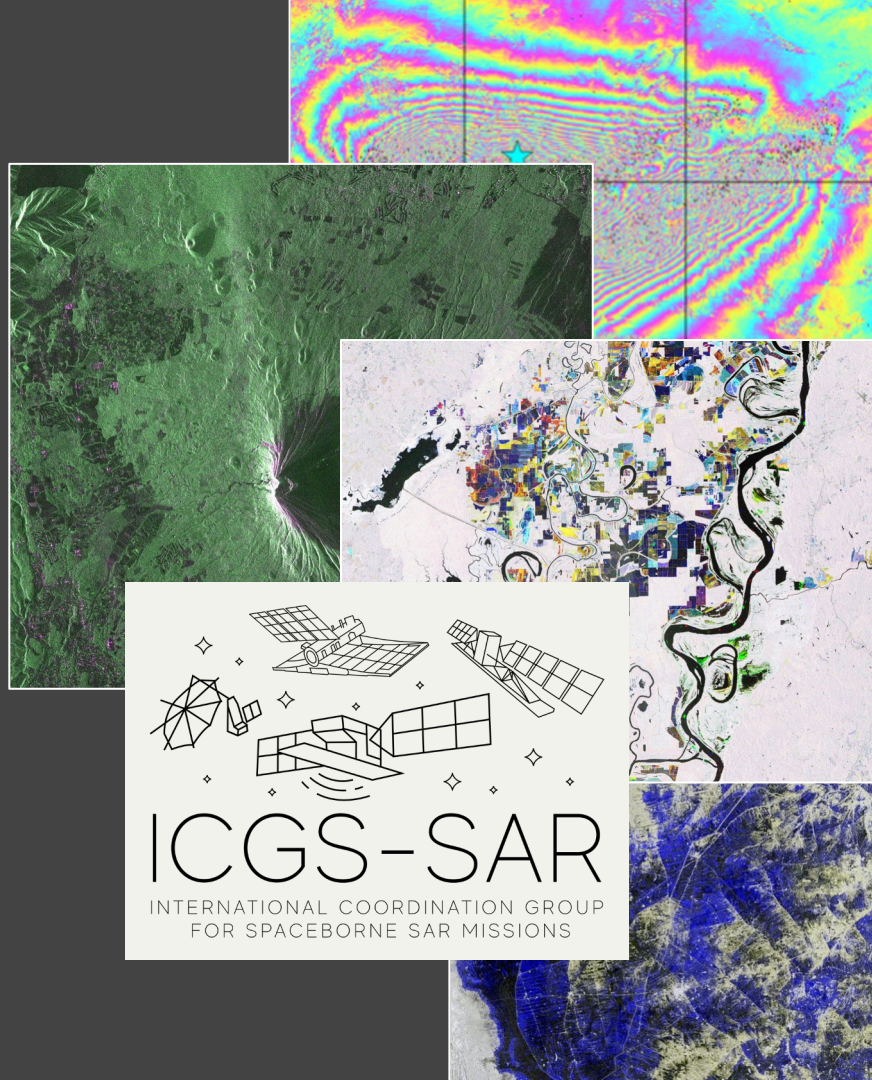
Third International SAR Workshop

TA-3 Program and Mission Coordination

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Agenda item 2.5

3rd International SAR Workshop
Saga Prefecture, Japan
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Collaboration Vision:
Fully Optimized & Coordinated International SAR Constellation

ICGS-SAR
INTERNATIONAL COORDINATION GROUP FOR SPACEBORNE SAR MISSIONS

Constellation of SAR satellites optimized to support the science and applications/services needs of the participating Agencies

Background:
- Each Agency contributes elements to the broader vision with major space Agencies providing the anchor/framework missions

Challenges
- Agencies will need to be willing to contribute elements to the overall vision that may be different than their specific needs.
- Budget, schedule, Agency process

Benefits
- Enhanced science and societal benefit that would not have been possible from a single Agency: requires a constellation of SAR satellites.

Collaboration	Level of Effort
Hardware Integration	High
Hardware Coordination Co-flyer, companion SV	High
Operations	High
Ground Segment	High
Data/ Products	High
Cal/Val Instrument/ Science	High



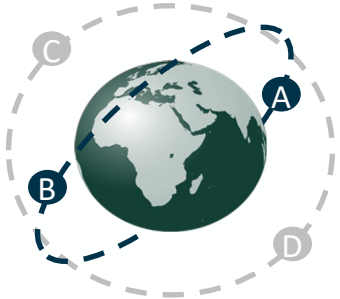


Image Credit NASA

Coordination: Data Availability

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Description

- Access to data

Observations

- There is a growing archive of SAR data
- Not all data are free and open but may be accessible: depends on legal and programmatic considerations under which an agency operates.
- *Data discoverability is fragmented and remains a dream of Charles and Maurice* along with the entire SAR community.

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination i.e. co-flyer or companion mission	Low
Operations	Low
Ground Segment	Low
Data/ Products	Low-Moderate

Recommendations

- Agencies need harmonize product descriptions for Level 1-3 products expressed in engineering units (i.e. backscatter, phase, geocoding, etc) building on CEOS definitions. *This ensures consistence across the agencies and ease of use of SAR data.*
- Encourage the removal for EULAs where possible to facilitate broader data use
- Support Agency initiatives at national level to influence data access regulations. *Government data restrictions are often roadblocks for data availability*
- Recommend agency-wide discoverability (metadata)
- Encourage agencies to discuss the viability of harmonizing data discovery metadata

Coordination: Data Analysis (1 of 2)

Description

- Collaborative analysis platform and tools
- Example: Multi-Mission Algorithm and Analysis Platform (MAAP)

Observations

- CEOS has SAR ARD (Analysis Ready Data) product specifications for:
  - Normalized backscatter
  - Radiometric backscatter
  - GSLC in progress
  - InSAR in progress
- The products are are highly sought.
- Open Source Science is a new paradigm that many not be uniformly implemented across every agency.

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination	Low
Operations	Low
Ground Segment	Low
Data/ Products	Low-Moderate

Recommendations next slide

Coordination: Data Analysis (2 of 2)

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination	Low
Operations	Low
Ground Segment	Low
Data/ Products	Low-Moderate

Recommendations

- Encourage agencies to systematically assess the CEOS standards for current and in progress product specifications and their potential implementation
- Encourage Agencies to share experience with implementation of the standards and provide feedback CEOS.
- Assess the role and implementation aspects of open-source-science for SAR missions and related science and applications/services.
- Investigate new multi-agency collaborations on dashboards that utilize SAR data

Coordination: Product Generation

Description

- The development of sustainable global products that combine data from available missions
- Can include other data types (i.e. SAR + optical)

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination i.e. coflyer	Low
Operations	Low
Ground Segment	Low
Data/ Products	Low to Moderate

Observation

Usually, products are generated by individual agencies in isolation.

Recommendation

- Encourage Agencies to better coordinate/share information on the development of higher-level products with the objective of harmonizing products across multiple missions. i.e. RTC, interferogram

Coordination: Calibration / Validation – SAR Instrument

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Description

- Coordinate effort for passive and active reflector
- Sustained networks that support multi-mission
- Coordinate and globally distributed targets: Natural, Artificial Passive, Artificial Active

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination	Low
Operations	Low
Ground Segment	Low
Data/ Products	Low
Cal/Val Networks	Moderate

Observation

- Cross-Agency calibration of SAR mission exist at Agency-to-Agency level (i.e. Sentinel-1 using CSA calibration network)

Recommendation

- Encourage Agencies to adopt and support the SARcalNET proposed by the CEOS WG SAR Cal/Val

Coordination: Calibration / Validation – Science

Description

- Well-defined calibration targets for SAR science calibration

Observations

- Common science Cal/Val sites are needed for cross-mission product assessments

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination	Low
Operations	Low
Ground Segment	Low
Data/ Products	Low
Cal/Val Science	Moderate

Recommendations

- Recommend SAR Agencies to participation in new COES WG that is establishing an entity to coordinate calibration/validation
- Document the process to establish a successfully science ecosystem Cal/Val infrastructure (BIOMASS, GEDI, NISAR) and ensure that integrated in the CEOS Land Surface Imaging Virtual Constellation (LSI-VC) Forests & Biomass Subgroup.
- Encourage Agencies to contribute to multi-mission science products cal/val.

Coordination: Ground Segment

Description

- Downlink of mission data from other Agencies
- Data archive mirroring

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination	Low
Operations	Low
Ground Segment	Moderate to High
Data/ Products	Low-High

Observations

- Roadblocks are often funding based: require bilateral agreements
- Agencies participating in the session have a long-term archive strategy for data collected by their SAR missions

Recommendations

- Explore co-investing in ground stations in key locations for infrastructure cost sharing

Coordination: Mission / Hardware

Jointly developed SAR mission with integrated hardware. Example: NISAR, ISRO S-band and NASA L-band

Observation

- WG-2 Most roadblocks are programmatic…

Collaboration	Level of Effort
Hardware Integration	High
Hardware Coordination	High
Operations	High
Ground Segment	High
Data/ Products	High

Recommendations

- Encourage Agencies to include members from other agencies during their mission formulation process
- Given that future missions are ill-defined: Encourage the exchange of preliminary collection strategies/modes in the formulation process that may aid other mission development
- Encourage agencies to explore future companion satellite functionality/companion interface that will enable future partnership.
- Encourage multilateral information exchange
- Consider the international constellation during the formulation process

Coordination: New Space / ComSAR

New Space constellations represent an opportunity to collect data for specific observational SAR needs

Collaboration	Level of Effort
Hardware Integration	Low
Hardware Coordination	Low
Operations	Low
Ground Segment	Low-?
Data/ Products	Low-Moderate
Cal/Val Science	Low-?

Observation

- New Space/ComSAR sector is complementary and unlikely to fulfill the broader Agency collection needs.
- Agencies have different approaches with engaging the ComSAR sector.

Recommendation

- Encourage Agencies who are evaluating ComSAR to share quality assessment and evaluation of ComSAR data. Lessons learned on how ComSAR can address mission science requirements: data availability, tasking, strengths/weakness.
- Encourage to work together to protect the SAR spectrum
- Agencies seek a better understand from ComSAR on the purchase of large data volumes for science: i,e. systematically image Greenland.
- Explore mechanisms with New Space/ComSAR sector for archive access
- Agencies share geographic science hotspots (i.e. volcanoes) with ComSAR companies.

TA-3 Summary

- Successful program and mission coordination *requires a shared understanding of the science programmatic, mission objectives, and data systems*
- Opportunities and roadblocks to coordination will vary depending on Agency mission objectives e.g.
  - Operational vs
  - Extending time series vs
  - R & D / science
- Mission users need to be involved and convinced of the benefits in the coordination (otherwise will want their own mission each time)
- Coordination and system of system aspects should be *addressed at beginning of mission lifecycle*