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Saint Denis, 10 February 2021
Washington, 10 February 2021

**EUROCAE WG-119 Plenary Meeting #2 “Radar Altimeter” /
RTCA SC-239 Plenary Meeting #2 “Low Range Radar Altimeter”**

DATE: November 4-5, 2020

TIME: 7 AM – 1 PM EDT

PLACE: Virtual

CONTACTS:

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AGENDA

- One hour for EUROCAE/RTCA presentation
- Reasons why SC-239/ WG-119 have been created
- Joint SC-239/ WG-119 philosophy (target: same MOPS)
- Presentation of each SC-239/WG-119 member and role.
- Status/outcome of the RTCA SC-239 Task Force 5G/RA interference Assessment Report (FCC)
- Discussion on the next steps: 5G Interference Threat Definition Worldwide (Europe, China, Australia, Canada, Japan...)
- Discussion on the items that are going to be address in the MOPS revision
- Potential Sub-group identification
- Delivery date of the MOPS and intermediate versions schedule
- Identification of the recurrence of next working groups Webex
- Identification of the next plenary session date
- Other Business
- Review of Action Items
- Adjourn

PARTICIPANTS

Name	Affiliation
Andrew Roy	ASRI
Angela Roth	Airbus
Anna Guegan	EUROCAE
Anne Vaske	TU Braunschweig - Institute for EMC
Charisse Green	Federal Aviation Administration
Cindy Freud	The MITRE Corporation
Clay Barber	Garmin, Ltd
Craig Brandt	The Boeing Company
David Redman	AVSI
Donny Morrow	Air Lines Pilots Association
Ed Hahn	Air Lines Pilots Association
Eddie Straub	Garmin, Ltd
Fred Fisher	AVSI
Gerhard Berz	EUROCONTROL
Gerlof Osinga	The Boeing Company
Hamza Abduselam	Federal Aviation Administration
Herve Dutruc	Airbus
Hussain Al-Sadi	The Boeing Company
Ivan Martin	Thales Group
Jean Luc Robin	Airbus
John Mettrop	UK Civil Aviation Authority
Karan Hofmann	RTCA, Inc.
Kim Kolb	The Boeing Company
Lee Nguyen	Federal Aviation Administration

Max Fenkell	Joby
Miles Bellman	Federal Aviation Administration
Oreoluwa Ajayi	NeuralVol Inc
Rebecca Morrison	RTCA, Inc.
Richard Amy	DGAC (La Direction generale de l'Aviation Civile
Robert Geise	TU Braunschweig - Institute for EMC
Sai Kalyanaraman	Collins Aerospace
Samh Menshawy	Thales Group
Seth Frick	Honeywell International, Inc
Shane Happs	Collins Aerospace
Shunichi Futatsumori	ENRI
Stephane Tallet	Thales Group
Ted Peterson	Collins Aerospace
Terry McVenes	RTCA, Inc.
Wes Googe	American Airlines
Zhimin Li	Collins Aerospace

1. Welcome, Introductions and Administrative Remarks

After a roundtable of introductions, the co-chairs Jean-Luc and Seth Frick along with Karan Hofmann from RTCA and Anna Guégan from EUROCAE welcomed the participants.

2. Agenda Review

The group reviewed and approved the meeting agenda.

3. Plenary Discussions

Karan and Anna presented a detailed set of kick off meeting slides that covered a range of items including the RTCA antitrust policy, EUROCAE IPR policy, RTCA's proprietary policy and EUROCAE Working group participation policy. RTCA program directors also presented an overview of the RTCA, its committees, the Committee positions, scope and tools used in the process. The EUROCAE TPM presented an overview of the EUROCAE organization, its governing bodies, gamut of members supporting standardization work within the EUROCAE forum and a listing of the domain of activities within EUROCAE. Pursuant to this, RTCA and EUROCAE presented

information on the established process between both SDO's for the purposes of joint MOPS development. The group reviewed the structure of the RTCA and EUROCAE document formats and the open consultation and FRAC processes. Further material on the RTCA and EUROCAE ToR's were presented in support of the joint MOPS development effort. This was followed by a discussion on the work plan, drafting guides and the usage of a standard template for MOPS development.

This was followed by additional discussion on how to specify unique manufacturer conditions, additional possible testing and further airworthiness guidance for installation. This was meant to address how the rad alt antenna performs and how it is integrated in the final aircraft level install.

The group engaged in a lot of discussions on how to structure the MOPS (for e.g., whether we will have a Rad alt plus antenna MOPS in the same document or if it will be in separate documents. The discussion trended towards having rad alt and antenna requirements in the same MOPS document but with considerations that will afford the manufacturer to obtain an incomplete TSO against the antenna. The FAA mentioned that they are open to discussions on this front.

Additional discussions ensued on the topic of threats to rad alt from interference. John Mettrop mentioned that we need to look at robustness across the board from other 5G systems. The group explored whether it was worthwhile to have multiple classes of radar altimeters and delved into the pros and cons of the same. Gary Berz from EUROCONTROL mentioned some of the potential issues with multiple classes of equipment including aspects of aerodrome compatibility. The group agreed that we need to rad alt designs that are as robust as possible (to the suite of threats) while accounting for SWAP-C considerations. John Mettrop emphasized the need to ensure that the rad alt designs meet the prevailing radio regs. The team has an action to identify gaps between the current rad alt requirement/guidance baseline and what is stated in the radio regs.

Terry McVenes, President of RTCA, presented details of the SC-239 Task Force (TF) activity that resulted in the report on compatibility assessment between LRRRA function in the presence of interference from potential C band mobile Telecom sources. He indicated that the report was technically sound and that we need to engage with appropriate people and industry groups to help carry the message. Terry was planning to meet with multiple industry groups (such as GAMA, ALPA, AIA) that same week. Terry indicated that we need to respond to the CTIA filing and we may need to provide a coalition letter to the Committee on Science and Technology and posed the question on whether industry can support this.

Further discussion ensued around the issue of overall rad alt compatibility with planned 5G sources in the C band around the rad alt frequencies. Gary Berz thinks that aviation has to adopt and change and pointed to the 5G developments and expect that aviation will update as well. John Mettrop mentioned that UK OFCom looked at radar interference into the rad alt in the past.

Gerlof Osinga mentioned the need to look at the SC-239 activity as two projects. One, the longer term (where we resolve the compatibility issue with robust rad alt sensor solutions) and two, the short term (to protect the capability and fielded solutions that we have today). On the second item (short term), he added that we will need to address this through discussions with 5G operators and regulatory action.

Ivan Martin mentioned that his team is working with a 5G operator and the regulator through CEPT. However, he indicated that there is a lot of pressure to get the 5G rollout moving forward. Sai Kalyanaraman added that telecom is not looking to abandon any of the frequencies that were

previously listed for IMT operations (entire band n77 for example). Telecom will plan to provide more capability with these bands and will seek more frequencies as we move forward.

The discussion went towards how to characterize the scope of the issue from an aviation perspective. Jean Luc asked for three things on this front:

- a) Characterize the economic impact,
- b) Number of aircraft impacted, and
- c) The number of altimeters impacted.

Richard (DGAC) added that this will help clarify the extent of the issue for the French operators. Terry McVenes wanted to understand the extent of how we will use this data given that all rad alts are not equally impacted. Jean Luc clarified the how's behind this to help show the FCC the scale and scope of impacts.

Discussion ensued on the new MOPS activity. The group looked at the potential MOPS framework and Seth had an action to refine the MOPS framework and share the same with the group. Jean Luc presented an update to the group on the SC-239 TF work on near band compatibility. He added that anyone who has access to the SC-239 workspace will have access to the 5G scripts and other docs used in support of the TF activity and the new MOPS development.

There was further adhoc discussion the rad alt applications and levels of criticality. The group discussed some of the wide-ranging uses of rad alt across different platforms. Boeing mentioned that rad alt is used for Tail strike protection function with flight controls. Herve Dutruc stated that the rad alt is very critical (catastrophic level from a functional failure perspective) for Search and Rescue operations. John Metrop commented that we may not be compliant to radio regs from a rad alt receiver selectivity perspective. He added that US may not have much Fixed services in the near band at this time. UK civil radar has 147 dBW power levels and -60dbc for spurious emissions (this is for radar in the 3.1 GHz band). If this is the case, then the civil radars will have lots of spurious emissions in the rad alt band. Seth added that he does not see anything specific in the RR which indicates that the rad alt does not meet radio reg reqs. Mettrop agrees that there is room for interpretation today.

Metrop questioned the spurious numbers that we have in the report for 5G and is concerned that as a regulator one will see this is as a rationale to not have the current rad alts support cat2/3 ops. Further discussion ensued on this and the group iterated that we are seeking a reduction in spurious emission level by the FCC in the final BS (base station) parameter set.

Jean Luc went ahead and presented the material that was shared with the FCC. Several discussions on impacts to helicopters were brought up by Herve and the rest of the team. There were further discussions on link margin, and Lee (FAA) asked if we can have an example of this for compatibility analysis purposes. Sai asked if we need this to address Pfa needs. Seth responded that we will need to add accuracy requirements. to the MOPS in order to address some of these concerns (gaps that need to be addressed in the MOPS). The Plan is to have a white paper type of document to represent a nominal link budget definition for the purposes of addressing Lee's concerns with compatibility analyses. Receiver and A/C OEM's agreed with this approach.

Jean Luc reviewed the spectrum threat to rad alt on both sides. Recommendation is for one person to be the focal for gathering info on 5G rollouts from each country / region. Gary Berz asked the group to review RTCA/DO-235 (GPS L1 Band Interference characterization) as a reference to how interference standards are compiled.

4. Future Meetings

- a. Next WG meeting on the 7th of Dec 2020 (10AM – 12 noon US ET)
- b. Next joint plenary set for Feb 10th and 11th 2021 with Eurocae WG-119 (7 AM – 1 PM US ET).

5. Other Actions

- a. Complete the formation of subgroups (SG) and identify SG leads, establish a cadence for the SG, and kick off the SG meetings
- b. Identify secretary for this group from a EUROCAE WG-119 perspective.

6. Adjourn

The meeting adjourned around 1 PM ET on 5th of Nov 2020.