



RTCA Paper No. 193-22/SC135-737
April 21st, 2022

SUMMARY OF THE EIGHTIETH MEETING

RTCA SPECIAL COMMITTEE 135
ENVIRONMENTAL CONDITIONS AND TEST
PROCEDURES FOR AIRBORNE EQUIPMENT

The Eightieth meeting of RTCA/SC-135 was held on April 21st, 2022, at RTCA Headquarters in Washington DC.

The following were in attendance:

Kyle McMullen, SC-135 Chairman	NIAR
Jacob VanDyke, SC-135 Secretary	Amazon
Rebecca Morrison, Program Director	RTCA, Inc.
Rich Adler	FAA
Patrick Andre*	Andre Consulting, Inc.
Robert Atkinson	Marshall Aerospace and Defense Group
Sri Boddepalli*	Collins Aerospace
Michael Boersma*	GE Aviation
Eric Borgstrom	Element Materials Technology
Darrell Burghardt	Textron Aviation
Philippe Chenebault *	Dassault Aviation
Nick Conquest *	NIAR
Charlie Cooper *	Collins Aerospace
Steve Deppen	GE Aviation
Tim Fletcher*	Textron, Inc
Scott Hanaway	Astronautics Corporation of America
Jim Hatlestad	The Boeing Company
Jeffrey Hebert *	The Boeing Company
David Kerr	Garmin Ltd.



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Mike Koontz*
Cong Li*
Evelyn Matheson *
Jerome Mavier *
Kyle McMullen
Brock Milford*
Rebecca Morrison
Fidele Moupfouma *
Marc Poncon *
Scott Steen*
Tim Steinbach*
Eric Stewart
Kyle Tidbal*
Alan Thompson *
Jacob VanDyke
Merrill Vaughan *
Ken Webb

Textron Aviation
GE Aviation
The Boeing Company
Airbus
NIAR
NIAR
RTCA
Transport Canada
Airbus
Garmin Ltd.
Collins Aerospace
Collins Aerospace
Textron Aviation
Element Materials Technology
Amazon
The Boeing Company
Collins Aerospace

* via Conference Bridge



The agenda for the meeting was as follows:

1. Chairmen’s Opening Remarks, Introductions.
2. Approval of Summary from the Seventy-Ninth Meeting – (RTCA Paper No. 051-22/SC135-735)
3. Review Working Group summaries DO-160, DO-357
4. Review Schedule
5. Review and Approve TOR updates
6. New / Unfinished Business
7. Establish date for next SC-135 Meetings.
8. Closing.

(Note: The following report is organized by Agenda Item, although some sections were conducted out of sequence to accommodate some members’ schedules.)

Agenda Item 1 **Chairman's opening remarks, Introductions**

The plenary session of the Eightieth meeting of RTCA/SC-135 was called to order at 09:03 AM on the 21st of April, 2022. Chairman Kyle McMullen opened the meeting by welcoming those in attendance. Rebecca Morrison reviewed the RTCA Anti-trust, Proprietary and Membership policies. Mr. McMullen reviewed the agenda for the meeting, and invited attendees to introduce themselves.

Agenda Item 2 **Approval of the Summary from the Seventy-Ninth Meeting**

Mr. McMullen opened dialogue to approve the minutes from the 79th meeting, RTCA Paper No. 051-22/SC135-735. A motion was made and seconded to accept the minutes, and the motion was approved unanimously.

Agenda Item 3 **Review Working Group summaries – DO-160, DO-357**

The Working Group discussions were centered on the Change Proposals submitted for DO-160 Revision H.



The Change Coordinators described Change Proposals which were reviewed and dispositioned in their respective group meetings. The level of detail in the Plenary session discussions precludes accurate reporting here, so only change proposals creating significant discussion are noted. The actual Change Proposals and any dispositions are found on the SC-135 Workspace and tracked in the Change Proposal Tracking Log, also found on the Workspace.

Sections 1, 2 and 3 – David Kerr, Change Coordinator.

Discussion was held for three change proposals, H-280, H281 and H286. CP H-219. H280 was accepted as written, with the two remaining accepted as modified. The result of these proposals is intended to clarify over/under testing, provide distinction for determining power lines, and moving the definition of Hermetically Sealed to section 2. Although the actual definition of hermetically sealed will be discussed in future meetings, the accepted proposal was only to relocate the existing text within the document.

Sections 4, – Jacob VanDyke, Change Coordinator.

Two change proposals were reviewed for Section 4, H269 and H287. H269 was accepted as modified, and added a comment to clearly allow for and increase in overpressure test levels to meet aircraft installation requirements. Proposal H287 was created to start the conversation for standard reporting requirements for Section 4 and was deferred.

Sections 7 and 8, Merrill Vaughan, Change Coordinator.

Three change proposals were discussed for Section 8. Proposals H262, correlating Design Assurance Levels to test categories, and H263 which suggested modification of existing sinusoidal test curves were rejected. Proposal H264 was deferred, which addresses process changes to drive minimum test times for Sine on Random test categories.

Section 9 and 11 – Kyle McMullen (Acting), Change Coordinator

Proposal H284 was accepted as modified, adding clarification to the number of cycles (3) that must be completed.

Four change proposals were dispositioned for section 11, with 3 being deferred for further discussion. Proposal H241 was accepted to reference different fluids more generically and reduce complexity. Proposal H245 expanded fluid “sullage” to include drinks at a user defined temperature, and H283 changed the wetting period from 4 hours maximum to 4 hours (+/- 30 min).



Section 15 – Ken Webb, Change Coordinator

For Section 15, ten proposals were discussed with four accepted, three rejected, two withdrawn, and one deferred. Most notable of the accepted proposals was updating the categories list to use Dc as opposed to 1 degree, removal of the permission to move the compass toward the EUT, and clarifying updates to figures.

Section 16 – Darrel Burghardt, Change Coordinator

Four proposals were discussed, H279 was accepted as modified to update the headers to be clearer in reference to Section 18. Proposal H-278, clarifying applicability of categories for 14V equipment was deferred to further confirm if 14V could be applicable to Cat Z. Two proposals were withdrawn, and a conceptual proposal to reorganize/renumber Section 16 was discussed.

Sections 19 and 20 – Jim Hatlestad, Change Coordinator

No new change proposals were submitted or discussed for Section 19. General discussion was held around the switching transients test.

For section 20, eight proposals were discussed/reviewed. Proposal H145 was accepted as Modified to set a minimum impedance limit below 100 kHz to address the uncontrolled resonance around 25 kHz for LISNs and to change the maximum frequency limit from 400 MHz to 30 MHz. Proposals 252 and 261 we accepted to allow for a LISN to be reverb outside of a reverb chamber above 1 GHz, and to turn the ETU off during chamber calibrations. Other proposals were also discussed regarding reverb field equations and antenna comparisons.

Section 21 – Nick Conquest, Change Coordinator (presented Kyle McMullen)

Change proposal H288 was accepted, allowing for use of FFT receivers.

Section 26 – Alan Thompson, Change Coordinator

Four proposals were discussed for Section 25. H-105 and H139 were rejected. The content was to specifically allow Cat C even if no test and modify the exception for display faces respectively. Proposal H195 to better clarify and expand exclusions for enclosures with connectors and displays was accepted as modified. Proposal H221 to create a better definition of vent holes was deferred, as it requires more testing at the FAA Tech Center



New box level testing methodology is in a very mature status, with the need to further define/quantify detection for the Flame exiting the box remaining.

Agenda Item 5/6 **Review Schedule/Review and Approve TOR updates**

Based on the Revised Terms of Reference (TOR), RTCA SC-135 has committed to presenting the first complete draft of DO160H by Q3 of 2024, to support final release by December 2024. The committee recommended to push DO-357A out to 2027 to allow for industry feedback for DO-160H, and DO380A will be removed from the TOR.

Agenda Item 7 **New/Unfinished Business**

New Change coordinators were identified for Sections 9, 11 and 17. Robert Atkinson accepted the role of Change Coordinator for Section 9, Scott Hanaway has accepted the role of Change Coordinator for Section 11, and Keith Peavler has accepted the role of Change Coordinator for Section 17.

Marc Poncon presented on Volcanic Ash, which may be covered in section 12 either naturally or by modification. Early discussions indicated Category D should cover most aircraft exposure situations with Category S providing an additional level of robustness for equipment with moving parts. The committee will consider reporting back to PMC and applicable authorities for decisions on how to move forward.

Daren Nerad presented on Electric Aircraft eVTOLs and their unique operating voltages. Discussion was held regarding how DO-160 may address these new operating conditions. The committee will continue to collect info and present recommendation to PMC.

Existing committees working this, WG-112 is for eVTOL and related WG-113 and WG-116, declined RTCA's request to work on this together.

Agenda Item 8 **Establish Date for Next SC-135 Meeting**

The next SC-135 meeting will be held at RTCA Headquarters, Washington DC. Dates of the meeting will be from Tuesday, October 18th through Thursday, October 20th, 2022.

Agenda Item 9 **Closing and Adjourn**



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Kyle McMullen asked for a motion to adjourn the meeting. A motion was offered, seconded, and unanimously approved. The meeting was adjourned at 6:01 PM on Thursday, April 21st, 2022.

-S-

Kyle McMullen
Chairman

-S-

Jacob VanDyke
Secretary

Certified as a true and accurate summary of the meeting.