

Special Committee 147

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

The 83rd meeting of the SC-147 was held on March 17th, 2016 in Phoenix, AZ. In accordance with the Federal Advisory Committee Act, Mr. Steve Plummer, Federal Aviation Administration (FAA) was the Designated Federal Officer (DFO) for this meeting.

J. Stuart Searight	Co-Chairman, Federal Aviation Administration
Ruy Brandao	Co-Chairman, Honeywell
Tom Troast	Secretary, Regulus Group
Al Secen	RTCA

Note: All presentations from the agenda items summarized below can be found on the RTCA Workspace (<http://workspace.rtca.org/kws>) in the SC-147 Traffic Alert & Collision Avoidance System area.

Agenda Item 1.a-1.d – Opening Plenary Session

Stuart Searight opened the meeting and thanked Stacey Rowlan and Tom Eich of ACSS for hosting the meeting in Phoenix. Stu then noted that the new co-chair of SC-147 would be Ruy Brandao. Stu asked the committee if they approved of the minutes from Plenary Meeting #82. There were no objections and the minutes were approved. Alexander Engle thanked Ken Carpenter for his time serving as WG-75 Chair. Alexander then introduced Bill Booth as the new WG-75 Chair. Next, Steve Plummer, the Designated Federal Official (DFO), read the public meeting announcement.

Agenda Item 2 - WG-75 Activities ([WG-75 activities March 2016.pptx](#))

Bill Booth presented a briefing on WG-75 activities. There were no questions raised during his briefing.

Agenda Item 3 – Update on SESAR 1 ([Update on SESAR 1 work – RTCA-147 March2016 Plenary.ppt](#))

Christian Avenau presented a briefing on SESAR 1 work. In response to a question, Wes Olson noted that while it is understood the primary focus of the SESAR work is validation of ACAS X performance for European airspace, it is hoped that SESAR can also support producing a sufficiently large encounter set for input of the Run 15 tuning process.

Agenda Item 4 – SESAR 2020 PJ11, CAPITO ([RTCA CAPITO v2.ppt](#))

Bill Booth presented a briefing on SESAR 2020 PJ11 and CAPITO. Bill noted that he will sometimes refer to work packages as “solutions”. In response to a question posed by Charles Leeper, Bill acknowledged that WG-75 is generally supported by PJ10 and WG-73 is generally supported by PJ13.

Alexander Engle explained that there is more discussion and work to be done to define the structure of the SESAR 2020 projects; however, WG-75 should be the focal point of TCAS/ACAS-related work.

Agenda Item 5.a – SWG Briefing ([SWG Report – Phoenix 031716 v3.pptx](#))

Walter Bender and Ruy Brandao presented a briefing containing a summary of SWG activities. Walter emphasized that the SWG will be holding weekly meetings between March and June in order to work through the large volume of MOPS material for which the SWG is responsible.

Ruy noted that with TCAS II Hybrid Surveillance, all tracks within 0.5 NM would be under active interrogation; the same is not necessarily true for ACAS X. Ruy added that ACAS X surveillance is not the CDTI generator; there is a separate MOPS for the CDTI.

There was some discussion about track correlation and its relationship to ASA compliance. Don Walker noted that he supports the idea of a common tracker for ASA and ACAS X and that SC-147 must be careful to not force separate trackers through incompatible tracker requirements to those found in DO-317.

Don Walker noted that SC-228 has been looking at surveillance issues. Michael Owen noted that there is benefit from horizontal maneuvers in certain encounter cases. Wes noted that horizontal maneuvers may be necessitated not only by encounter geometry but by aircraft capability limitations as well.

Ruy said that in TCAS II the loss of bearing did not affect safety. If, in ACAS X, there is a relationship between bearing accuracy and safety, the accuracy requirement needs to be achievable. Also, additional failure and monitoring requirements would need to accompany such a requirement, and those requirements would need to be added to the MOPS.

There was some discussion about the use of Geometric Altitude (GeoAlt) [that is provided by GPS receivers through ADS-B] in the context of ACAS X. Don Walker said that ADS-B Version 3 would make GeoAlt widely available. Neal acknowledged Don's remarks but noted that the TCAS PO has conducted several studies that showed that GeoAlt measurements would not improve the performance of ACAS X.

Don Walker expressed some concerns about ADS-B validation. He said that Paul Cambell was very concerned about ADS-B measurements that cannot be validated using active measurements since such measurements could be from spoofed targets. Neal asked if passive ranging (of UAT ADS-B measurements) could help detect spoofed targets. Don said that currently the passive ranging isn't enough to avoid spoofing.

Agenda Item 5.c – Safety Subgroup Briefing ([Safety Subgroup Report 3.16.pptx](#))

Andy Zeitlin presented a briefing on the safety subgroup activities and work. Andy clarified that system safety objectives need to be considered distinct from system performance objectives. Andy said that the January safety report can be made available upon request. Andy noted that the safety subgroup will hold teleconferences in the upcoming weeks to discuss all of the hazards and their associated mitigations.

Agenda Item 5.b – TWG Briefing ([TWG 2016.03.15.Short.Topics.v1.pdf](#))

Josh Silbermann and Stacey Rowlan presented a briefing on TWG activities and work.

Regarding the slide on TCAS II problem reports, Josh noted that several of them could be combined and up-leveled. Josh added that he removed items from the list that were written against the pseudocode and state charts.

Don Walker said that consideration should be given to the ways in which GeoAlt can be used for commercial space technology (such as Virgin Galactic space vehicles). The main problem is that altimetry becomes very poor after 65,000' altitude – a problem which is driving the ADS-B V3 changes. At some point in the future there could be as many as two commercial space flights per-day, which may require additional surveillance for high-altitude airspace, as well as considerations for the means by which ACAS X would perform surveillance and collision avoidance against such types of airborne vehicles.

There was some discussion with regard to the statistical significance work that Jeff Brush and Ken Carpenter had worked on. Stu said that he had no objections to the approach, but he would like to see more input from a focus group and the buy-in on this approach from all organizations that present performance and safety analysis to the committee. Garfield said that he would also like more time to review it. Josh said that the intent of the work was to follow-up on an earlier action; the statistical significance work will eventually influence the metrics matrix.

Josh stated that ASIM will only have one more release beyond the most recent version. Josh then recommended that people who are interested in using ASIM download the most recent release soon and test it to see if they have any concerns or recommendations; there will be relatively few ASIM changes in the future. Ruy asked if ASIM was intended to help people who are implementing the ADD algorithms in a language other than Julia [for a vendor platform]; Josh said that it can probably be used for that purpose, but general manufacturer feedback on ASIM is welcome.

Agenda Item 5.d – ACAS Xo Subgroup Briefing ([Xo summary brief for SC147 031716 MCP.pptx](#))

Michael Petri presented a briefing on ACAS Xo subgroup activities and work. There were no questions raised during his briefing.

Agenda Item 5.e – CSG Briefing ([SC-147 CSG ProgressUpdate March2016v2.pdf](#))

Stu noted that WG-75 has, in their Terms of Reference (TORs) a task to generate an interoperability MASPS [based on work from the ISRA between SC-147 and SC-228]. Stuart proposed that SC-147 should work with WG-75 to restructure the material developed for the ISRA into the MASPS and, as with all of our standards, work towards a joint approval and publication process. The scope of that MASPS needs to be determined soon. Neal noted that this effort does not seem to be needed right away, so it should be done at a lower priority level, therefore the MASPS will probably take around a year to complete. Everyone agreed that work on the MASPS should not interfere with the timely completion of other activities on the ACAS Xa/Xo critical path. Stu noted that WG-75 would likely perform the majority of work on the MASPS, but if there is discussion or deliberation that needs to take place that discussion should take place in the ACAS Xu subgroup.

In response to a question from the group, Adam said that the CSG will continue have Monday teleconferences until June.

Agenda Item 5.g – ACAS Xu Subgroup Briefing (ACASXU_147Plenary_Update_March2016.pptx)

Charles Leeper presented a briefing on ACAS Xu subgroup activities and work. Don Walker asked whether there would be an OSED generated for ACAS Xu. Stu said that there would not be an OSED for Xu; however, the Xu CONUSE is under review by the committee and would serve the purposes of an OSED by setting the scope of the operations and environments to be supported by the MOPS. Stu added that a complete SPR would be time consuming and cause delays in the schedule. In response to Don wondering if Europe’s approval process might require an OSED, Neal noted that Kevin Hallworth from EASA was aware of the plans for ACAS Xu and seemed fine with them. Bill Booth said that if an OSED is needed in Europe, it will be a European document only.

There was some discussion about safety assessments for ACAS Xu. Charles and Don said that the Xu subgroup would try to leverage models that were developed in SC-228. Don recommended limiting the amount of ACAS Xu safety work that is done until the FAA plan for ACAS Xu safety analysis is more mature. Stu said that the safety concern for ACAS Xu is higher than for ACAS Xa/Xo because UAS operations are something new being introduced into the NAS and their safe integration (i.e. the self-separation functionality of the DAA system) will need more of a complete Target Level of Safety (TLS) assessment than will the collision avoidance functionality which traditionally is treated as an extra layer of safety. Neal said that the safety approach would be discussed at the next ACAS Xu face-to-face meeting.

In response to the slide on the ACAS Xu MOPS and its relationship to the DAA MOPS, there was some discussion on how the ACAS Xu MOPS should be viewed. Charles said that the ACAS Xu MOPS should be viewed as a collision avoidance MOPS document.

Regarding the ACAS Xu high-level schedule, Wes noted that the ACAS Xu schedule will include an operational evaluation period similar to the one for the ACAS Xa/Xo schedule.

Agenda Item 7 – Closing Session

There was some discussion about upcoming meetings. The upcoming SC-147 face-to-face meetings will be as follows:

Year	Dates	City	Venue	Host Organization	Focus
2016	April 26-28	Washington, DC	RTCA Headquarters	RTCA	ACAS Xu
2016	June 21-23	Washington, DC	JHU Applied Physics Laboratory	JHU Applied Physics Laboratory	ACAS Xa/Xo
2016	July 26-28	Washington, DC	RTCA Headquarters	RTCA	ACAS Xu
2016	Sept. 27-29	Washington, DC	RTCA Headquarters	RTCA	ACAS Xa/Xo
2016	December 6-8	TBD	TBD	TBD	ACAS Xa/Xo

Stuart Searight adjourned the SC-147 plenary. Bill Booth closed the meeting for WG-75.

Certified as a true and accurate summary of the meeting.

Co-Chairman

Co-Chairman

-S-

Mr. Stuart Searight

FAA

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Mr. Ruy Brandao

Honeywell

Attachment 1
Meeting Attendance for SC-147 Plenary on March 17th, 2016

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