NISAR L-band CEOS-ARD self-assessment

Background

- NISAR launched on July 30, 2025, and has been releasing provisional data products since June 2026
  - Images most locations globally twice every 12 days (usually 10 or 20 m pixel spacing)
  - Products are hdf5 format, stored in the cloud, and freely available through NASA Earthdata
- The NISAR project has worked hard to make data products that are Analysis Ready !
  - RTC products (NISAR GCOV) are produced for every image collected over land globally.
    - Some per pixel layers such as local incidence angle are stored in 'static' layers that don't need to be downloaded repeatedly if you are working with a time series.
    - Can convert to/from γ^0 and σ^0.
    - Full covariance matrix for quad pol mode.
  - All sequential co-pol InSAR products (NISAR GUNW) are produced for all land observations (plus offset maps over glaciers and ice sheets).
  - Ground projected SLC (NISAR GSLC) images are produced for all land observations globally for all bands – easily make your own interferograms from any two observations.
  - Soil moisture products are produced for most land observations globally.
    - Also contains primary bands of imagery at a more manageable lower resolution (200m).
  - Products are fully reproducible from level-0b using isce-3 software on github.
  - Data can be easily subset during data download by the user and stored locally in any format.
    - By geographic bounding box, band of data, metadata, etc.

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- RTC (NISAR GCOV) product is over 99% compliant with CEOS-ARD SAR specifications (1.3)
  - The NISAR product specification development began prior to CEOS ARD finalization of the specifications.
  - **All required per-pixel layers and georeferencing requirements are in place or soon will be in place.**
  - **A small number of missing items are non-technical omissions and not specific to an image or its processing. All missing items are known and described elsewhere. The project plans to submit the RTC product for certification as soon as these missing items are addressed.**
- InSAR (NISAR GUNW) and GSLC products will be the next priority for certification.
  - Most metadata are in common with the RTC product

Currently missing

- 1.6.4. “listOfObservationModes” at /science/LSAR/identification/listOfObservationModes

  This field exists in the GCOV product and will be populated soon.

- 1.7.9. “number of lines” and “pixels per line”

  The ARD specification should allow flexibility for formats to be able to functionally address these fields. The spec should be written with “or equivalent self-documenting method” to allow for self-describing formats.

- 2.4. The local incidence angle is a required layer included in the NISAR static layer products

  Compliant, as each product has a pointer to a static layer that will be archived at NASA Earthdata.

- 4.3. Estimation of the geolocation accuracy at /science/LSAR/GCOV/metadata/ceosAnalysisReadyData/geometricAccuracy

  Metadata field exists. We have estimates of geolocation accuracy that can now be included.

- 4.5. “Gridding convention”

  The NISAR products currently being produced are "snapped to grid”, but this is a choice made when processing data stacks over time, so it is not clear how to best implement the entry in the metadata.