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Session 2

Task Team Progress Report for March 2024 to October 2025 – Ground-Based

(Submitted by Domenico Cimini and Thierry Leblanc, co-chairs)

Summary and Purpose of this Document

Progress report from the task team on Ground-Based Remote Sensing Measurements.

Summary

The GRUAN Task Team on Ground-Based Remote Sensing Measurements (TT-GB) oversees the integration and production of ground-based measurements from lidar, microwave, and infrared remote sensing techniques, in compliance with GRUAN best measurement practices.

Concerning lidars, the GLASS Lidar Data Processor has been installed on a centralized server at the GRUAN Lead Center. Test data analysis were successful for Payerne, and more tests are planned for the other GRUAN lidars. The GLASS software has been upgraded to run automatically in near-real-time for systematic ozone processing.

Regarding microwave radiometers (MWR), TT-GB has produced a document (MWR_GRUAN_compliance_Table_20240627.docx) reviewing the compliance of relevant MWR networks (ACTRIS and ARM) with GRUAN requirements. TT-GB is also promoting a Memoran-dum of Understanding (MoU) between GRUAN and ACTRIS.

An update on activities related to infrared instruments (FTIR and AERI) may be provided after the TT-GB meeting scheduled for first week of November 2025.

Task team composition / structure

Co-chairs	Institution	Country	Expertise	Site
Thierry Leblanc	JPL-Caltech	USA	Lidar	
Domenico Cimini	CNR-IMAA	Italy	MWR	Potenza

Member	Institution	Country	Expertise	Site
Arnoud Apitouley	KNMI	Netherlands	Lidar	Cabauw
Maria Cadeddu	ANL	USA	MWR	ARM SGP
Jonathan Gero	Univ. Wisconsin	USA	AERI	ARM SGP
Jim Hannigan	NCAR	USA	FTIR	Boulder
Christine Knist	DWD	Germany	MWR	Lindenberg
Fabio Madonna	CNR-IMAA	Italy	Lidar, MWR	Potenza
Gianni Martucci	Meteoswiss	Switzerland	Lidar, MWR	Payerne
Christoph Ritter	AWI	Germany	Lidar, MWR	Ny-Alesund
Matthias Schneider	KIT	Germany	FTIR	Tenerife
Michael Sommer	DWD	Germany	GRUAN LC	Lindenberg

New TT-GB Members (after ICM-15)

Member	Institution	Country	Expertise	Site
Bernhard Pospichal	U. Cologne	Germany	MWR	
Tim Wagner	U. Wisconsin	USA	AERI	ARM SGP

Progress on main tasks

During the second half of 2024, the steps towards a GRUAN Lidar Product (lidar GDP) included the successful installation of the GLASS Lidar Data Processor on a centralized server at the GRUAN Lead Center in Lindenberg. Test data analysis with this centralized data processing version were successful for Payerne, and more tests are planned for the other GRUAN lidars, Cabauw upcoming next. Also, test temperature data processing using centralized GLASS for the Lindenberg RAMSES lidar were successful, which opens the gate for a possible larger-scale water vapor and temperature data pro-cessing, and potential RAMSES contribution to GRUAN and NDACC.

In summer 2025, the GLASS software developed at JPL has been upgraded to run automatically in near-real-time (NRT) for systematic TOLNet ozone processing (centralized at NASA Langley). This new centralized version will be installed at Lindenberg for GRUAN, which should allow the automated processing of large amount of data. Because of the many GLASS upgrades and installations in 2024/2025 and due to chronic budget uncertainty throughout 2024/2025 that significantly disrupted GLASS-related activities, completion of the documentation on GLASS has been delayed.

Regarding MWR instruments, TT-GB has continued to interface with other expert teams and networks. Two major programs were identified for operational MWR observations: the European ACTRIS re-search infrastructure and the US ARM programme. Details of these two MWR data programs have been presented at ICM-15 by Tobias Marke (ACTRIS) and Maria Cadeddu (ARM). After ICM-15, TTGB reviewed the state-of-art of MWR data processing within ACTRIS and ARM program and verified the compliance with GRUAN requirements. A document was delivered to GRUAN chairs in July 2024 (MWR_GRUAN_compliance_Table_20240627.docx), identifying compliance gaps. This closed Action A1 from ICM-14. A summary table is reported below (corresponding to Table 3, more details in the delivered document). The review indicates that currently neither one fulfils the GRUAN requirements completely. However, plans for more transparent uncertainty characterization, validation against references, and open access documentation, will likely elevate the current status from partially to totally compliant for most of the GDP requirements in a few years from now. The point of contact with the ACTRIS MWR programme is Bernhard Pospichal (University of Cologne, Germany), who has been invited to join TT-GB.

Summary of compliance of ACTRIS and ARM MWR data products with GRUAN reference observation requirements (Y/P/N indicate Yes/Partially/No).

GDP requirement	ACTRIS	ARM
Traceable to standards	N	N
Uncertainty characterization	P	P
Documented on open access litera-ture	Y	P
Validated vs. reference	P	Y
Metadata	Y	Y
Raw data for reprocessing	P	Y

In parallel, plans for a Memorandum of Understanding (MoU) between GRUAN and ACTRIS have been discussed. ACTRIS is currently completing the processed of signing a MoU with European pro-filing programme E-PROFILE (part of EUMETNET). Once this is completed, it will set the basis for the MoU between ACTRIS and GRUAN.

There is currently no activity to report for the infrared instruments (FTIR and AERI). To be updated after the TT-GB meeting scheduled for first week of November 2025.

Relevant activities not covered by tasks

Because of the many GLASS upgrades and installations in 2024/2025 and due to chronic budget uncertainty throughout 2024/2025 that significantly disrupted GLASS-related activities, completion of the documentation on GLASS has been delayed.

Governance / Terms of reference

The TT-GB Terms of references remain unchanged.

- Interface with other expert teams and networks (e.g., NDACC, ARM, ACTRIS)
- Develop guidance on the type and number of data and associated metadata needed to be stored from the instruments, as needed
- Evaluate the data products (uncertainty budget etc.) and bring in missing knowledge
- Inventory instruments worldwide for potential inclusion in GRUAN
- Draw conclusions on the suitability of the deployed equipment and advise accordingly the GRUAN Task Team on Sites
- Establish campaign rationales for the validation of data from multiple platforms

- Establish a system for the routine collection and display of data from multiple platforms
- Report to WG-GRUAN on all above duties