



Summary of the Ninety-Seventh Meeting

Special Committee 159

Navigation Equipment Using the Global Navigation Satellite System (GNSS)

The ninety-seventh Plenary meeting of SC-159 was held December 13th, 2016 at RTCA Headquarters, 1150 18th Street NW, Suite 910, Washington, D.C. 20036. The attendees were the following:

Christopher Hegarty (Co-Chair)	The MITRE Corporation
George Ligler (Co-Chair)	PMEI
Ken Alexander (Designated Federal Official)	Federal Aviation Administration

NAME	COMPANY
Abduselam, Hamza	Federal Aviation Administration
Anand, Shiva	The MITRE Corporation
Anderson, David	
Azoulai, Laurent	Airbus
Baker, Greg	Aviation Spectrum Resources, Inc.
Biggs, Michael	Federal Aviation Administration
Chesto, Lawrence	Consultant
Clark, Barbara	Federal Aviation Administration
Dennis, Jed	NAVTAC
Dimos, George	Volpe National Transportation Systems Center
Doolan, Mike	NTIA/Office of Spectrum Management
Dutta, Santuna	Ligado
Ericson, Swen	Zeta Associates
Erlandson, Robert	NISC III
Fan, Tiange	The Aerospace Corporation
Foley, John	Garmin Ltd.
Green, Valerie	Ligado
Harris, Matt	The Boeing Company
Hayden, Tom	TLH Consulting LLC
Judge, David	Advantage Consulting Engineering Corporation

Kalyanaraman, Sai
Kancherla, Madhu
Miller, James
Mitra, Trin
Morrison, Rebecca
Oria, A.J.
Parikh, Ajay
Peterson, Kenneth
Reddan, Patrick
Roy, Andrew
Settle, Mark
Smith, Brian
Spence, Rod
Stearn, Geoff
Swanson, Anne
Vafiades, Monica
Wichgers, Joel

Rockwell Collins
Honeywell International, Inc.
NASA
RTCA
RTCA, Inc.
Overlook Systems Technologies, Inc.
Ligado Networks
Federal Aviation Administration
ZETA Associates
Aviation Spectrum Resources, Inc.
Wilkinson, Barker, Knauer, LLP

NASA
Ligado Networks
Cooley LLP
U.S. Air Force
Rockwell Collins, Inc.

The agenda for the meeting was as follows:

1. Introductory Remarks: DFO, RTCA, and Chairmen
2. Presentation by WG-6 of comments on the Ligado Proposal dated August 30, 2016 with discussion for review and approval by SC-159
3. Other Business
4. Adjourn

In accordance with the Federal Advisory Committee Act, Ken Alexander, Federal Aviation Administration (FAA), was the Designated Federal Official for this meeting.

Agenda Item 1. Introductory Remarks: DFO, RTCA, and Chairmen

At the suggestion of SC-159 Co-Chair George Ligler, attendees introduced themselves. Ken Alexander, the meeting’s Designated Federal Official, read the meeting announcement. Rebecca Morrison, SC-159’s RTCA Program Director, summarized the RTCA Special Committee Membership and Proprietary Reference Policies. Dr. Ligler explained that the 97th SC-159 Plenary was a special meeting focused on the review and approval of comments generated by SC-159’s WG-6 (Interference) on two documents concerning a proposal by Ligado for a network operating in bands adjacent to GPS. The FAA had requested that RTCA review these two documents in a letter dated 19 October 2016 sent by Ms. Peggy Gilligan, FAA Associate Administrator for Aviation Safety, to RTCA President Margaret Jenny.

Agenda Item 2. Presentation by WG-6 of comments on the Ligado Proposal dated August 30, 2016 with discussion for review and approval by SC-159.

Sai Kalyanaraman, WG-6 Chair, provided an overview of the Ligado document review conducted by WG-6. Two documents entitled: (1) “Ligado Report on Compatibility of Ligado Networks’ Uplink Emissions with FAA Requirements for Certified Aviation GPS Receivers”, and (2) “A method for calculating adjacent band RF interference power received by a certified aviation GPS receiver from proximate terrestrial base stations” were reviewed. Based upon inputs to SC-159 from the FAA and Ligado Networks, WG-6 established a 15 December 2016 suspense date for their generation of comments on these documents and SC-159 review/approval.

Eight WebEx meetings were held by WG-6 from October 28 to December 5, 2016, to discuss comments on the two documents. 34 comments were received on the downlink (base station) document. Consensus was not achieved on 15 of these comments. No comments were received on the uplink document. A report was generated by WG-6 summarizing the comments and providing supporting material. This report was provided to SC-159 for review on 6 December 2016.

The areas for which there was a lack of consensus were:

- RFI propagation (channel) model
- Safety margin
- 250 foot standoff radius based partially on out of band emissions
- Mechanism for coordination of potential Ligado deployment
- Determination of aggregate RFI backoff
- GPS acquisition/initialization near Ligado base station
- Review of tools and numbers behind the analyses

Dr. Kalyanaraman and Dr. Ligler then led a discussion of comments on the WG-6 report:

1. Geoff Stearn, Ligado, thanked WG-6 for their efforts in conducting the review. He suggested some wording changes in the report regarding terms such as “the other WG-6 participants’ perspective.” He noted that such terms implied a degree of consensus among participants that, in his opinion, were not established by the WG-6 process. Other SC-159 participants favored the original text. After SC-159 considered several potential compromises in wording that were not found satisfactory by the consensus of the meeting, Geoff withdrew his comments.
2. John Foley, Garmin, suggested wording changes to 3 sentences within the WG-6 report. These changes were discussed and accepted by the meeting.
3. In anticipation of approval of the WG-6 report by SC-159, the Meeting decided it would be appropriate to append to the original title of the report (“Summary of Ligado Proposal Review by RTCA SC-159 WG-6”) with the phrase “as Approved by RTCA SC-159, December 13, 2017”.

The report, as amended by the Meeting, was formally approved by SC-159. The approved version is available at:

http://www.rtca.org/Files/Miscellaneous%20Files/SC-159_WG6_Response.pdf

The input materials for the 97th Plenary are posted to Workspace.

Agenda Item 3. Other Business

There was no other business.

CERTIFIED as a true and accurate summary of the meeting.

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Christopher Hegarty
Co-Chair

--S--

George Ligler
Co-Chair

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