



NovaSAR-1 National Facility

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Australia's National Science Agency



*Presented at the FIG Working Week 2025,
6-10 April 2025 in Brisbane, Australia*

Content

NovaSAR-1 Overview

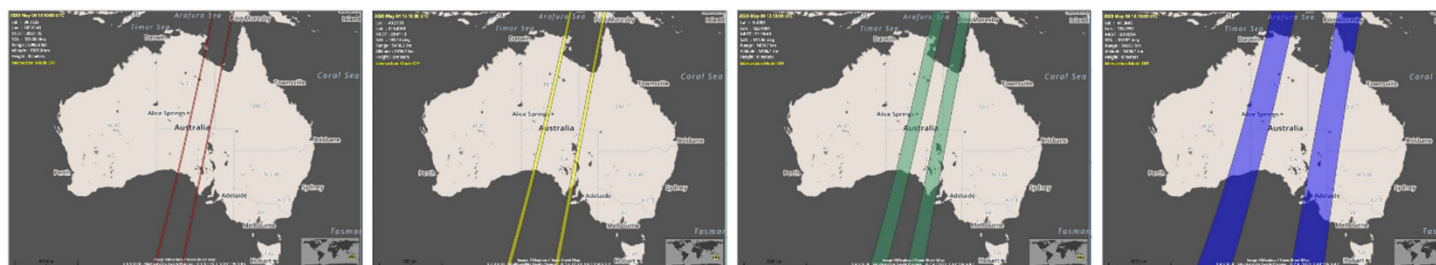
Data Access

- Tasking
- Datahub
- CEOS-ARD
- Mosaic

Applications



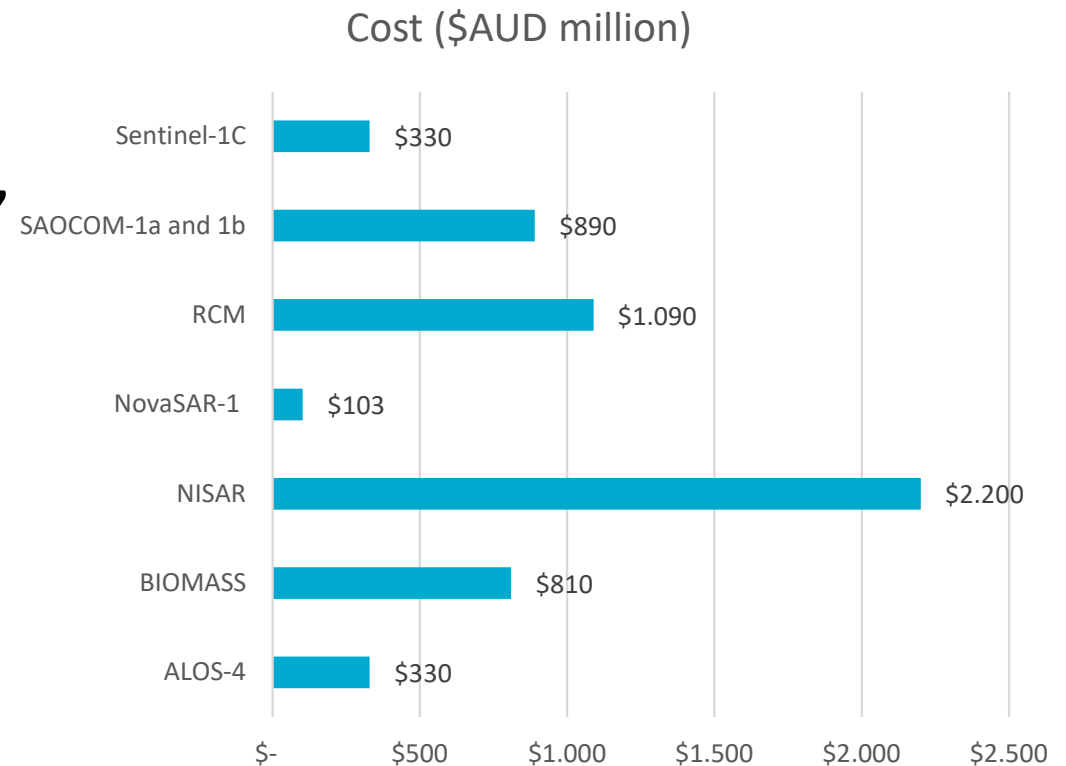
NovaSAR-1 acquisition modes



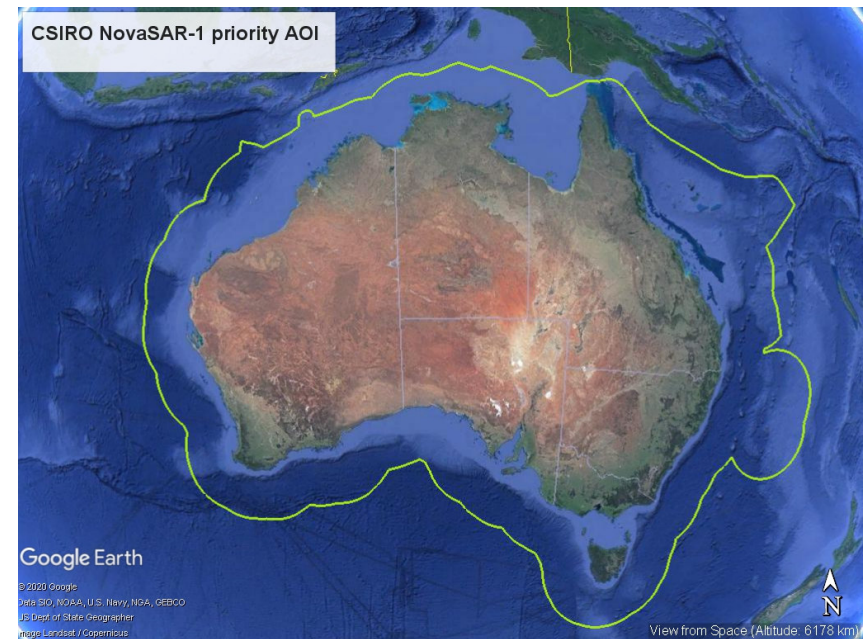
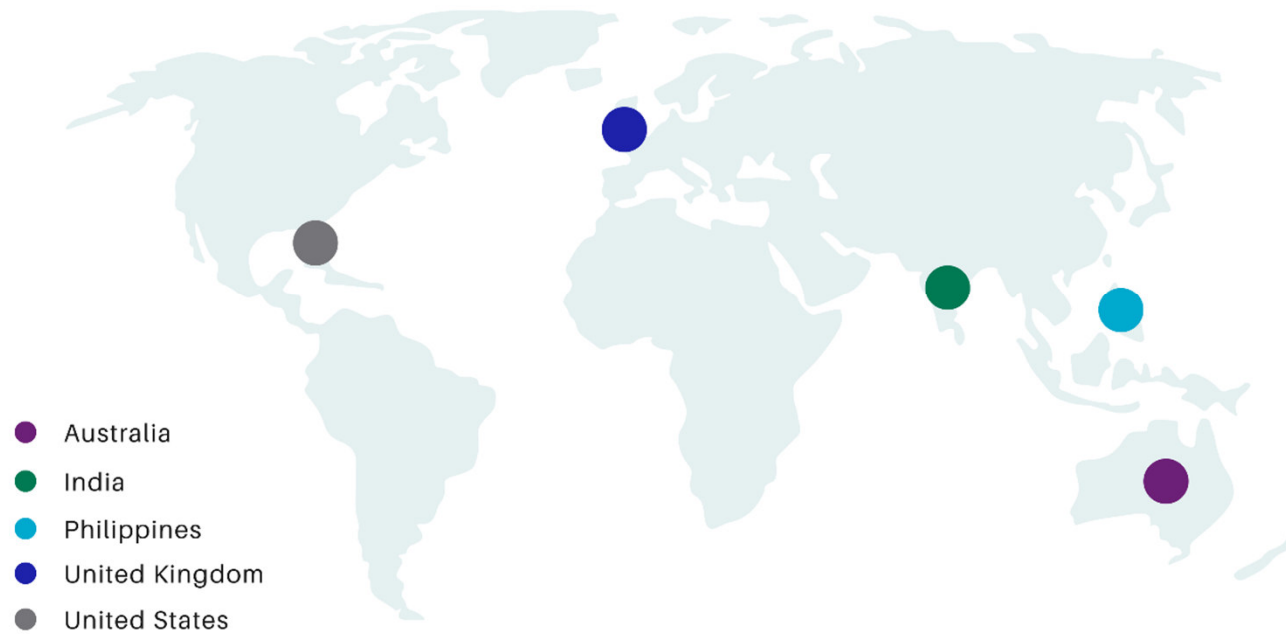
Mode	Stripmap	ScanSAR	ScanSAR Wide	Maritime
Resolution	6 m	20 m	30 - 50 m	Deliberately Ambiguous in Azimuth
Swath	13 - 20 km	50 & 100 km	50 - 195 km	400 km
Use Case	Detailed observations	Nominal mode	Large area monitoring	Ship detection in combination with AIS

NovaSAR-1 – low-cost SAR mission

- Developed as a low-cost SAR technology demonstrator by Surrey Satellite Technology Ltd, UK (SSTL), and Airbus DS.
- CSIRO acquired a 10% share in the acquisition and tasking capacity for 7 years – running until December 2026.



Capacity share partners



CSIRO capacity share usage

Daily allocation is split across the following four categories in order of priority:

1. Disaster acquisitions
2. Tasking projects
3. Specific CSIRO activities
4. Background mapping

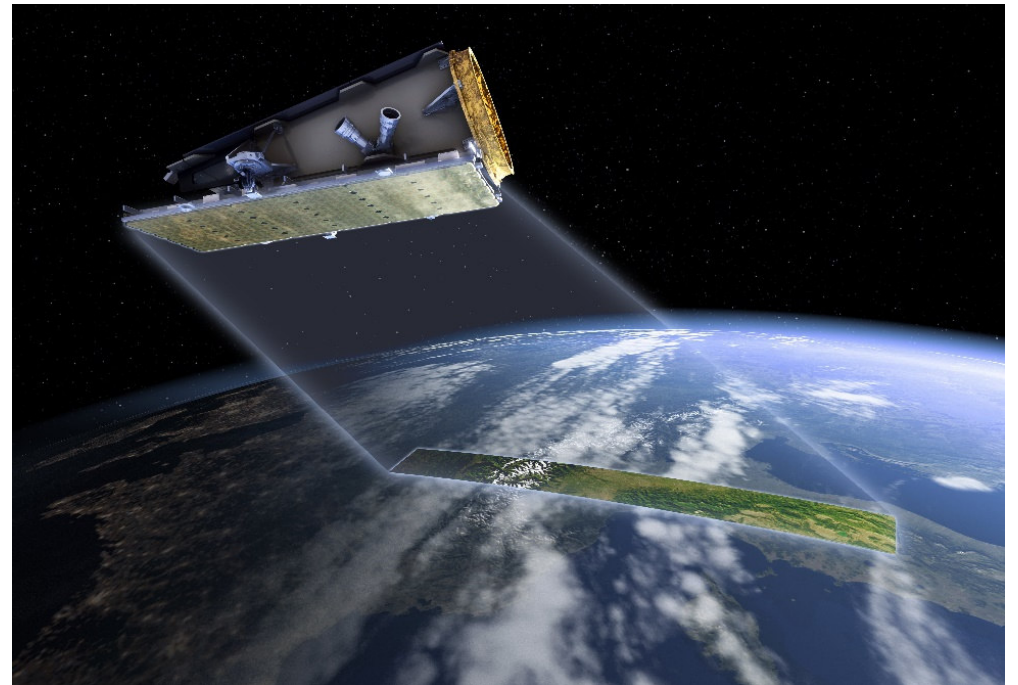


Image Tasking Requests

Simple online form

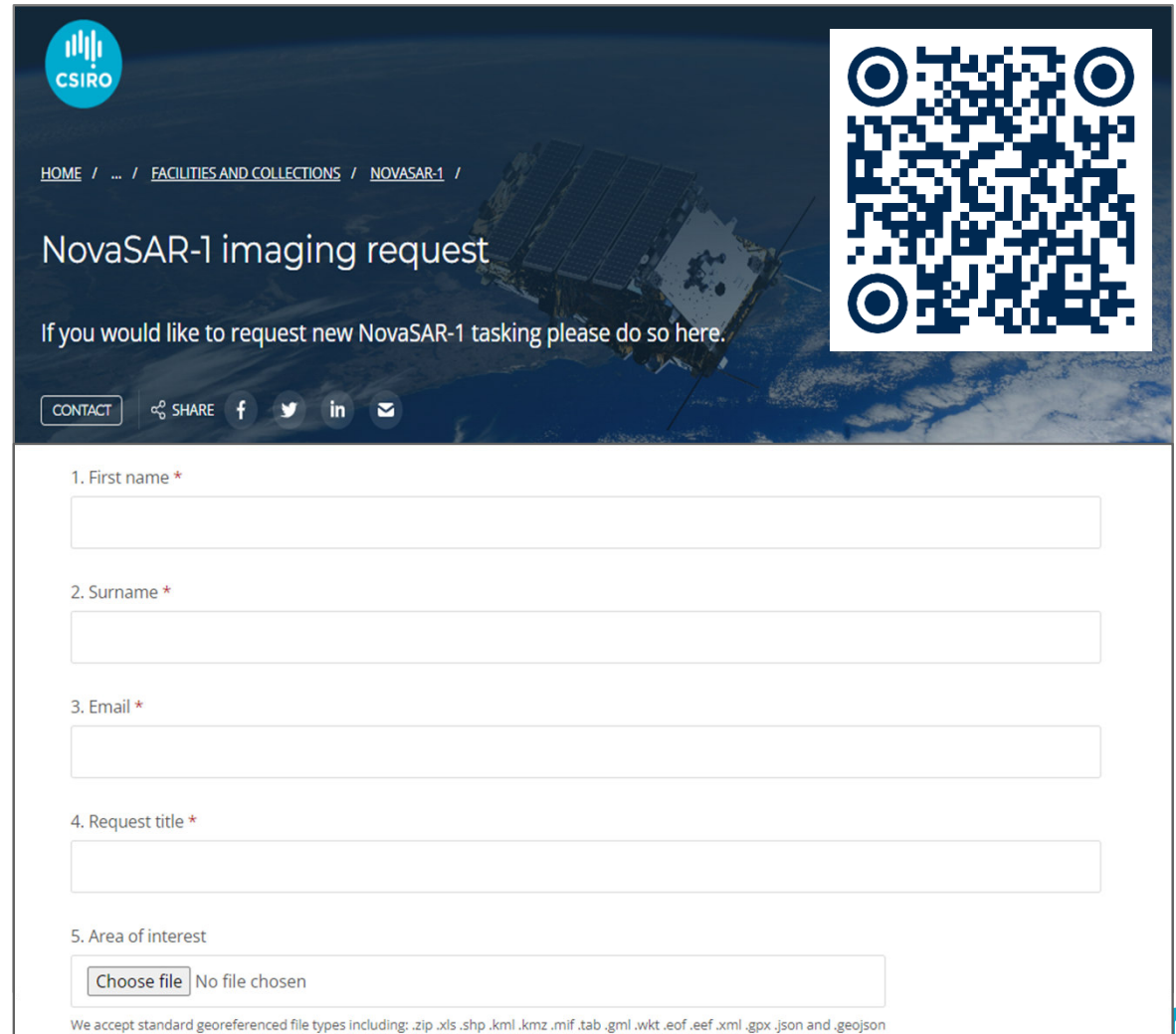
Requests always welcome

Immediately assessed on their feasibility

Reviewed periodically by the team

<https://www.csiro.au/en/about/facilities-collections/NovaSAR-1/image-request>

<https://research.csiro.au/cceo/novasar-1-imaging-request-guide/>



The screenshot shows the NovaSAR-1 imaging request page. At the top left is the CSIRO logo. The breadcrumb trail reads: HOME / ... / FACILITIES AND COLLECTIONS / NOVASAR-1 / . The main heading is "NovaSAR-1 imaging request". Below it, a text prompt says: "If you would like to request new NovaSAR-1 tasking please do so here." To the right of the heading is a QR code. Below the heading are buttons for "CONTACT", "SHARE", and social media icons for Facebook, Twitter, LinkedIn, and Email. The form consists of five numbered fields: 1. First name *, 2. Surname *, 3. Email *, 4. Request title *, and 5. Area of interest. The "Area of interest" field includes a "Choose file" button and the text "No file chosen". At the bottom, a note states: "We accept standard georeferenced file types including: .zip .xls .shp .kml .kmz .mif .tab .gml .wkt .eef .xml .gpx .json and .geojson".

CSIRO

HOME / ... / FACILITIES AND COLLECTIONS / NOVASAR-1 /

NovaSAR-1 imaging request

If you would like to request new NovaSAR-1 tasking please do so here.

CONTACT SHARE f t in e

1. First name *
2. Surname *
3. Email *
4. Request title *
5. Area of interest

Choose file No file chosen

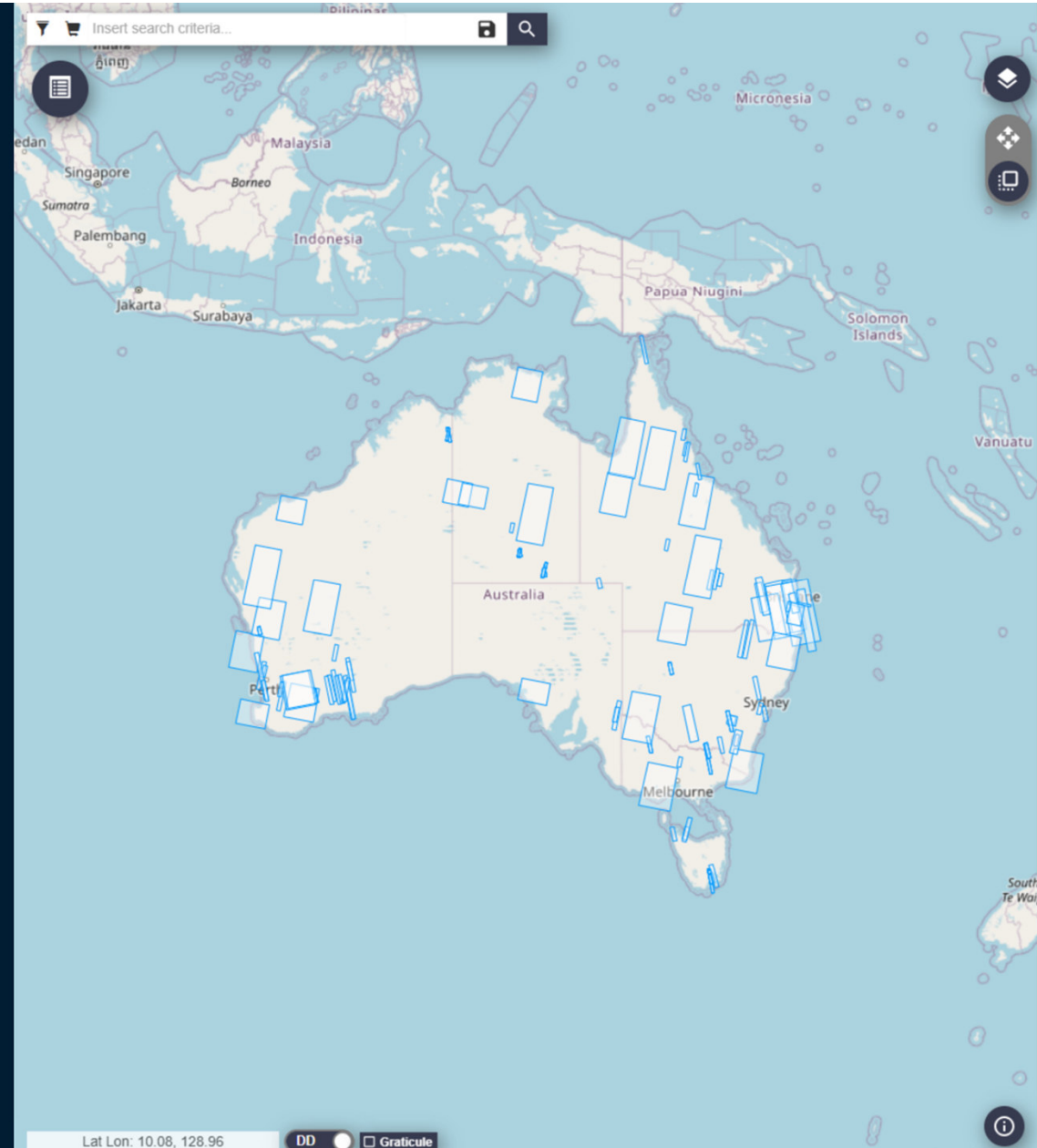
We accept standard georeferenced file types including: .zip .xls .shp .kml .kmz .mif .tab .gml .wkt .eef .xml .gpx .json and .geojson



NovaSAR-1 National Facility Datahub

All NovaSAR-1 images are available for free download from the CSIRO NovaSAR-1 National Facility Datahub (following registration).

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New NovaSAR-1 National Facility Datahub coming

5300+ L1
products



2800+ CEOS-
ARD products



We are launching
our new datahub
later this year



Uses our existing Earth
Analytics Science & Innovation
Platform (EASI)

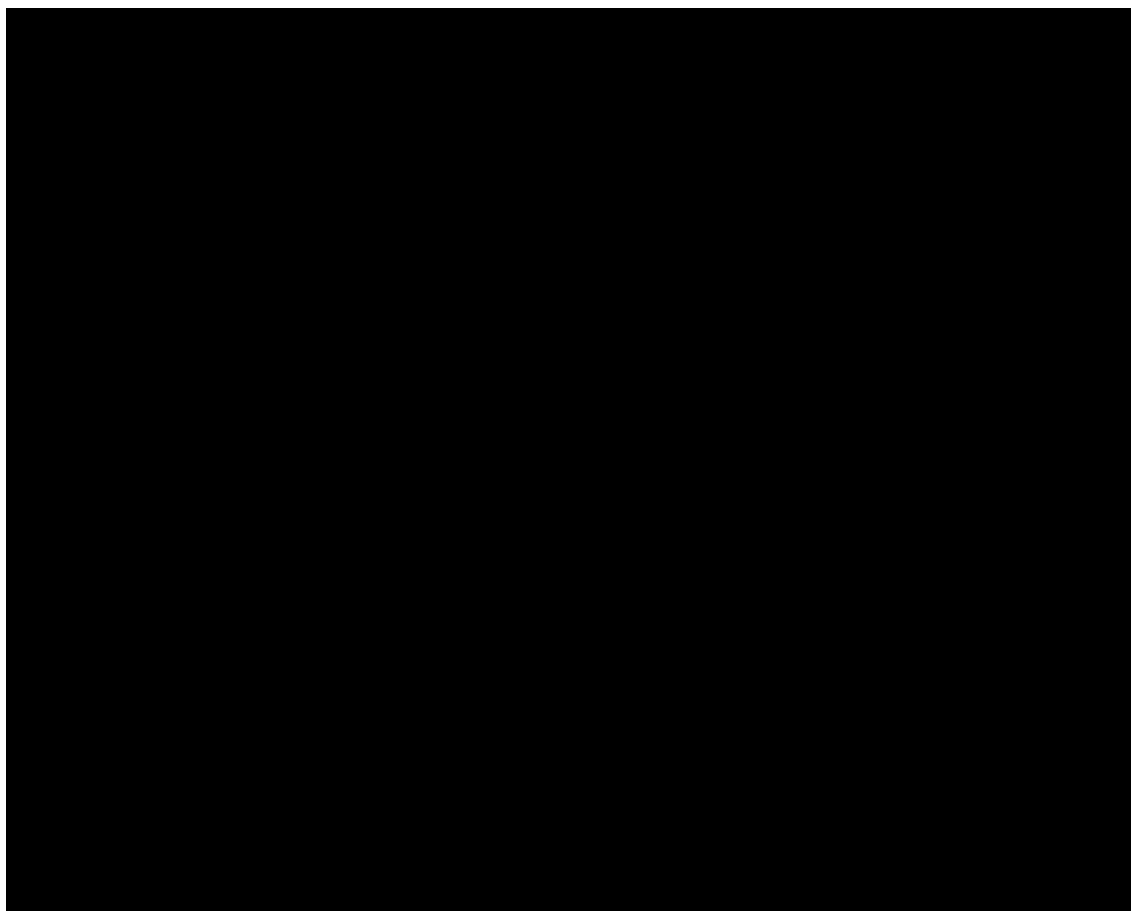


New registration
required

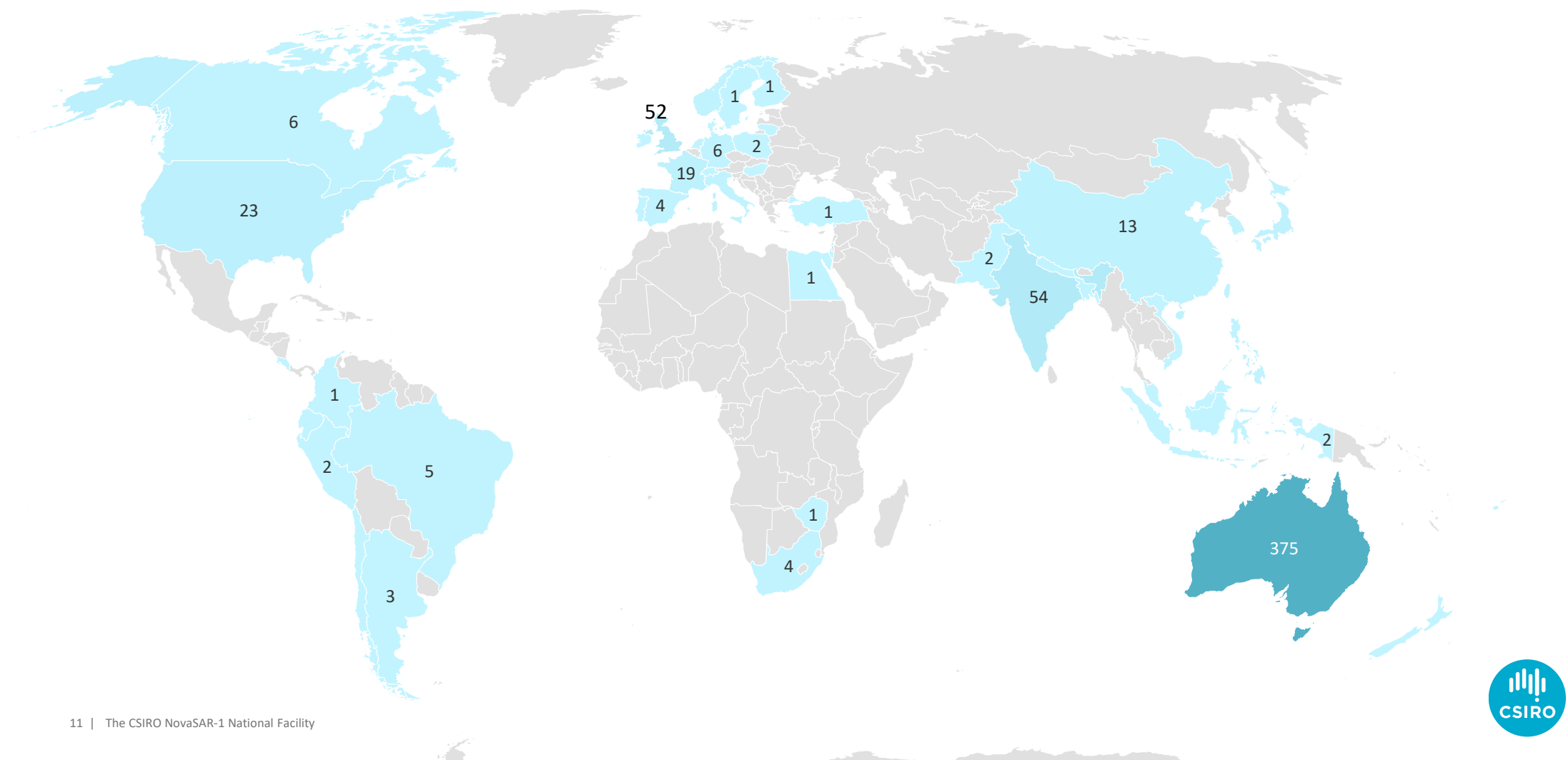


More details
coming soon

Archive coverage 2023



Locations of NNF Datahub users




Committee on Earth Observation Satellites

CEOS-ARD NRB PFS 5.5

CEOS Analysis Ready Data (CEOS-ARD):

- processed to a minimum set of requirements
- organized into a form that allows immediate analysis with a minimum of additional user effort
- Allow interoperability both through time and with other datasets

CSIRO NovaSAR-1 ARD products follow the requirements of CEOS-ARD NRB (Normalised Radar Backscatter) PFS (Product Family Specifications) version 5.5.



New CEOS-ARD Products

- JAXA ALOS-2 PALSAR-2 Normalised Radar Backscatter (NRB) (Combined SAR PFS v1.0 update) [17 April 2024]
- ISRO EOS-04 (RISAT-1A) NRB (Combined SAR PFS v1.0) [2 April 2024]
- AIR-CAS Landsat-8 Surface Reflectance and Temperature [6 December 2023]
- CSIRO NovaSAR NRB [8 October 2023]

CEOS-ARD Datasets

A complete record of CEOS-ARD datasets is maintained on our website. The catalogue include links for data access and more information.

[See Datasets](#)

Product	CEOS-ARD Type	PFS Version	Agency	Processed	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification
Landsat-8 Surface Reflectance	Surface Reflectance	4.0	USDA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Landsat-8 Surface Temperature	Surface Temperature	4.0	USDA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Landsat-8 Surface Reflectance and Temperature	Surface Reflectance and Temperature	4.0	USDA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
CSIRO NovaSAR-1 NRB	Normalised Radar Backscatter	5.5	CSIRO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

Under Peer Review

Product	CEOS-ARD Type	PFS Version	Agency	Processed	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification	Thumbnail Specification
Landsat-8 Surface Reflectance	Surface Reflectance	4.0	USDA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

NovaSAR-1 CEOS- ARD



All archive NovaSAR-1 SCD (excluding Maritime mode) and GRD data acquired in Australian region have been processed into ARD



Submitted CSIRO self-assessment for CEOS-ARD NRB PFS v5.5 compliance review to CEOS in August 2023



CEOS Review results were released on 5 October 2023: 14 CSIRO NovaSAR-1 NRB products have been evaluated as CEOS-ARD compliant at the threshold level



On 21 March 2024, the processed archive completed ingestion to the datahub and the AWS processing was integrated into the NovaSAR-1 image processing chain



NovaSAR-1 National Mosaic

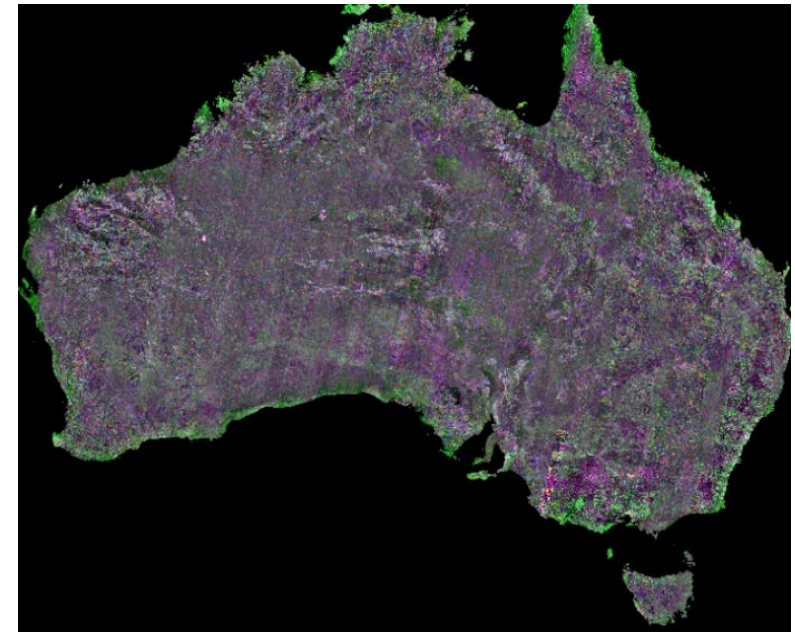
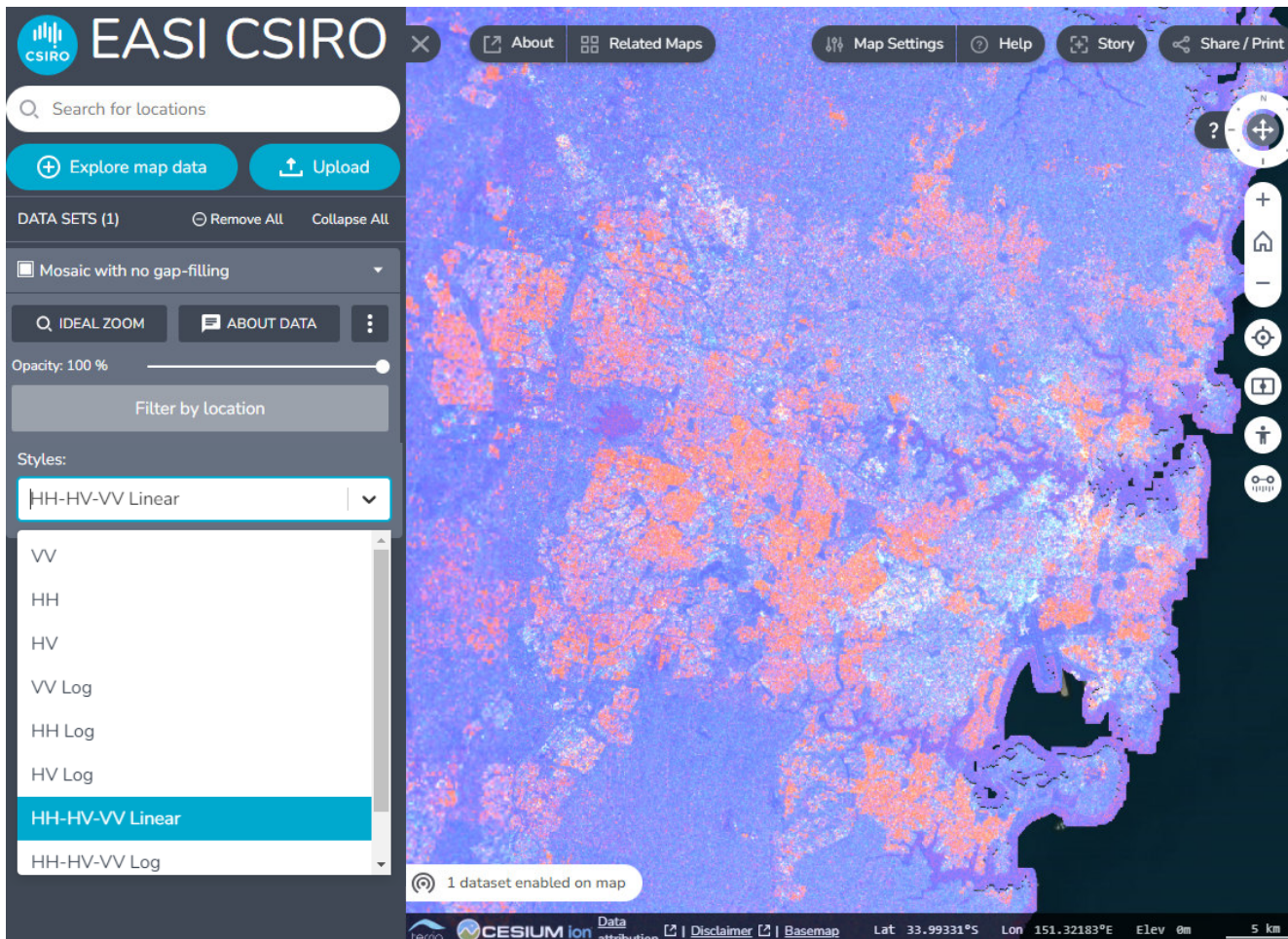
We have produced a National NovaSAR-1 Mosaic that can be explored in our Earth Analytics Science and Innovation platform (EASI) portal.



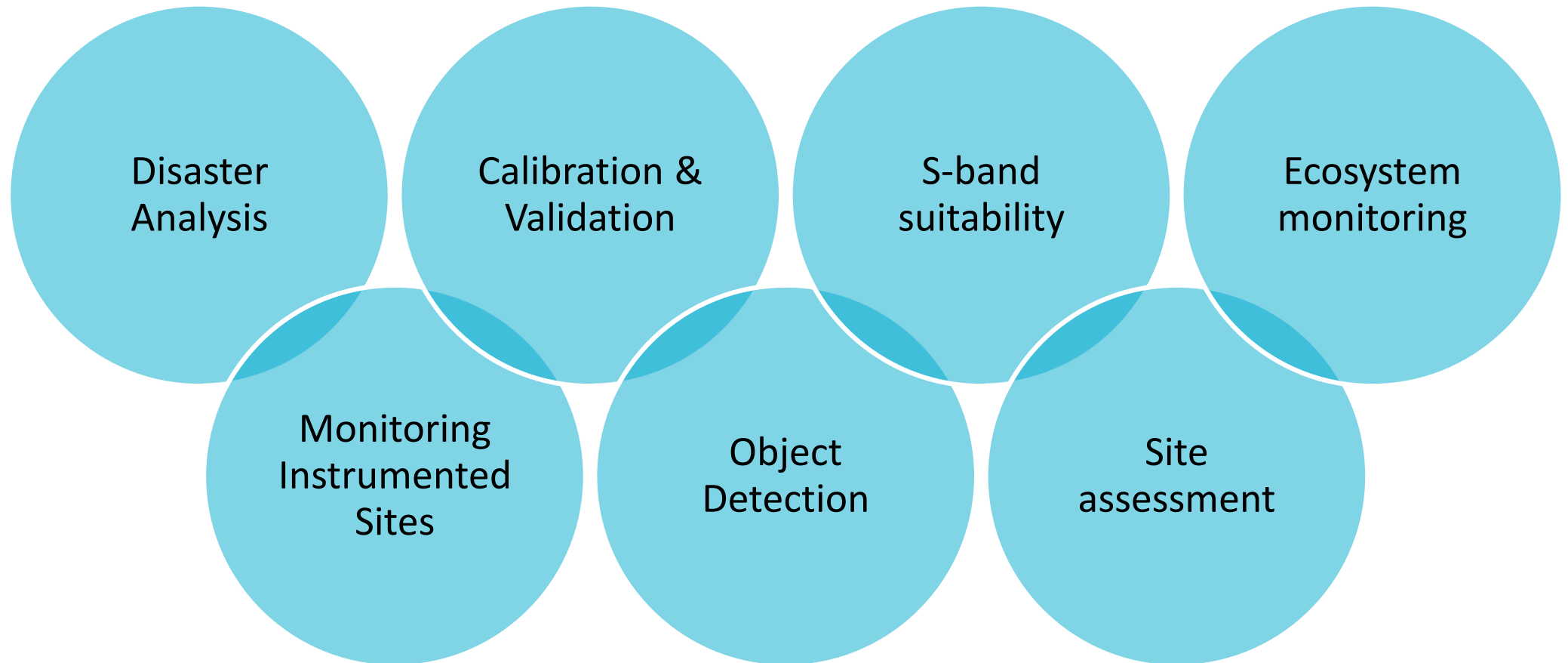
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NovaSAR-1 National Mosaic



Applications

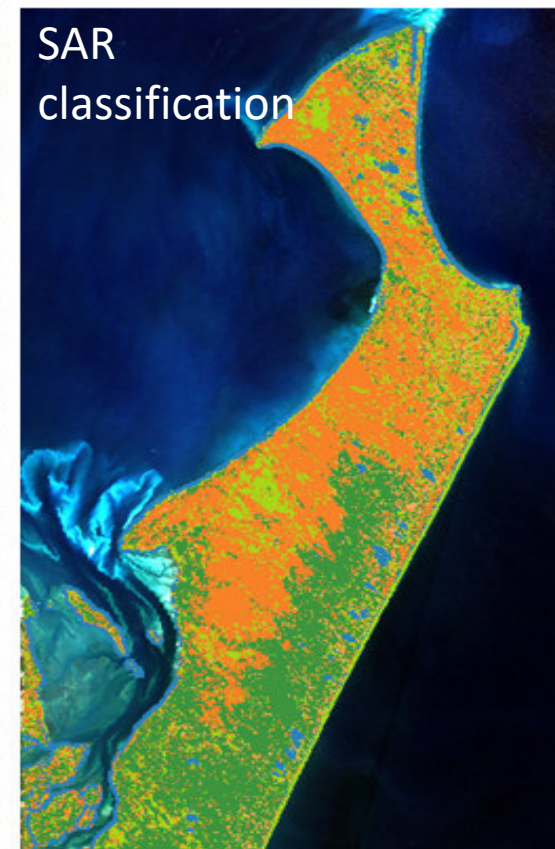
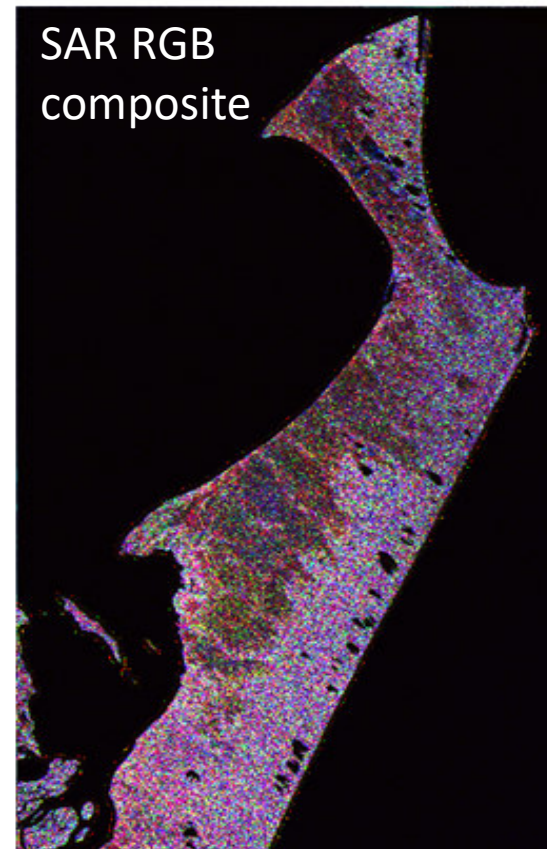


Burnt Area Mapping in Fraser Island, QLD

Research leveraging the complementarity of Sentinel-1 (C-band) and NovaSAR-1 (S-band)

Example of December 2020 fire on K'Gari (Fraser Island)

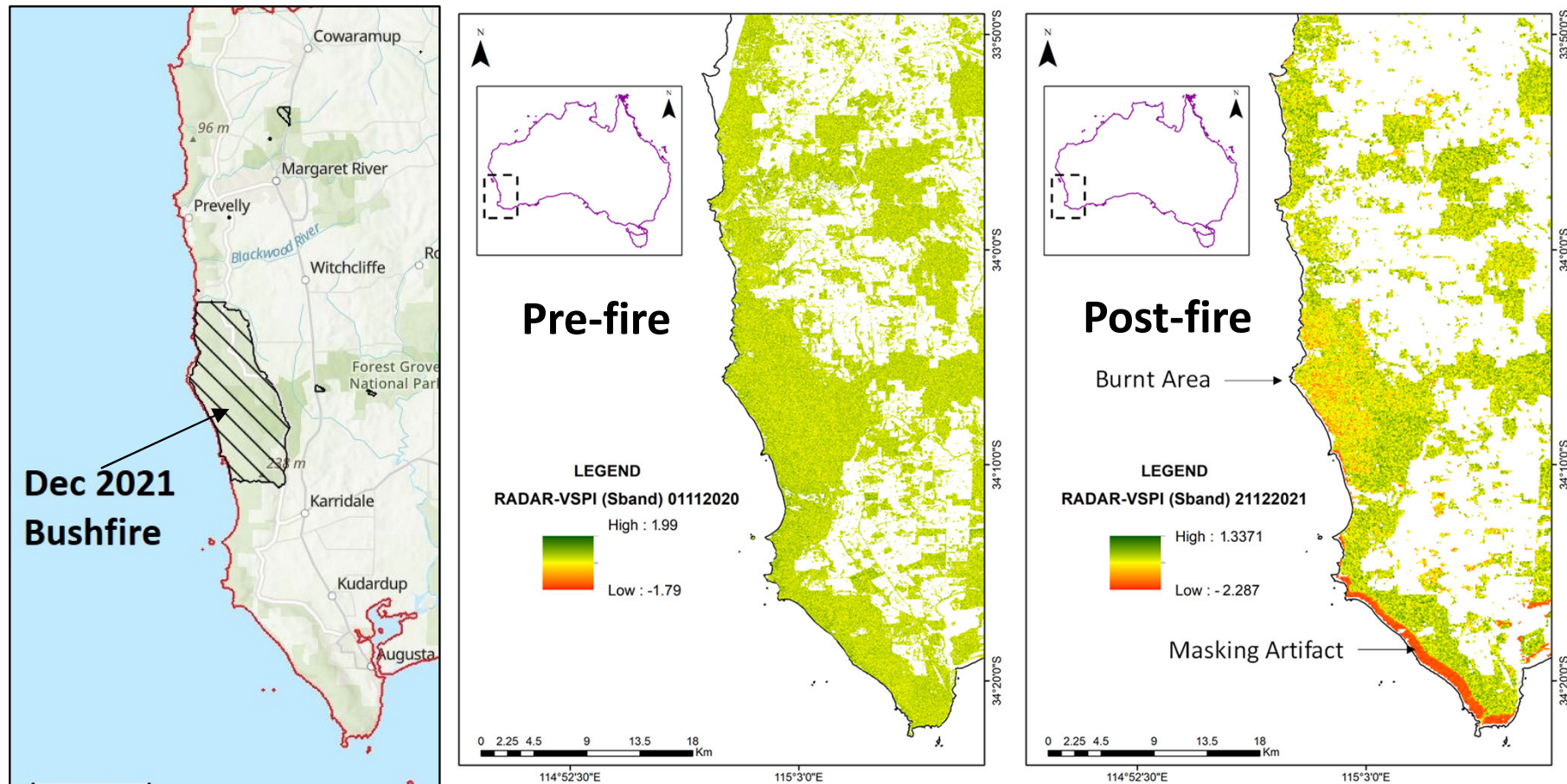
Amy Parker, Catherine Ticehurst, Zheng-Shu Zhou, Tristan Ward



Margaret River Fire, WA

Aakash Chhabra

Applying the RADAR Vegetation Structure Perpendicular Index to NovaSAR-1 (S-band) data
Example of December 2021 fire on Margaret River



Acquisitions at TERN SuperSites

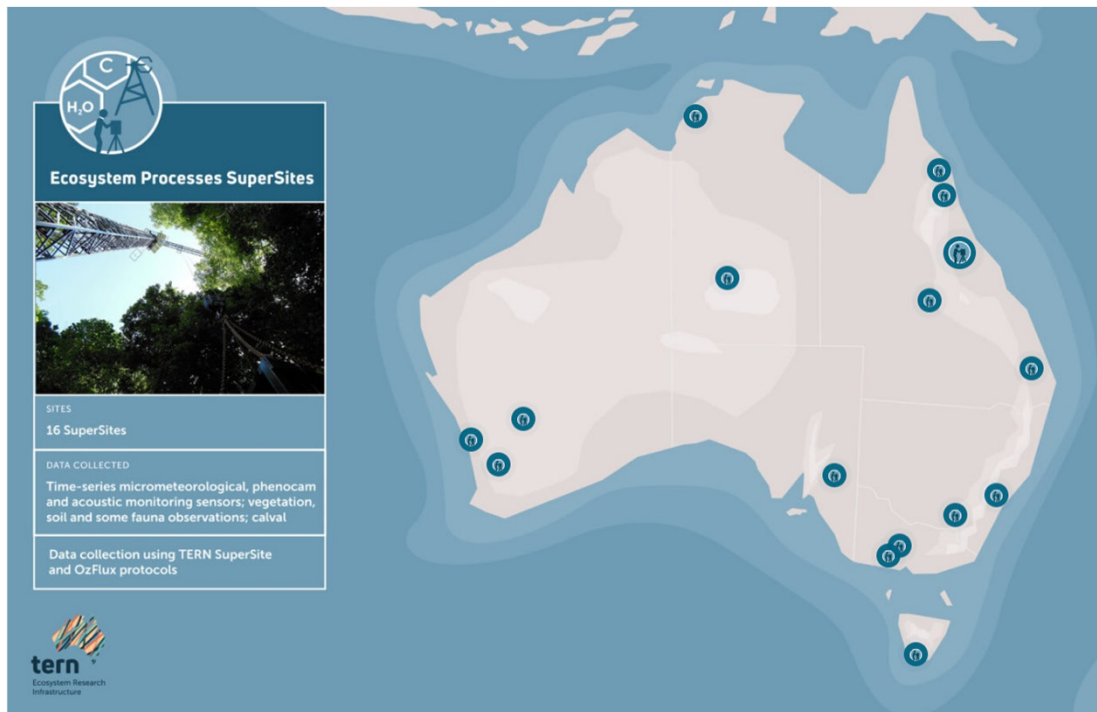


Image credit: tern.org.au/news-novasar-data

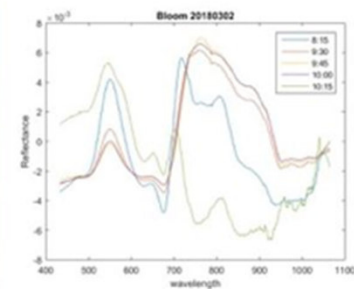
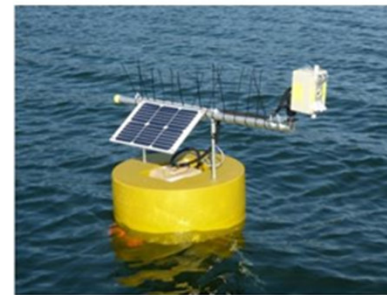
Worked with TERN during the NovaSAR-1 launch to show data acquisitions across their network

Ongoing collections with 438+ images collected since March 2020 across 16 TERN SuperSites

Collections also available over instrumented IMOS, AERONET and Aquawatch Pilot sites as well as the CSIRO Boorowa Agricultural Research Station and Cal/Val sites

Assessment of NovaSAR-1 Data in Algal Bloom Detection Over Lake Hume, VIC/NSW

- **Objective:** Assess if NovaSAR-1 data can detect Harmful Algal Blooms over the Lake Hume Hydraspectra site.
- **HydraSpectra:** An algal bloom early warning sensor used in various water bodies.
- Designed to complement in-situ monitoring programs, deployed as a network of sensors coupled with satellite imaging technologies.
- CSIRO's AquaWatch underlying technology.



Earthnet Data Assessment Project



- EDAP is responsible for assessing missions being considered for ESA's Third Party Missions (TPM).
- Worked with teams from Aresys, Airbus UK (providing their own NovaSAR-1 images over Europe), ESA and Telespazio
- Images are being collected over the GA Surat Basin corner reflector network in Queensland.
- These images were used to assess the geolocation accuracy of NovaSAR-1 using both:
 - single measurements (single product, single corner reflector)
 - calculation of range and azimuth Absolute Location Error (ALE)

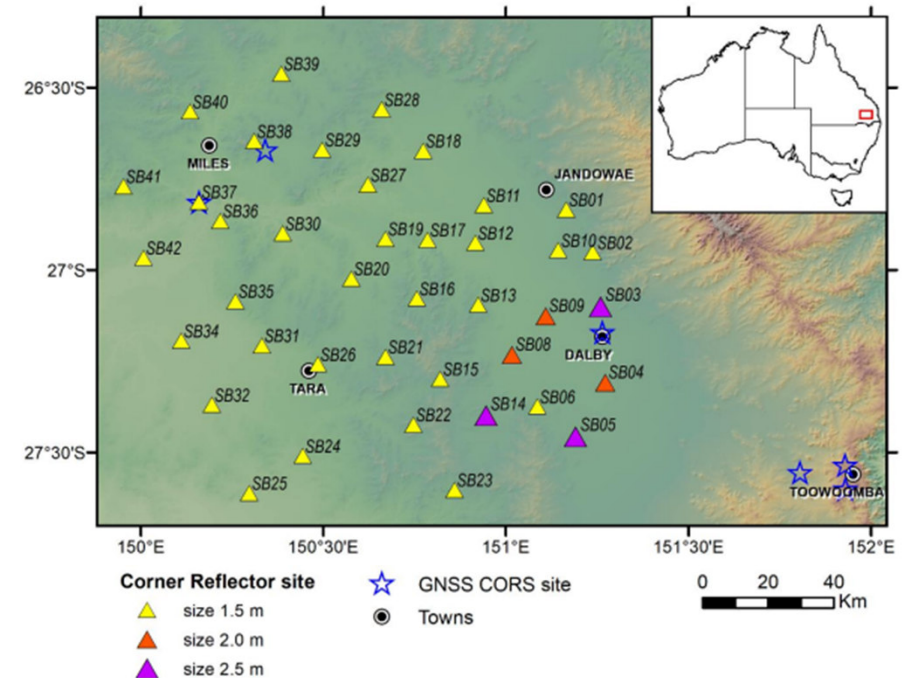


Figure 1: Map showing the location of 40 CR sites in south-east Queensland. Each site consists of a high-stability ground survey mark and a CR installation. Background image shows 1-arc-second Digital Elevation Model data from the Shuttle Radar Topography Mission (SRTM-1; ~30 m spatial resolution). Height values range from 300 m (green colours) to 1000 m (dark brown colours) across the mapped area.

Various studies in Antarctica

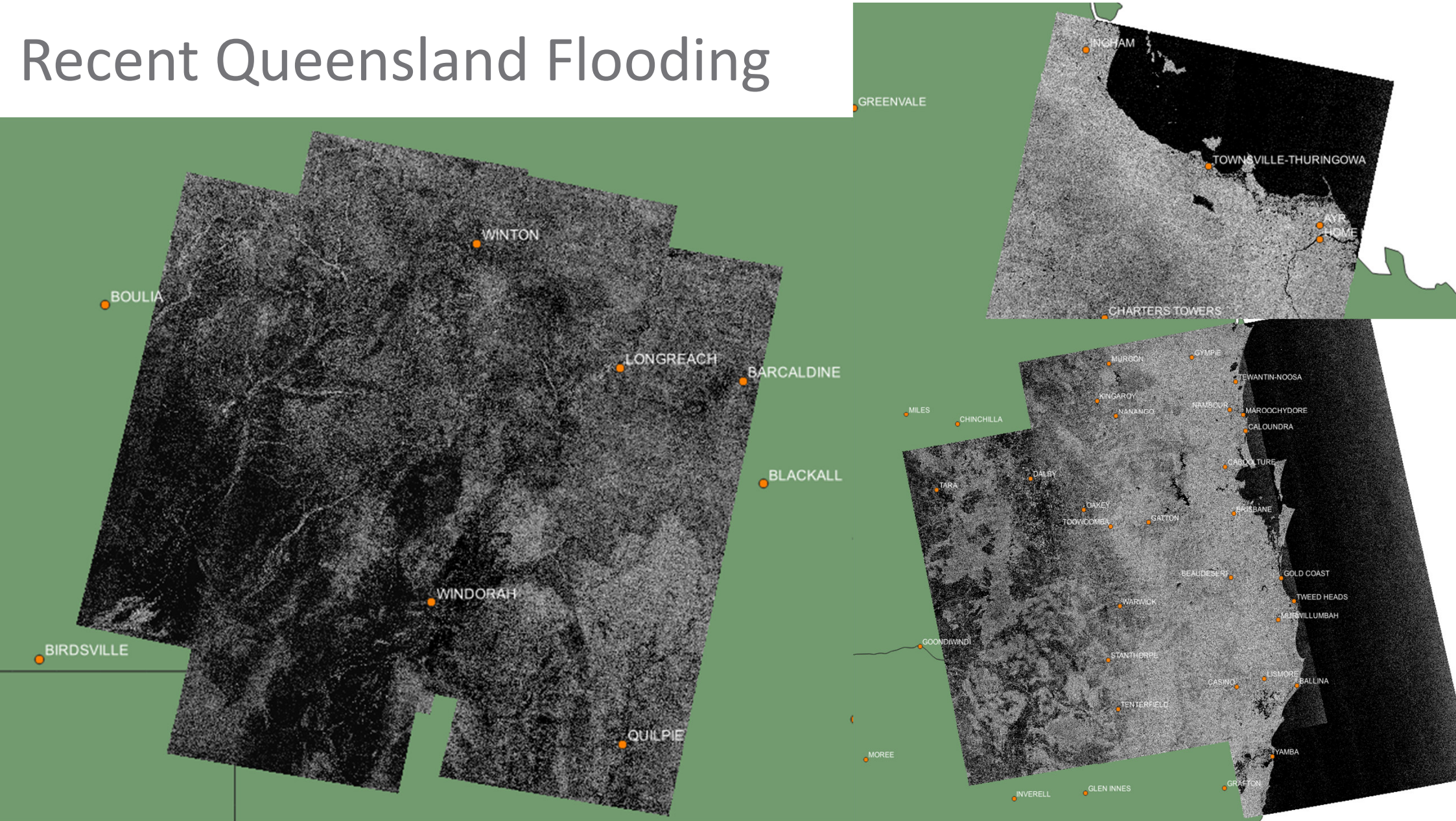
Site Assessment of Australian Sites in Antarctica for Calibration Target Site Suitability with AusCalVal to support AAD and JPL



Looking for vehicle lost in 1955 for AAD to assist potential retrieval

Mawson Station Credit: Doug McVeigh

Recent Queensland Flooding





Datahub



Mosaic



Tasking

Thank you

Space & Astronomy

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NovaSAR-1 National Facility

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<https://data.novasar.csiro.au/#/home>

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