

RTCA SC-230 Plenary #21 Meeting Minutes (July 15-16, 2020)

Attendance list:

July 15th - WG10	
Name	Company
Karan Hofmann	RTCA
Lee Nguyen	FAA
Jean-Baptiste Berthier	Airbus
Kenny Ren	Boeing
Dawn Gidner	Honeywell
Jan Lukáš	Honeywell
Jeff Finley	Collins
Venkata Sishtla	Collins
Marius Irimia	Collins
Mark Smith	Collins
Steven Harrah	NASA
Fred Proctor	NASA
Ivan Clark	NASA
Justin Strickland	NASA
Patricia Hunt	NASA
George Switzer	NASA
Shigeru Machida	JAXA
Patrick Vrancken	DLR
Shumpei Kameyama	MELCO
Shiki Nakagawa	MELCO
Rockee Zhang	OU
Yunish shrestha	OU

July 16th - WG11	
Name	Company
Karan Hofmann	RTCA
Lee Nguyen	FAA
Jean-Baptiste Berthier	Airbus
Kenny Ren	Boeing
Dawn Gidner	Honeywell
Jeff Finley	Collins
Venkata Sishtla	Collins
Marius Irimia	Collins
Shumpei Kameyama	MELCO
Masatoshi Abe	MELCO
Shiki Nakagawa	MELCO
Patrick Vrancken	DLR
Steven Harrah	NASA
Fred Proctor	NASA
Ivan Clark	NASA
Shigeru Machida	JAXA
Hamaki Inokuchi	JAXA
Kotake Nobuki	JAXA



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RTCA Paper No. 229-20/SC230-052
September 2, 2020

7/15/2020 (8:00-12:00 PDT) WG-10 discussions

Administrative and agenda review:

Welcome/Administrative Remarks – RTCA Opening remarks on Anti-Trust Laws, IP Policy, and Membership Policy provided by Karan Hofmann. Jeff led introductions.

Karan introduced RTCA symposium topics

Introductions/Agenda/Minutes Approval - Minutes from April 2020 (Meeting #21) were approved without comment

Jeff review agenda and schedule:

WG-10 schedule review:

Deliverable: Updated MOPS: DO-220B due March 2021 (FRAC complete)

WG-11 LiDAR feasibility report was published

Co-chairs review schedule/action item status:

All outstanding action items from April Plenary were reviewed

University of Oklahoma presentation: Initial effort of electromagnetic scattering simulation of HIWC (Rockee Zhang)

Reference presentation material in RTCA SC-230 workspace

Summary of Objectives and Findings

A one-month quick investigation of possibility of EM-scattering-based simulation solution for verification of Swerling algorithm.

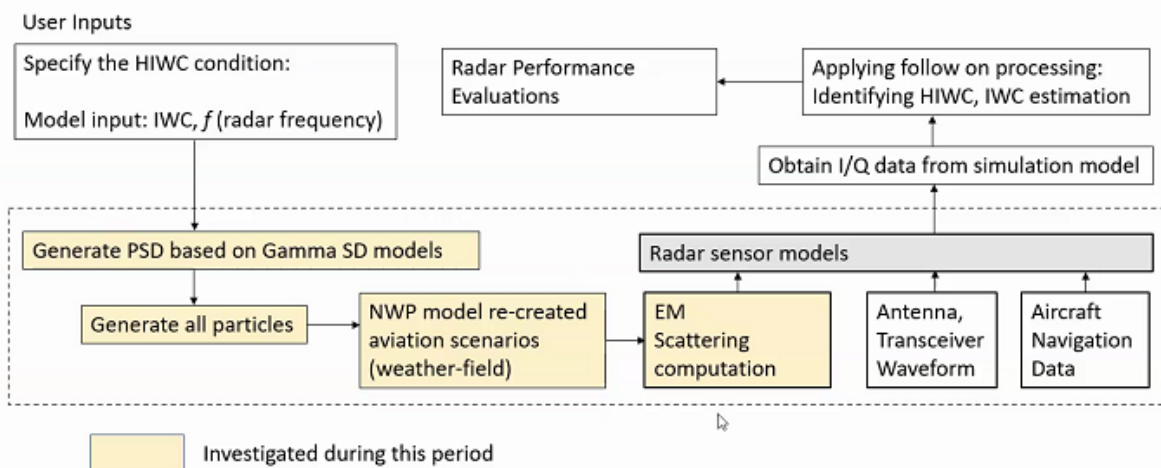
Key is microphysical model of ice crystals with HIWC condition, we used both simulated exponential model, and measured PSDs from flight campaigns.

We also made assumptions on the particle shape, orientation, counting angle.

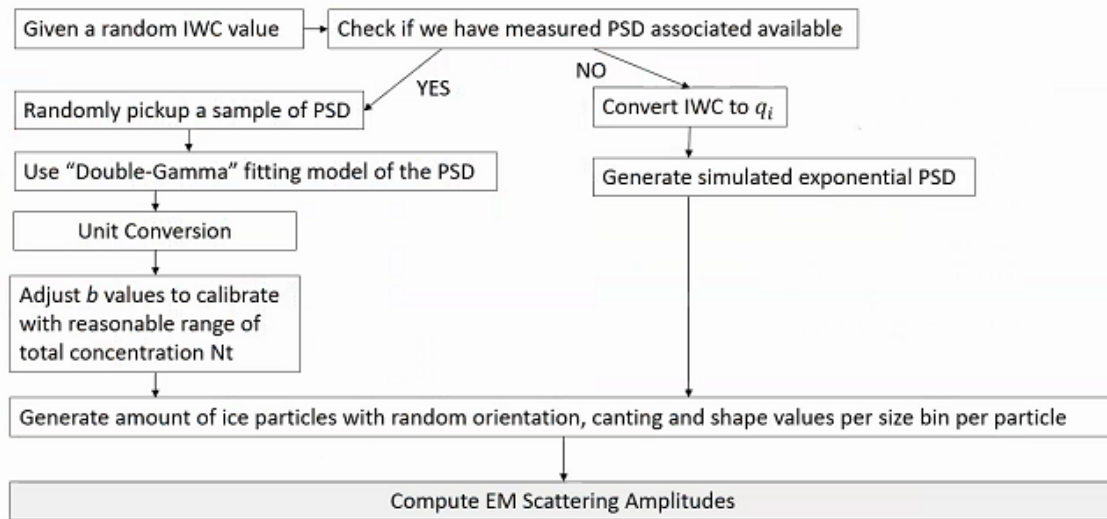
The key conclusion is that we can observe HIWC as a “radar target”, its averaged reflectivity factor (dBZ) follows approximately power-law models, variance of reflectivity factor (the basis of discrimination factor in Swerling Algorithm) indeed changes with IWC values.

Further investigation is needed to model detailed relationship between IWC and Z as a statistical model.

Simulation Solution to Radar Performance Validation



Approach of Generating Ice Crystal Particles in M-C Simulation



On the OU side regarding Flight test data, OU has a lot of Probe data, also ground radar (dual pole). Has some initial flight test radar data from NASA, hasn't started analyzing.

The verification/validation model may be available in 6-month pending numerous variabilities.



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TASS Comparison of ADWRS Simulations presented by NASA

(Steve/Justin):

Reference presentation material in RTCA SC-230 workspace

ADWRS simulation shows good correlation to TASS with no alteration needed (as presented).
Improvements to ADWRS may improve the correlation if needed (tie in with scattering physics model)

Currently proposing to use ADWRS as is.

[Action] Steve and Rockee work together to explore the potential of including OU particle model in ADWRS to increase ADWRS model's fidelity

Review of DO-220B Draft:

[Action Group] Section 2.2.6 needs to be reviewed rigorously before next plenary.



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7/16/2020 (14:00-18:00 PDT) WG-11/WG-10

Review WG-11 Schedule and Deliverables:

Reference RTCA LiDAR FS FRAC notional Timeline:

Regarding FAA's previous mention of using LIDAR is a LRRRA substitute/auxiliary, currently there is no plan to discuss this topic in either SC-230 or SC-239.

FAA recommends continuing development activity for CAT detection as a non-required/non-essential function.

If MOPS development is to be pursued:

New RTCA document creation requirement:

Need 2 sponsoring organizations, inform RTCA know the interest in developing MOPS (industry or government), then SC-230 TOR needs to be updated.

FAA mentioned that SC-236 WAIC group had a technique to support the GLA function, the MASP is DO-378.

The group also had questions on how OEMs instruct the pilots to handle Turbulence situation:

- Airbus Turbulence management guidance:
<https://safetyfirst.airbus.com/managing-severe-turbulence/>
- Boeing guidance: autopilot on, auto-throttle off

Future SC-230 working topics:

Flexible MOPS development?

GLA work

[Action] Lee to email the guidance documents:

- Guidance document (RTCA template guidance) FAA AC to recognize the RTCA guidance from WG-10/11 (DO220B and LiDAR feasibility study)
- RTCA guidance document to provide guidance to AC (DO-220A change 1 or DO-220B)

Other items for SC-230 (WG-10) to engage in:

- Guidance for vertical weather
- Guidance for PWS windshear, committee to make minor clarification on re-use of clutter suppression in the windshear algorithm.
- Downlink/crosslink weather data, our MOPS to cross-reference other datalink MOPS, but provide interface information
- Data Fusion of weather radar data and other types of data (EDR for example)



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WG-10 Continue Day 1 discussion: review DO-220B draft:

Section 2.2.6.5/2.2.6.6

[Action Jean-Baptiste] get calcification from Camille on 0.9 times in 2.2.6.5 since the group doesn't seem to understand it.

Section 2.4.3.6.5.2

[Action Steve] look at 2.4.3.6.5.2 bottom paragraph to make a wording recommendation

Section 2.4.3.6.5.1 Statistical Evaluation of Performance

Group had some extensive discussions around the use of reflectivity data to do performance indication. Based on NASA Swerling algorithm, reflectivity alone may not be the proper metric. The Swerling algorithm uses pulse to pulse reflectivity instead of just one single reflectivity pulse. The pulse to pulse reflectivity variance (index of dispersion) has strong correlation to IWC.

[Action Group] Look at statistical evaluation section and consider validity of the whole approach, consider re-craft the entire section to include the call-out of index of dispersion

Tuesday (7/21) WG-10 working meeting to discuss the above 4 V&V approaches.

Next Plenary:

Propose October 5th and 6th for next Plenary



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Action item summary

Action Item #	Action	Person(s)	Estimated Completion Date
Day 1 WG-10 - HAIC:			
1	Work together to explore the potential of including OU particle model in ADWRS to increase ADWRS model's fidelity	Steve (NASA), Rockee (OU)	Next Plenary
Day 2 WG-11 - LIDAR:			
1	Provide the guidance documents	Lee	Next Plenary
Day 2 – WG-10 – HAIC (DO220B draft review):			
1	Section 2.2.6.5/2.2.6.6 Get calcification from Camille on 0.9 times in 2.2.6.5 since the group doesn't seem to understand it.	Jean-Baptiste	Next Plenary
2	Section 2.4.3.6.5.2 review bottom paragraph to make a wording recommendation	Steve	Next Plenary
3	Section 2.4.3.6.5.1 Look at statistical evaluation section and consider validity of the whole approach, consider re-craft the entire section to include the call-out of index of dispersion	group	Next Plenary

CERTIFIED as a true and accurate summary of the meeting.

Kenny Ren, SC-230 Secretary

Jeff Finley, SC-230 Co-chair

Dawn Gidner, SC-230 Co-chair