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RTCA Paper No. 212-22/SC230-067  
9/7/2022

**RTCA SC-230 Plenary #30 Meeting Minutes (Jul 19-22, 2022)**

**Attendance list:**

<i>Jul 19<sup>th</sup></i>	
<i>Name</i>	<i>Company</i>
<i>Karan Hofmann</i>	<i>RTCA</i>
<i>Moin Abulhosn</i>	<i>FAA</i>
<i>Jean-Baptiste Berthier</i>	<i>Airbus</i>
<i>Mohammed Ahmed</i>	<i>Boeing</i>
<i>Jeff Finley</i>	<i>Collins</i>
<i>Mark Smith</i>	<i>Collins</i>
<i>Marius Irimia</i>	<i>Collins</i>
<i>William Blake</i>	<i>Garmin</i>
<i>Mariusz Starzec</i>	<i>Garmin</i>
<i>Florian Kunstmann</i>	<i>Hensoldt</i>
<i>Dawn Gidner</i>	<i>Honeywell</i>
<i>Jan Lukáš</i>	<i>Honeywell</i>
<i>Rockee Zhang</i>	<i>OU</i>
<i>Matthew Lug</i>	<i>USAF</i>

<i>Jul 20<sup>th</sup></i>	
<i>Name</i>	<i>Company</i>
<i>Karan Hofmann</i>	<i>RTCA</i>
<i>Moin Abulhosn</i>	<i>FAA</i>
<i>Jean-Baptiste Berthier</i>	<i>Airbus</i>
<i>Bob Avjian</i>	<i>Mitre</i>
<i>Mohammed Ahmed</i>	<i>Boeing</i>
<i>Jeff Finley</i>	<i>Collins</i>
<i>Mark Smith</i>	<i>Collins</i>
<i>Marius Irimia</i>	<i>Collins</i>
<i>William Blake</i>	<i>Garmin</i>
<i>Mariusz Starzec</i>	<i>Garmin</i>
<i>Florian Kunstmann</i>	<i>Hensoldt</i>
<i>Dawn Gidner</i>	<i>Honeywell</i>
<i>Jan Lukáš</i>	<i>Honeywell</i>
<i>Matthew Lug</i>	<i>USAF</i>
<i>Rockee Zhang</i>	<i>OU</i>

<i>Jul 21<sup>th</sup></i>	
<i>Name</i>	<i>Company</i>
<i>Karan Hofmann</i>	<i>RTCA</i>
<i>Moin Abulhosn</i>	<i>FAA</i>
<i>Jean-Baptiste Berthier</i>	<i>Airbus</i>
<i>Mohammed Ahmed</i>	<i>Boeing</i>
<i>Jeff Finley</i>	<i>Collins</i>
<i>Mark Smith</i>	<i>Collins</i>
<i>Marius Irimia</i>	<i>Collins</i>
<i>William Blake</i>	<i>Garmin</i>
<i>Mariusz Starzec</i>	<i>Garmin</i>
<i>Florian Kunstmann</i>	<i>Hensoldt</i>
<i>Dawn Gidner</i>	<i>Honeywell</i>
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## **7/19/22 – 7/21/22 SC230 WG-10 Plenary #30 at Garmin**

### **Action items – Day 1**

[Group] Consider bringing in another co-chair to be trained.

[Jeff] Ask if NASA has any objections for the group to use their TASS model storm data.

[Jeff] Check with Steve if NASA is still willing to distribute or generate ADWRS in different languages and provide support for ADWRS modifications (specifically, this is related to the footnote for the ADWRS in 1.9.2).

[Rockee] Provide the journal article after authors provided feedback and comments have been addressed. Also provide the journal article and conference paper references.

[Group] Need to write a technical digest or summary of Rockee's work that includes a table or equation set detailing on how to incorporate the scintillation effect into the models.

### **Action items – Day 2**

[William]: Look at the statistical requirements for smaller antennas and feasibility of detection at 40 nmi. Do we need separate classes for different antenna sizes?

- Following discussion on Day 3, four options were provided for defining the operational range. If option 1 is agreed upon, then this action item is still valid otherwise if any other options are chosen then it can likely be removed.

[Group] Revisit and agree upon “operational” and “display” ranges terminology.

[Group] Revisit what a “perfect target” details for the statistical requirements.

[Group] Revisit all the IWC thresholds for the statistical requirements (previously sections 2.2.6.4-2.2.6.7; new draft sections 2.2.6.5-2.2.6.8).

- In particular, lots of discussion surrounding the “Must not indicate high” criteria threshold and whether 2 or 1 g/m<sup>3</sup> is appropriate.

[Venkata] Finalize event scenario figures, which includes correcting titles, setting appropriate axes, etc. and adding figure descriptions.



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- Suggestion: Show flight path through the original, unaveraged images and then show the rotated, 3 nmi averaged images (which means removing the rotated, un-averaged images)

[Mariusz] Provide figures to Dawn that depict line plots of IWC and 3 nmi averaged IWC along the flight path for each case.

### **Action items – Day 3**

[Group] Evaluate the impacts of beam width/beam smearing to determine if the 3 nmi threshold for “must not indicate” is appropriate (Appendix D.2).

[Mariusz] Go through initially discarded event scenarios and re-integrate them back in with the current six scenarios and potentially add new relevant cases. Shoot for around 12 cases and add a short justification for each case.

[Mariusz] Provide an overview about the event scenarios and description about how to use the tests cases, what the parameters mean, etc.

[Mohammed] Review the four options in the new section 2.2.6.4 regarding declaring the “operational range.”

- [Group] Come to a consensus on one of the four options regarding declaring the “operational range.”

[Moin] Continue to gauge interest in revisiting PWS for small antennas.

- Group to send out letter inquiring about whether changes to PWS guidelines for smaller antenna sizes is needed.

[Moin/Mohammed] Continue to collect information regarding volcanic ash and to look into operational requirements that are present/known for volcanic ash.

[Group] Continue to track the issue of X-band spectrum interference and effects of increases in interference in and near the spectrum.

### **High-level summary of effort and major discussion points:**

- Majority of the plenary was spent working through the MOPS draft document.



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- Airbus (Jean-Baptiste) brought up that the statistical evaluation does not provide useful operationally relevant value because it is hard to convey what detection statistics on a perfect target mean for real world usage. Garmin (William) argued that the statistical evaluation is a way to assess confidence on algorithm performance for each indication scenario.
  - More discussion about what a “perfect target” is and how is a perfect target defined. Thoughts were discussed about using what is in the draft MOPS now: a homogenous floating sphere of ice crystals 3 nmi in diameter at 20 dBZ. Also discussed using a vertical profile of reflectivity and ice crystals to create a storm “cylinder” or using a TASS model. Discussion of perfect target never completely resolved. Considered removing statistical evaluation all together but ended up deciding against it.
  - Airbus (Jean-Baptiste) requested addition of more cases to the simulation evaluation portion of the document (we initially agreed on six cases) because of previously discussed thoughts on ‘usability’ of the statistical evaluation. Discussion ensued about how many cases is enough and there were two (not mutually exclusive) thoughts: 1) (Honeywell [Dawn], Garmin [Mariusz]) Specify what we are looking for in the cases and identify which cases achieve those goals instead of just simply adding more cases to increase case count and 2) (Airbus) Add more cases or included the previously discarded cases and that is it ok to added ‘redundant’ cases for purposes of robustness. This led to an action item to re-integrate the cases that were previously discarded during a working group session, add justification as to why each case was chosen, and limit the case counts to around 12 for now. The problem with adding more cases is that there are only four storm models and ‘uniqueness’ to data cases, especially “Must Detect High,” is questionable.
- Discussion on what the IWC thresholds are for the statistical evaluation and why they were selected. Numbers of 1 and 3 g/m<sup>3</sup> are relevant concentrations for probe and engines but based on discussion the ‘must not indicate high’ and ‘must not indicate’ moderate thresholds of 2 and 0.2 g/m<sup>3</sup> were rather obscurely chosen had no real physical or theoretical justification at the time.
  - Garmin (William) suggested changing the threshold of the ‘must not indicate high’ from 2.0 to 1.0 g/m<sup>3</sup> to match the ‘must indicate moderate,’ which would match the already justified threshold of 1 g/m<sup>3</sup> and provide more leeway between the detection categories arguing that the end result with either threshold would not be much different anyways.
- Spirited discussion related to the range of the statistical evaluation. Discussion started around the fact that the statistical requirements only have to be met at 40 nmi (which was the threshold at the time of this discussion), but that is not the max range a manufacturer can claim their algorithm works on. The 20 dBZ perfect target was *supposed* to be a test of how far a radar manufacturer can claim. Airbus (Jean-Baptiste) claimed this is could be misleading since it could/would be understood that the statistical performance is met at the claimed range. Radar



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manufacturers argued that there is still usefulness and situational awareness that can be gain from expanding the range outside the statistically validated range and that turbulence MOPS were written the same way.

- Brief discussion into whether high-altitude icing should be changed to a “situational awareness” function instead of “avoidance” function, but after reading the objectives of the high-altitude section that language makes it clear that is could be used for both.
- Consensus was reached that two ranges are need, an “operational range” that meets the statistical requirements and a “display range” where the manufacturer can still display algorithm indications but can do so with degraded performance (although these actual names are still under debate).
- This led to more discussion about how the “operational range” is defined. In the end, four options were listed that the working group has to decide on, which include a constant 20 nmi range, ranges based on antenna size, ranges based on different defines antenna classes, or ranges based on aircraft speed.
- No new developments on possibility of volcanic ash detection. Mohammed to continue collecting information on volcanic ash.
- Working group agreed to send out letter inquiring on whether there is any need for smaller antenna wind shear although Garmin (William) do not find the need for this because no known complains or issues about the topic have been raised. Moin to continue internal inquiring on PWS for smaller antennas and funding possibilities but wants letter to be sent out so there is something to reference.
- No new developments on X-band spectrum interference but continue to watch progress of other committees tasked with addressing the issue.

## Next Meetings:

- Upcoming Plenaries:
  - 31 Oct, 2-3 Nov, 11:00 AM – 3:00 PM ET – Virtual
  - 31 Jan – 2 Feb, 9:00 AM – 5:00 PM ET – RTCA and Virtual – OPEN FRAC
  - 12-14 April, 9:00 AM – 5:00 PM ET – RTCA and Virtual – FRAC Resolution and approval to forward document to PMC



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CERTIFIED as a true and accurate summary of the meeting.

Mohammed Ahmed, SC-230 Secretary

Jeff Finley, SC-230 Co-chair

Dawn Gidner, SC-230 Co-chair