



The GRUAN IP 2024-2030: action status

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Goal of the presentation

.... Check the work progress against our main official document for the implementation of the network towards the 2030 horizon.....

Progress in addressing the actions vs time-frame and performance indicators

Action 1:

Action:	Ensure day-to-day operation of the GRUAN network including addressing the high-priority actions from the latest ICM, regular reports to the AOPC on progress, issues and updates on GRUAN IP, and undertaking regular Implementation and Coordination meetings.
Who:	Lead Centre, WG-GRUAN and GCOS Secretariat
Time-Frame:	Continuous
Performance indicator:	Delivery of the strategic goals of GRUAN; number of high-priority actions addressed; reports to AOPC; ICM meetings.
Benefits:	The operational delivery of GRUAN; GDP available to the user community.

The most quantifiable indicator is the number of HP action addressed: 3 out of 5

Action 2:

Action:	Continue the development of the measurement techniques in Table 1, and any identified additional candidate measurement techniques, to enable GDP certification.
Who:	Task Teams, data processing centers, Lead Centre, WG-GRUAN, sites, contributing / collaborating networks.
Time-Frame:	By 2030
Performance indicator:	Number of systems which have certified GDPs (based on Table 1 which could have systems added during the period of this IP).
Benefits:	Increased availability of reference data.

- No new systems have been certified in the last 18 months, we need at last 2-3 new GDPs in the next 18 months.
- GNSS is in pole position, other sonde types then; ozonesonde and CFH as well?



Action 3:	
Action:	Deploy GDPs as they develop via the data portal and monitor indicators of usage such as publications that use the data and availability in third-party repositories.
Who:	Lead Centre, Task Teams, sites.
Time-Frame:	Continuous
Performance indicator:	Data are publicly accessible and there is demonstrable evidence of growing usage within the community.
Benefits:	Long-term network utility and viability, return on investment.

- GRUAN data are currently available from the NCEI ftp, Copernicus Climate Data Store (CDS) and the GRUAN website.
- Statistics from the access through the CDS reveal a continuously growing number of data users. Better performance may be achieved in the GRUAN popularity according to Google Trends (talk by S. Gagliardi)



Action 4:	
Action:	Implement a process for the periodic review of GDPs, to assess their usage, document issues and check consistency between GDPs. Review should include external peer review.
Who:	WG-GRUAN, Task Teams
Time-Frame:	Develop process (2025); Implement (2026)
Performance indicator:	Implemented process by end of 2026.
Benefits:	Ensuring that GRUAN data streams/products remain cutting edge, consistent and are regularly reviewed both internally and externally. Updated GDPs where required.

- A document under discussion with the co-chairs will identify triggers for the GDP reprocessing.
- Needs to identify the procedure to apply and ensure check of consistency with the other GDPs.
- External review: Paul Poli at ECWMF agreed to serve as external reviewer, given its commitment as technical officer for the in situ observations of the CDS. Chunlue Zhou from University of Goteborg has been also invited, offering a STM to support him. Reply still pending.



Action 5:	
Action:	Instigate and improve GRUAN data hosting system, including DOIs and usage tracking options.
Who:	Lead Centre, GCOS Secretariat, TT sites.
Time-Frame:	2024-2025
Performance indicator:	New system implemented
Benefits:	Improved accessibility, citation and data usage tracking.

See presentation by S. Gagliardi about it

Adoption of new tracking system for data usage once data hosting strategy will be agreed.



Action 6:

Action:	Recruit and retain more sites with a priority in South America, Africa and Eurasian regions.
Who:	WG-GRUAN, Lead Centre
Time-Frame:	Continuous
Performance indicator:	At least 35 active sites present on map at the end of the IP period.
Benefits:	Improved global network coverage, reference quality measurements in new regions important to stakeholders.

Action 7:

Action:	Review and re-review sites as detailed in the GRUAN manual so that at least 80% of the active sites are certified over the last year of the IP period.
Who:	WG-GRUAN, Lead Centre
Time-Frame:	Continuous, for any given site at least once per four years.
Performance indicator:	Number of certified sites; number of sites delivering data streams via the relevant GRUAN data portal(s).
Benefits:	Certification ensures a minimum quality to end users and a degree of compatibility/comparability of their data streams and quality to the contributing sites.

3 new sites applied in the last 18 months, recertification proceeds regularly



Action 8:

Action:	Develop and implement a proposal to review and revive silent sites.
Who:	WG-GRUAN, Lead Centre, GCOS sites
Time-Frame:	2024
Performance indicator:	Silent site removal process is implemented and working; number of silent sites.
Benefits:	The proposal would revive the silent sites or decommission them from GRUAN. It would ensure a high quality and active network.

Silent data policy approved by the WG, it will be applied after ICM-15.



Action 9:	
Action:	Develop, test and implement new UTLS water vapor sensors and new cooling agent for R23 replacement.
Who:	Task Team on radiosonde, WG-GRUAN, Lead Centre
Time-Frame:	2024-2026
Performance indicator:	New sensors and non-R23 cooling methods for frostpoint techniques are tested (by end of 2024); implemented at all relevant GRUAN sites (2026).
Benefits:	Continuity of the UTLS water vapor measurements.

Action 10:	
Action:	Justify the use of the Standard Humidity Chamber (SHC) and document the necessary procedures.
Who:	Task Team on sites, Lead Centre
Time-Frame:	2024
Performance indicator:	Peer reviewed paper and technical note published. Increase use of SHC at GRUAN sites.
Benefits:	Improved uncertainty calculation for radiosondes measurements; potential for SHC to become more widely used at non-GRUAN sites.

Action 11:	
Action:	Strengthen the use of satellite and GRUAN products for validation and calibration activities of both data sets, leading to improved uncertainty estimates.
Who:	Task Team on Satellite, Lead Centre, WG-GRUAN
Time-Frame:	Continuous
Performance indicator:	Publications and evidence for progress in annual ICM reports.
Benefits:	Better characterization of measurement uncertainties, optimal use of observational assets to meet stakeholder needs.

- Discussion and recommendation had during this meeting. To consider achieved although new action have been formulated for implementing UTLS WV measurements at the GRUAN sites?
- Outline of the paper shared by the LC. Can the paper be ready by this summer?
- ARM is working to have the SHC at all sites.
- Need to manage the situation of autolaunchers. Payerne and Potenza started working on it. Action for ICM-16?
- Proposal for the validation of ICI and MWI
- GNSS-RO activities: do we have any plan for a paper or a review paper outlining the mutual benefit for uncertainties?



Action 12:	
Action:	Ensure sustained interactions with other networks interested in upper-air measurements of ECVs to realize synergies through cross-cutting governance activities, collaborative projects, joint peer-reviewed publications etc.
Who:	WG-GRUAN, Lead Centre, Task Teams
Time-Frame:	Continuous
Performance indicator:	Memoranda of understanding enacted, appropriate cross-representation, joint participation in research project.
Benefits:	Scientific insights, mitigation of capability redundancies, better governance in the framework of WIGOS.

- A discussion has been initiated with BSRN, GSRN representative are attending the ICM-15.

Action 13:	
Action:	Periodically review WG-GRUAN membership and terms of reference and whether task teams are still relevant/additional task teams needed.
Who:	WG-GRUAN, Lead Centre, Task Teams, AOPC
Time-Frame:	Review internally at GRUAN ICMs as a standing item. Reported annually to AOPC including relevant decisions and issues.
Performance indicator:	Regular review at ICMs and reporting to AOPC.
Benefits:	Ensure continuous relevance of activities and relevant expertise is recruited and retained to address the present challenges.

- WG-GRUAN membership and ToR have been reviewed and published on the GRUAN website. Further updates to membership will come in the next months.



Action 14:

Action:	Sustained engagement with the user community to ensure usage and exploitation of data arising from GRUAN activities.
Who:	WG-GRUAN, Lead Centre, Task Teams, AOPC
Time-Frame:	Continuous
Performance indicator:	Papers published, presentations given, participation in international activities and occasional special sessions on GRUAN in international conferences.
Benefits:	Ensures usage by user community to drive value.

- Scientific paper published in 2023 citing GRUAN or using GRUAN data: 12 paper+more than 100 hundreds document citing GRUAN or GRUAN related publications
- Presentation given at MMC, EMN, AMS24, GCOS AOPC, participation to the BIPM stakeholder workshop in Sept. 2024.
- C3S webinar by Peter Thorne (2023)
- Tracking of data usage in the CDS to collect feedback and C3S work on the GRUAN data assessment and usage
- Plan to arrange a training course at EGU2025 on reference measurements.



Action 15:	
Action:	In collaboration with partner networks, assess the relevance and tractability of the full suite of remaining GRUAN target variables defined in GCOS-112 (updated with new ECV definitions in the 2022 GCOS IP) in the context of measurement capabilities and measurement programmes underway in partner networks.
Who:	WG-GRUAN, Lead Centre, Task Teams
Time-Frame:	2026
Performance indicator:	Report available and some data streams for new ECVs not yet considered, at a minimum, under demonstrable development (stretch target: at least one additional ECV now has a GRUAN product).
Benefits:	After network expansion the next benefit would be in starting to observe all important facets of the column at the sites which requires expanding the ECV set.

- Discussion initiated with BSRN and GSRN on radiation products
- Interaction with SHADOZ for ozonesoundings.
- Do we initiate a discussion with ACTRIS on cloud measurements using ceilometers? This will be reconsidered in the next months during WG meetings.



Action 16:	
Action:	Review and update GRUAN Manual and Guide (GCOS-170 and GCOS-171).
Who:	WG-GRUAN, Lead Centre, AOPC and GCOS Secretariat, WMO SC-ON
Time-Frame:	2024-2026
Performance indicator:	Updated GRUAN Manual and Guide.
Benefits:	Recognition by NMHSs who provide sites and/or analysis capabilities. Visibility with stakeholders such as the satellite cal/val community.

First review made and discussion opened in this meeting, expectation to complete by 2025Q1



Action 17:	
Action:	Contribute to the WMO-GCOS activity on the implementation on the tiered networks. Show how GRUAN has benefits for broader measurement networks.
Who:	WG-GRUAN, Lead Centre, AOPC and GCOS Secretariat, WMO SC-ON
Time-Frame:	2024-2030
Performance indicator:	Progress on the implementation of tiered networks within WIGOS. Peer reviewed publications highlighting the benefits of GRUAN to broader observing network.
Benefits:	Strengthening of GRUAN's position within the global observing system. Benefits of GRUAN programmes to other end users.

C3S work using GRUAN algorithm to improve quality of upper-air (Madonna et al., 2022) and GNSS (Rannat et al., 2023) global measurements is continuing. Other assessments must be developed within the frame fo the SCG.

Action 18:	
Action:	Periodically review aspects around sustainability and environmental impacts of GRUAN operations
Who:	WG-GRUAN, Lead Centre, AOPC and GCOS Secretariat, WMO SC-ON
Time-Frame:	2024-2030
Performance indicator:	Reporting of sustainability and environmental impacts. Testing and deployment of new more sustainable practices.
Benefits:	As a leading network it is important that GRUAN leads by example in regard to environmental sustainability concerns minimizing the environmental footprint where and when possible.

Shortly report by next ICM on the usage of eco-friendly materials in the radiosondes and other mitigation actions taken to limit measurement impact?