115, which is the MOPS for Light Aviation Secondary Surveillance Radar Transponders. This work will be done jointly by WG-75 and WG-49 and will focus on addressing new systems and Electronic Conspicuity technologies. Matt Haskin stated that this would be more appropriate for SC-209 to be involved with and speculated that they may desire to have this be a joint standard. As the Government Authorized Representative of both SC-147 and SC-186, Matt took the action to bring this development to SC-186's attention.

10. ACAS Xr V5 Logic Release Status (241003 ACAS Xr V5 Path Ahead.pdf)

    Randal Guendel, MIT Lincoln Laboratory, provided a status update on the release of the Version 5 ACAS Xr Logic. Randal gave a quick overview of the development process, the schedule for completion and release of various components of the logic, and a rundown of a few known issues that have yet to be addressed.

11. ACAS Xu Revision Scope and Update (ACAS Xu Terminal Area Plan - 10-03-24.pdf)

    Revisiting the planned Revision A to the ACAS Xu MOPS (DO-386/ED-256), Charlie Leeper, Johns Hopkins Applied Physics Laboratory, gave a presentation on the scope of the changes that incorporate the terminal capabilities into ACAS Xu, and some of the key technical aspects that would change both internally to the system and externally on the behavior of the system. There was some discussion about the alerting policies that would now be used for aircraft determined to be in the terminal area, which would mean a narrower RA policy, but with longer range, and that would issue only Vertical RAs. These changes would essentially make ACAS Xu systems a "DAA Class 3+5 system" per definitions in the current DAA MOPS, DO-365C. Charlie walked through the schedule for the Program Office releases of materials, while noting all corresponding changes to DO-386 Volume I material would need to be done by committee members outside of the Program Office Team. Matt Haskin announced that FAA plans to release TSO-C211a to incorporate ACAS Xu once SC-228 releases DO-365C Change 1. TSO-C211b will reference DO-365D and DO-386A once both those documents are released.

12. Review of Interface Section of ACAS Xr MOPS

    Randy Jacobson, Collins Aerospace, had a series of open questions regarding the interface section of the ACAS Xr MOPS (2.2.7.5). These questions included topics such as Data Time Out periods, the need for to know all the required Ownship discretes listed, and if all new Received Discretes listed were truly required. All questions were reviewed and addressed as best possible in preparation of the pending initial review and comment cycle.

13. Meeting Close

Ruy Brandao thanked everyone for the participation and reemphasized his appreciation for all the hard work done by the Program Office team. Ruy then adjourned the meeting.

Attendees:

Last Name	First Name	Company Name
Arbuckle	Douglas	Regulus Group, Inc.
Brandao	Ruy	Honeywell International, Inc.
Caicedo	Randy	L3Harris Technologies
Ciaramella	Kathryn	Federal Aviation Administration (FAA)
Dean	Garfield	EUROCONTROL
Guendel	Randal	MIT Lincoln Laboratory
Harrison	Austin "AK"	Garmin Ltd.
Haskin	Matt	Federal Aviation Administration (FAA)
Jacobson	Randy	Collins Aerospace
Leeper	Charlie	Johns Hopkins University Applied Physics Laboratory
Long	Anthony	Federal Aviation Administration (FAA)
Manfredi	Guido	Volocopter
Monk	Walter	Constellation Aviation Solutions, LLC
Rowlan	Stacey	Sagetech Corporation
Saunders	Jonathan	Aurora Innovations
Searight	Stuart	Federal Aviation Administration (FAA)
Scott	Jenipher	The MITRE Corporation
Sigman	Alan	Federal Aviation Administration (FAA)
Smith	Casey	NASA
Spinks	Brian	L3 Harris Corporation
Suchy	Neal	Federal Aviation Administration (FAA)
Teel	Brandi	RTCA, Inc.
Voyzey	Erika	L3 Harris Corporation
Wikle	Jared	MIT Lincoln Laboratory
Wu	Sam	MIT Lincoln Laboratory
Zintak	Ben	Johns Hopkins University Applied Physics Laboratory