

Presented by

Julien Delanoë and Alain Protat

Contributions:



Breakout #2 Promoting collaborative research in the HAICHIWC team: opportunities with W-band radar data set

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RASTA-F20

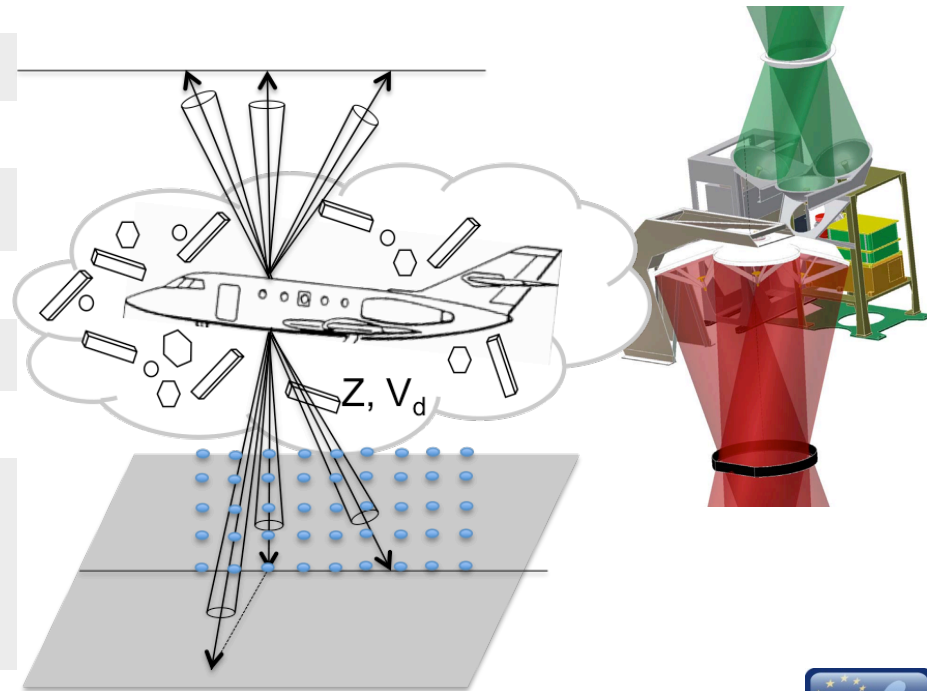
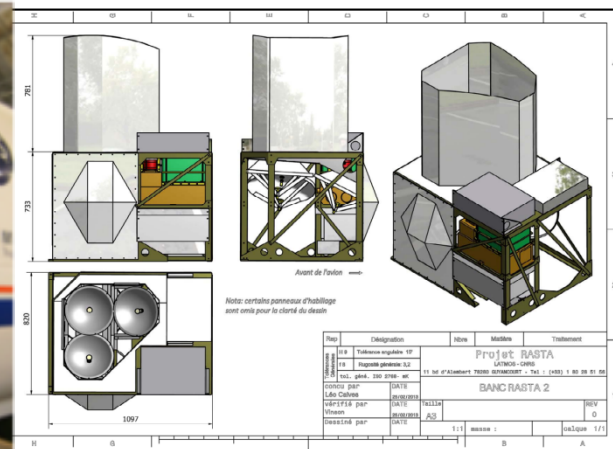
RASTAI - Description

Cloud radar operating at 95 GHz (same as CloudSat)

- Unique feature is the 5-antenna system (only 2 flights with 6 antennas)
- Allows for 3D wind retrieval + cloud microphysics retrieval (including IWC)

5-6 antennas

Frequency (GHz)	95 (3.2mm)
Vertical resolution (m)	60
Horizontal resolution (m)	225 to 300 depending on aircraft speed
Range (km)	15
Integration time (ms)	250 (measurement every 1.5 s for each antenna)
Energy (kW)	2 (pulse 0.4 μ s)
Ambiguous velocity (m s ⁻¹)	8
Antenna size (cm)	30 to 45 (0.7°/0.5° beam width)
Sensitivity at 1km (dBZ) – to be updated after calibration flight	<ul style="list-style-type: none"> • Down backward: -30 • Nadir: -30 • Down transverse: -30 • Zenith: -23 • Up backward: -30 • Up transverse: -19
Weight (kg)/dimensions (cm)	110/82x102x150



Vertical profiles every ~250m, 60m vertical resolution of

- 3D wind, including updraft / downdraft
- Ice terminal fall speed (two techniques)
- Cloud microphysical parameters :
IWC (2 techniques), Reff, Nt, Visible extinction, MMD

Indices characterizing vertical profiles :

- Convective or stratiform profile
- Attenuated profile (use with caution, flight-level basically)

Radar collaborations

CloudSat overpass :

synthesis of NAWX / RASTA / CloudSat comparisons

Direct estimate of multiple scattering and estimate of associated error on IWC.

Evaluation of DARDAR at two levels with IKP. Data exchange needed.

Who takes the lead ?

W-band attenuation estimate :

Julien retrieves W-band attenuation with forward modelling.

Mengistu has X versus W: non-Rayleigh scattering AND attenuation effects.

Nearly collocated RASTA-W vs NAW is the only clean way to get attenuation.

Who takes the lead ? Methodology needs discussion (profiles not collocated).

Intercomparison of radar IWC (and extinction) retrievals :

X, W, Radonvar, dual-frequency Z and Doppler, NRC lidar, Honeywell retrieval

Coordination is needed.

Use of Honeywell X-band data and other pilot radar data:

Who ? What ?

Other collaborations

- Lot of closure work using radar and in-situ microphysics. How do we coordinate ?
- Process studies : 2 types of HIWC regions. Alexei has a conceptual scheme for one, what about the other. Need coordinated work to characterize differences between those two flavours ? Collaborations ?
- High-resolution model evaluation and parameterization improvement work : inputs from radar and in-situ data ?
- Satellite work : use of RDT / NASA OT detection to provide context and build composite analyses of our observations.

Other collaborations

- Satellite work : use RASTA (and other radar) retrievals to refine assumptions in NASA retrievals and evaluation of IWP ? Who ? When ? How ?
- Radar extension of Appendix D/P. Work has started with RASTA. Inclusion of other retrievals (NAWX ?)
- Nowcasting : use RASTA profiles to inform development / validate ALPHA ?

High Altitude Ice Crystals (HAIC, 314314)

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