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Session 2

Task Team Progress Report for March 2024 to October 2025 – Satellites

(Submitted by Lori Borg, Axel von Engeln, and task team members)

Summary and Purpose of this Document

Progress report from the task team on Satellite-based remote sensing measurements.

Summary

Main work of the TT focussed on progress regarding TT10 Satellite collocations with in-situ and ground-based. The LC has now implemented, and is currently testing, a web based interface that allows radiosonde collocation with satellite overpasses. LC will give a presentation on the interface at ICM-16.

The EUMETSAT radiosonde service EUMETRAVES was discussed at several telecons; the contract has now been signed between EUMETSAT and CNR-IMAA/Italy (though not a formal TT achievement).

The TT also followed the development within the covariance and quality working groups.

TT was also impacted by the restructuring activities in the US, 2 core members from NOAA left, currently there is no NOAA affiliated member (some possible candidates have been identified and will be contacted soon).

Task team composition / structure

The current members of the task team are listed on the GRUAN TT-SAT page `https://www.gruan.org/network/task-teams/tt-satellite`. Tony Reale* and Bomin Sun* retired from TT-SAT in 2025. Efforts are underway to assess task-team membership and to identify additional members.

First Name	Last Name	Affiliation	Status
Lori	Borg	University of Wisconsin, Madison SSEC/CIMSS	co-chair
Axel	Von Engeln	EUMETSAT	co-chair
Chi	Ao	Jet Propulsion Laboratory, California Inst. of Tech.	member
Thomas	August	ESA	member
Fabien	Carminati	Met Office	member
Tim	Hewison	EUMETSAT	member
Florian	Ladstdter	Wegener Center, University of Graz, Austria	member
Stephen	Leroy	AER	member
Johannes	Nielsen	Danish Meteorological Institute	member
Tony	Reale	NOAA / NESDIS / STAR	*
Benjamin	Ruston	UCAR	member
Bomin	Sun	NOAA	*
Jordis	Tradowsky	Norwegian Meteorological Institute	member

Progress on main tasks

TT1 Justification for high-altitude attainment

Article published in July 2025. Discussion closed. Task expected to be closed at ICM-16.
Preprint: `https://egusphere.copernicus.org/preprints/2025/egusphere-2024-3906/`
Final Draft: `https://amt.copernicus.org/articles/18/2919/2025/`

TT2 GDPs profile uncertainty correlations

A dedicated sub-group of GRUAN is working on this, a draft description is available. An open source tool for handling error covariance is used (CoMet Toolkit). `https://www.comet-toolkit.org/`
Action: Co-chairs to reach out to this sub-group at ICM-16, to see what can be contributed.

TT10 Satellite collocations with in-situ and ground-based

TT-SAT has worked with the LC on the development of a searchable database for satellite collocations. Michael Sommer prepared a browser-based tool to perform satellite collocations with GRUAN observations, which uses the University of Wisconsin SSEC Orbital Navigation toolkit as its backbone (`https://www.ssec.wisc.edu/~gregq/html/orbnav.html`). The GRUAN collocation tool will eventually become available for public use. Michael demonstrated this tool to the TT-SAT co-chairs in July 2025 and this tool was discussed by TT-SAT in October 2025.

RO data repository is available through Amazon Web Services (AWS). Contains UCAR, ROM SAF, JPL, and EUMETSAT (access phase only) RO data. Data will be updated once per month (contain the post-processed RO, not for near real time use). There is a python API. Access to the repository is possible using Jupyter Notebook provided by Stepehn Leroy: `https://pypi.org/search/?q=awsgnssroutils`.
Funding has been secured to migrate this repository to the NASA Earth data archive/repository.
Action: Co-chairs to follow up database setup with the LC.

TT12 Collocation metadata

F. Carminati to follow up public VICIRS tool provision (SAF s/w licensing approach): UKMO internal admin part completed, waiting for NWP SAF partner confirmations

Radio Sonde support to EUMETSAT Satellite Instruments

- Contract has been signed, and kick-off will be held on 16 October 2025.
- First activity is covered in Work Order 1 (WO1), primarily network setup/site evaluations/etc. Duration of WO1 is 6 months.
- Dedicated METOP-C targeted radiosonde launches began at the ENA & SGP ARM sites (in coordination with the JPSS Radiosonde program) in preparation for targeting of METOP-SGA.

Relevant activities not covered by tasks

Related to radiosondes/Planetary Boundary Layer: Presentations on PBL activities at EUMETSAT, including introduction on EUMETRAVES, at ESA Living Planet Symposium 2025 and EUMETSAT 2025 Conference.

TT-SAT Teleconferences

During the reporting period, March 2024 to October 2025, there were 6 TT-SAT related teleconferences. Highlights from these meetings are discussed below.

- TT-SAT Telecon, 24 June 2024
  Overview of ICM-15 and discussion of main tasks for TT-SAT including: Final draft of paper on justification for high altitude attainment of radiosondes (TT1), profile correlation effort (TT2), satellite collocation effort (TT10), collocation metadata (TT12), and the EUMETSAT Radiosonde Service.
- TT-SAT Telecon, 23 September 2024
  - Talk by Nico Cimini: Update on the VIcarious Calibration tool for MWI and ICI using RadioSoundings. EUMETSAT will look into sharing of the VICIRS tool and report back. (TT12)
  - Talk by Joe Nielsen: Comparison of GRUAN radiosonde uncertainties and constructed error-covariance matrices to empirically derived error-covariance matrices. (TT2)
- TT-SAT Telecon, 13 February 2025
  Talk by Stephen Lerory: Cloud Repository of GNSS RO Data and Collocation Utility (TT10)
  Site: `https://registry.opendata.aws/gnss-ro-opendata/`

Action: LC plans to look closer into the tool, and Stephen offered to provide some additional information / adaptations.

- TT-SAT Telecon, 03 June 2025
  Talk by Tim Hewison: Introducing GSICS to GRUAN TT-SAT
- TT-SAT Telecon, 24 July 2025
  - Discussion between Michael Sommer and TT-SAT co-chairs (Axel & Lori) regarding the development of the GRUAN satellite collocation tool. (TT10)
  - Collocations were provided by Michael to Lori for PREFIRE SAT-1 and SAT-2 collocations for all GRUAN site radiosonde launches.
- TT-SAT Telecon, 13 October 2025
  - Stephen Leroy demonstrated how to access Amazon Web Service RO data using Jupyter Notebook. (TT10)
  - The GRUAN radiosonde/satellite collocation tool was demonstrated. Slides were provided by Michael Sommer. (TT10)

Contribution of TT-SAT members to ICM-16

- Axel - Presentations: (1) EUMETRAVES overview; (2) Validation of Radiosonde Data using Radio Occultation measurements; (3) TT-SAT Co-Chair Activities (sub-group meetings, discussions)
- Joe - Presentation: (1) On the uncertainty of satellite based tropospheric water vapour measurements; (2) TT-SAT member activities

Governance / Terms of reference

No changes to the terms of reference. `https://www.gruan.org/gruan/editor/documents/gruan/ToR_satellites_20201103.pdf`