

Second workshop on International Coordination for Spaceborne SAR

28–30 September 2022 | ESA–ESRIN | Frascati (Rome), Italy



WG3

*Data exploration - Cal/Val, fusion and assimilation
(L3-L4)*

Co-Chairs:

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WG3 Seed Questions

- What initiatives are ongoing to collect regional or global data sets of field measurements of bio- and geo-physical parameters relevant to possible SAR science products?
 - *What measures are being collected*
 - *How are they being collected*
 - *Who is collecting them*
- What are the challenges in making these field data accessible to the broad research community?
- *Data consistency/QC*
- *IP restrictions/protecting graduate student research*
- *Meta data requirements Etc.*
- Are there existing data portals that can be leveraged to gather these global/regional validation data sets and make them accessible?
- **How can the space agencies and missions promote joint SAR cal/val activities?**



The Development of CEOS SARCaINet

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CEOS WGCV - SAR Subgroup



Introduction

- SAR instruments need external calibration targets in order to calibrate imagery and for long term monitoring of image calibration stability
- Currently, most missions design their own external targets, typically a combination of natural and artificial calibration targets
- There is a strong desire by CEOS and the SAR community to have an established network of calibration sites that **would facilitate collaboration between sensors by using the same calibration references.**



Australian Geophysical Observing System



What is SARCalNet?

- SARCalNet is an initiative of the SAR subgroup of the Working Group on Calibration and Validation (WGCV) of the Committee on Earth Observation Satellites (CEOS).
- It is the next step in decades-long efforts to coordinate SAR multi-sensor Cal/Val.
- SARCalNet, when fully implemented, will provide **reliable, pre-defined information about SAR calibration targets**, both natural and artificial, to **facilitate joint calibration and performance evaluations** as well as assist **post-launch Cal/Val of any operating SAR sensor** data operating at typical SAR frequencies and polarizations.
- When possible, SARCalNet will also provide access to the calibration data sets that were used to either calibrate or monitor calibration and performance of specific sensors.



SARCaNet

Currently, the CEOS WGCV SAR subgroup hosts a target database

<http://calvalportal.ceos.org/point-distributed-targets-db>

However, while information is earnestly provided, the information on this site is lacking in some ways:

Natural targets

- not curated
- Regions are broadly specified, and sensor frame based
- Incomplete
- No reporting of image backscatter

Artificial targets

- User submitted, but not curated
- Can be out of date
- Varying degrees of measurement specificity
- Different measurement techniques and requirements
- No reporting of RCS or background clutter



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Making SARCaNet a reality

1. Establish requirements for inclusion in SARCaNet
 - Guidelines for artificial and natural targets
 - Recommended minimum analysis to facilitate intercomparison of results
 - Handbook that describes procedures
2. Curate the content
 - Submission protocols
 - Annual review
3. Annual summary report on SARCaNet



JPL P-band reflector 4.8 m at Rosamond Dry Lake



Current status of SARCalNet

For the past year, the CEOS WGCV SAR subgroup has been meeting regularly to write guiding requirements documents:

- Requirements and guidelines for Artificial and Natural calibration targets
- Guidelines for image calibration analysis
- A handbook that describes how SARCalNet operates
- Requirements for the web portal that will host SARCalNet

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Challenges for Coordinating SAR Cal/Val

1. Many SAR Cal/Val activities are associated with individual SAR projects and in particular with those needed during the commissioning phase of the instrument
 - Often this entails a large initial investment in resources
 - But – when the commissioning phase has completed, project resources often become more limited, and the calibration arrays may not have sufficient long-term support (such as that needed for monitoring long term SAR system performance)
2. SAR missions often build resources specifically designed for their instrument only
 - Support for multi-sensor or multi-agency Cal/Val is rare
3. Frequency and polarization diversity necessitate different standards and requirements for different missions.



Recommendations:

1. Long-term support directly from the space agencies rather than the projects themselves for international SAR calibration arrays and their maintenance.
2. Coordination of regular multi-sensor and multi-agency calibration campaigns over the same natural and artificial target sites.
3. Freely sharing of all data and results from calibration sites through a single, reliable and long term data archive

