

SAR and SARscape updates

Dr Paolo Pasquali

Co-founder, President and Technical Director

From space news...

Via Satellite 40^{Years}

Paolo,

I just got back from Paris.

Typically at industry events like World Space business Week, there's a theme that runs through the week whether it's planned or not. **This year it was two things: AI, and sovereignty.** Every session, every dinner, every conversation in the corridor. The two topics just kept colliding, and honestly, it made for a fascinating week.

I had the pleasure of sitting down with Brian O'Toole, CEO of BlackSky, at the Space Defense and Security Summit to talk about sovereign space and what AI-enabled intelligence actually means in a world where governments want more control over their assets. Is it a Gold Rush for companies like BlackSky? Brian had some strong views.

06/10

Major

Space

Forces

PRESS RELEASE

Defense and intelligence Natural ca

ICEYE to deliver space-based ISR capabilities to the Royal Netherlands Air Force

APPLICATIONS

IRIDE satellites

3789 VIEWS 4 LIKES

ESA / Applications / Observing the Earth / IRIDE

IRIDE's system consists of six constellation observation. It is one of the most complete satellite systems in the world.

Each of the six constellations carries different characteristics of the Earth's surface, providing by IRIDE:

Radar sensors

IRIDE has two constellations with synthetic aperture technique based on radar pulses to produce high contrast images in darkness.



LATEST SATNEWS EVENTS

MISSIONS & CONSTELLATIONS

France Co Sovereign

JANUARY 21, 2026

Share X Share in S

In a decisive move to become a "sovereign" Synthetic Aperture Radar (SAR) player, France has announced a significant shift in European satellite capabilities.

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home

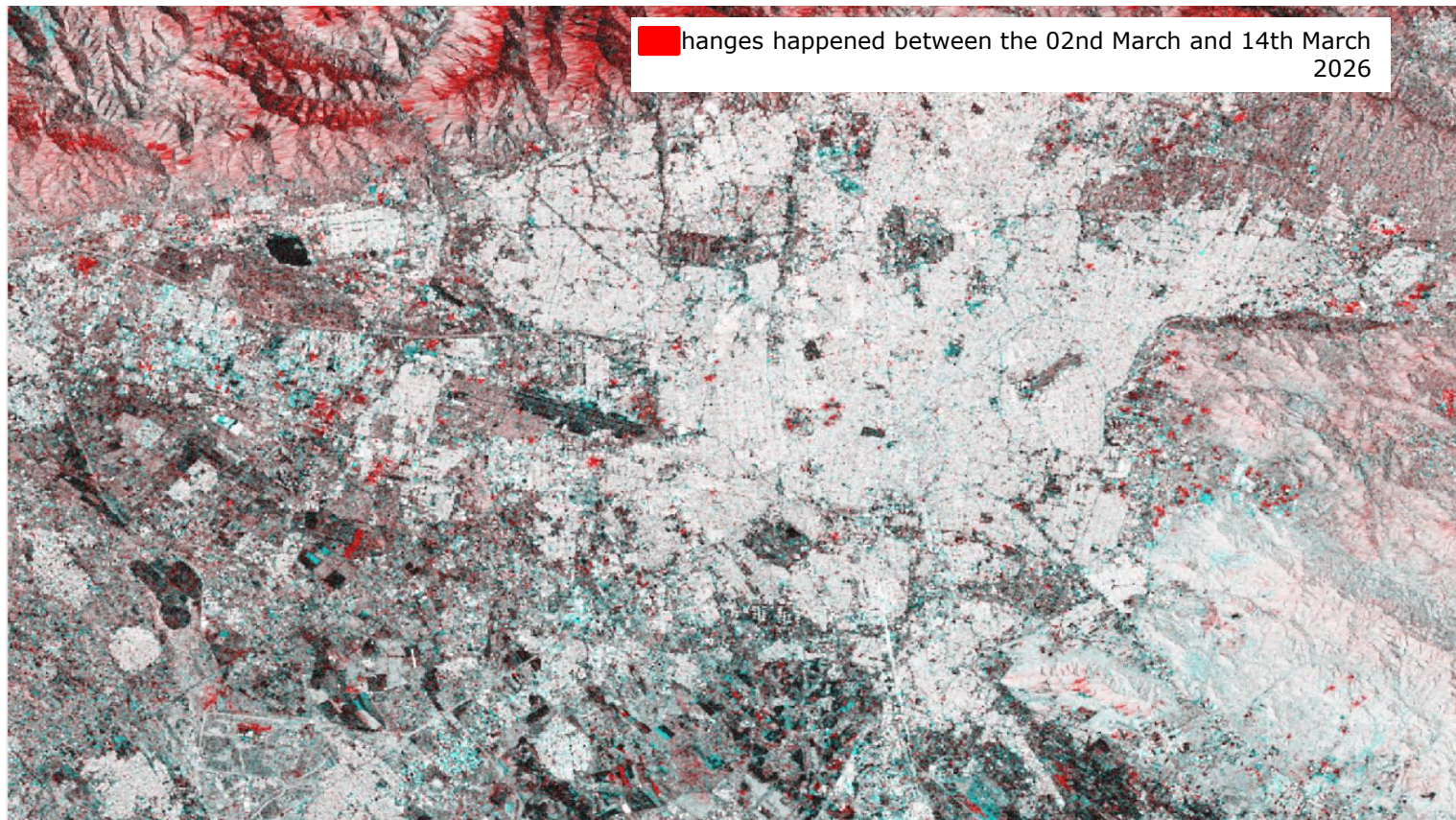
National sovereignty

- Flexibility vs. consistency
- Data exploitation
- Federation

Sentinel-1 Change Detection: Tehran



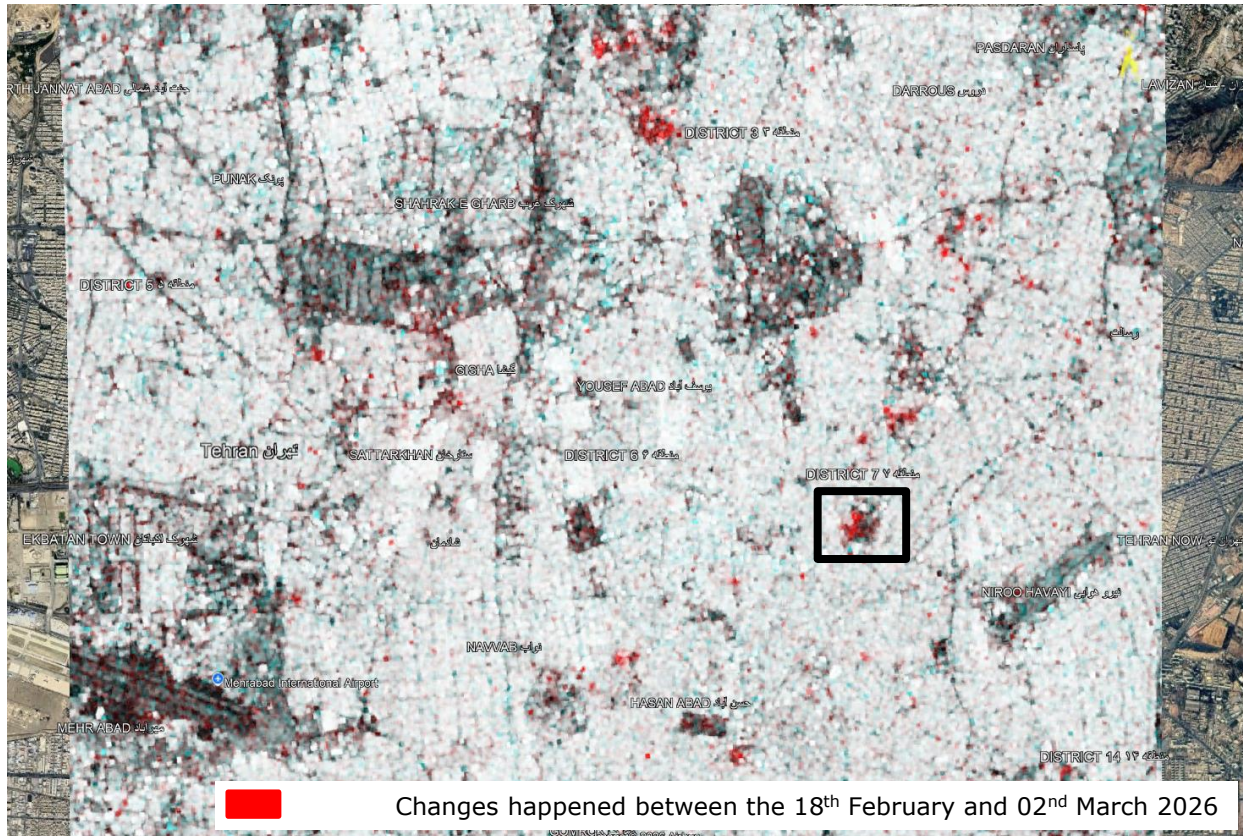
Sentinel-1 Change Detection: Tehran



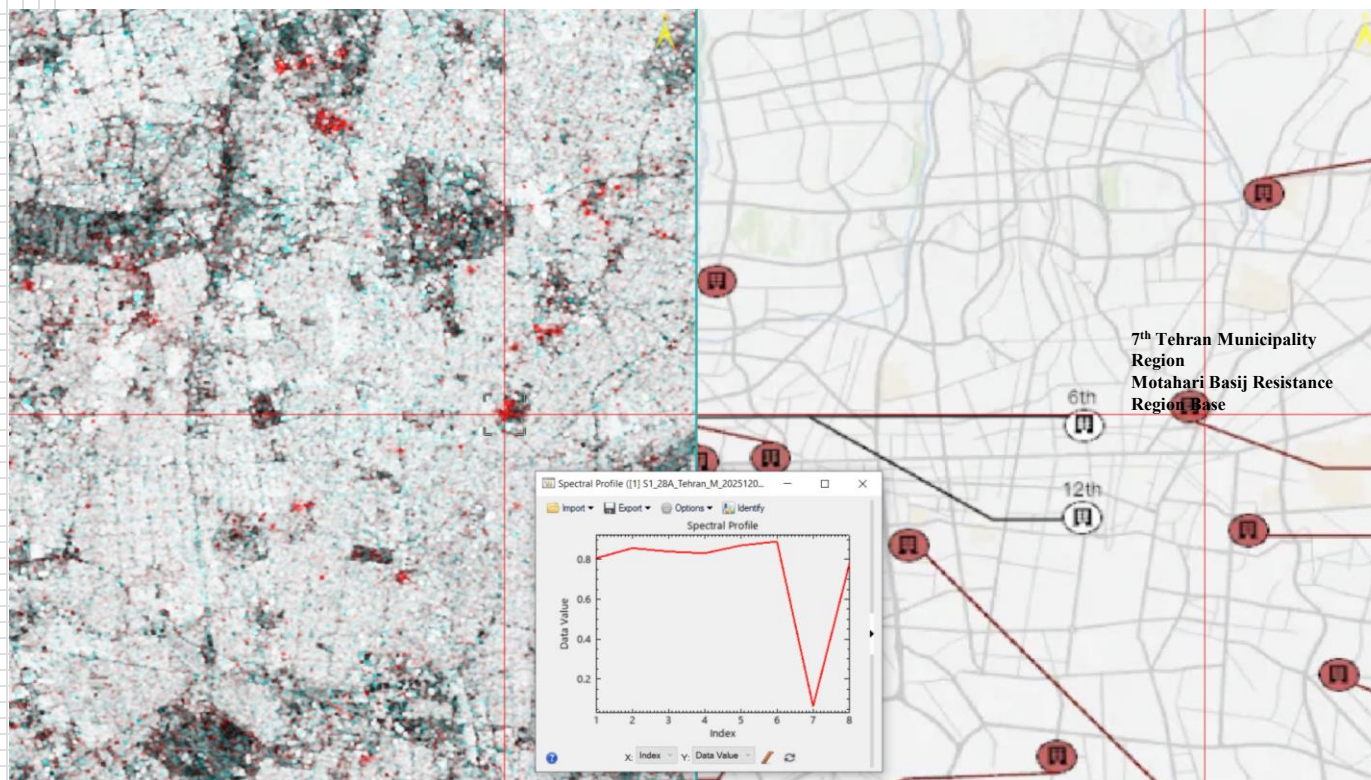
Sentinel-1 Change Detection: Tehran



Sentinel-1 Change Detection: Tehran



Sentinel-1 Change Detection: Tehran



Changes happened between the 18th February and 02nd March 2026

The combined force has struck dozens of internal security institutions across central and western Iran since February 28.

<https://understandingwar.org/research/middle-east/iran-update-evening-special-report-march-9-2026/>

Sentinel-1 Change Detection: Tehran

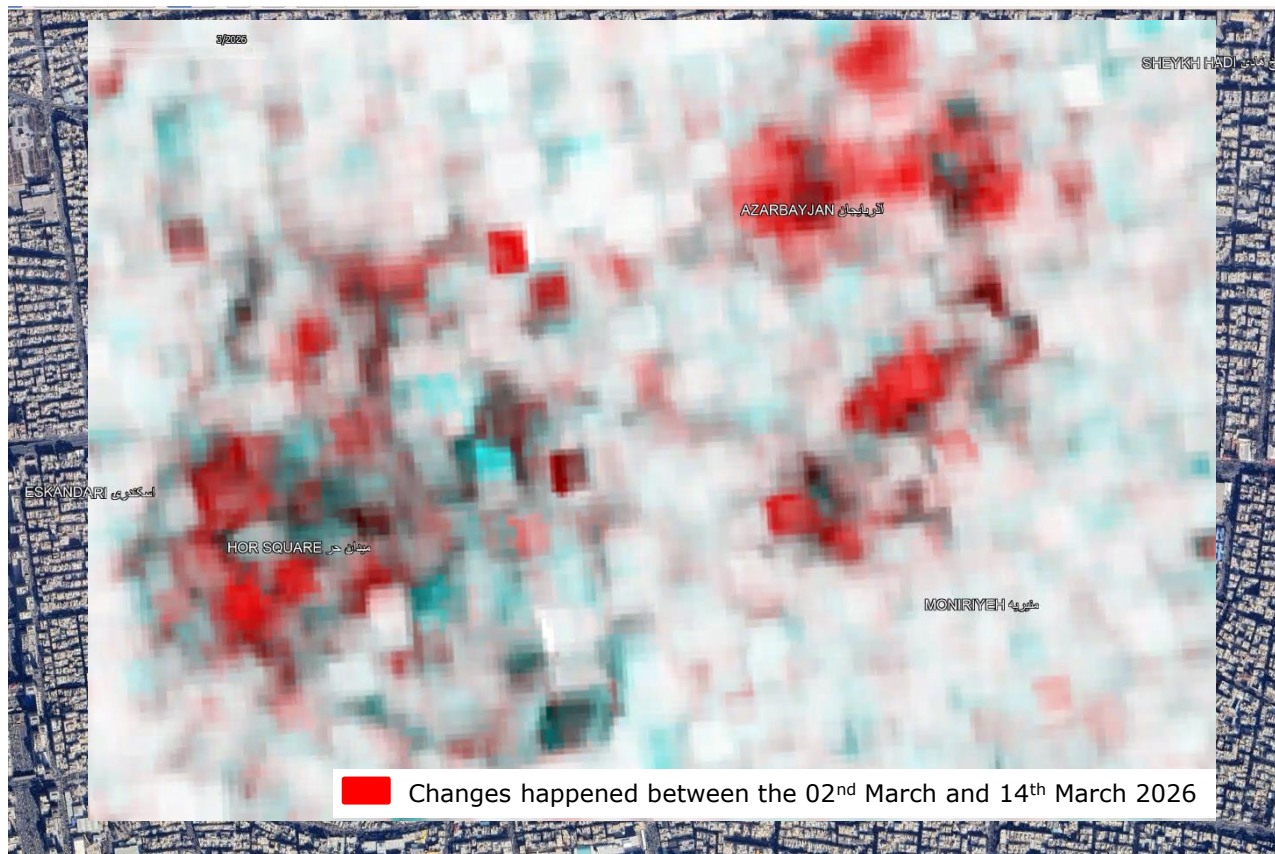


Khamenei
residence and
presidential
complex

11th Tehran
Municipality
Region

Salman Basij
Resistance
Region Base

Sentinel-1 Change Detection: Tehran

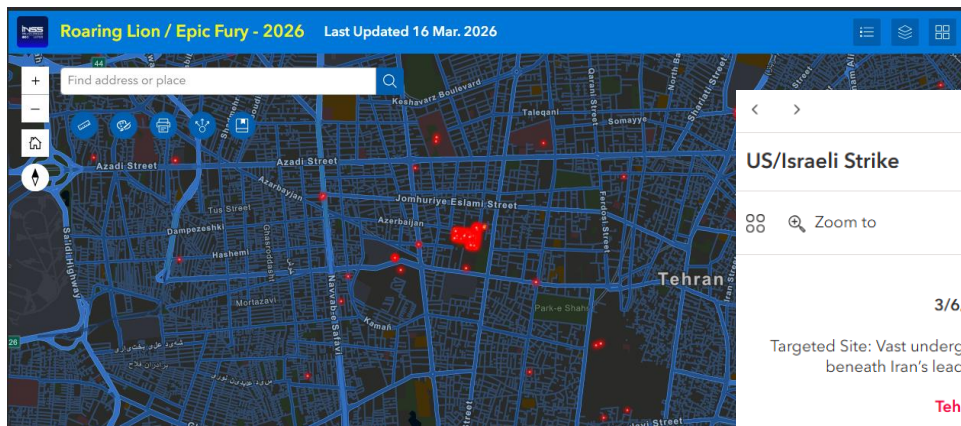


Khamenei
residence and
presidential
complex

11th Tehran
Municipality
Region

Salman Basij
Resistance
Region Base

Sentinel-1 Change Detection: Tehran



US/Israeli Strike

3/6/26

Targeted Site: Vast underground command complex beneath Iran's leadership compound

Tehran

About 50 Israeli fighter jets dropped more than 100 munitions on vast underground command complex beneath Iran's leadership compound in Tehran

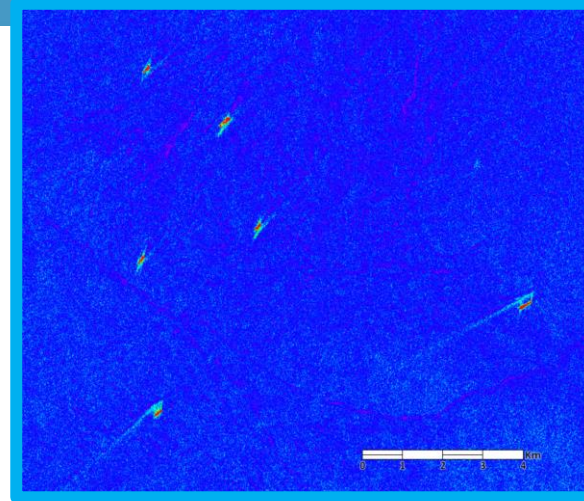
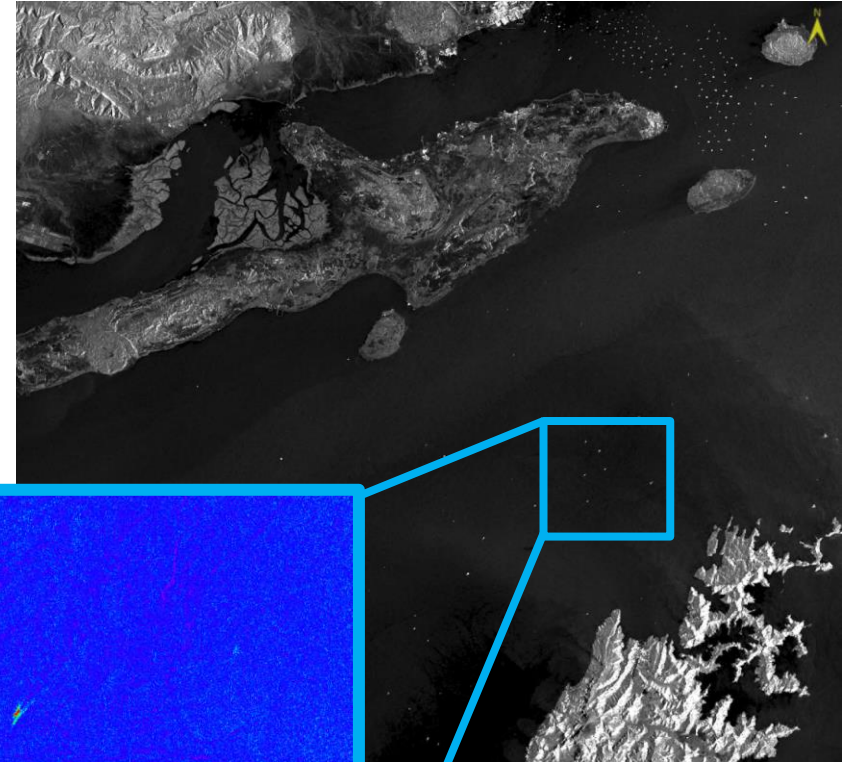
Khamenei residence and presidential complex

<https://www.reuters.com/graphics/I-RAN-CRISIS/MAPS/znpmelervl/>

Ship Detection: Strait of Hormuz

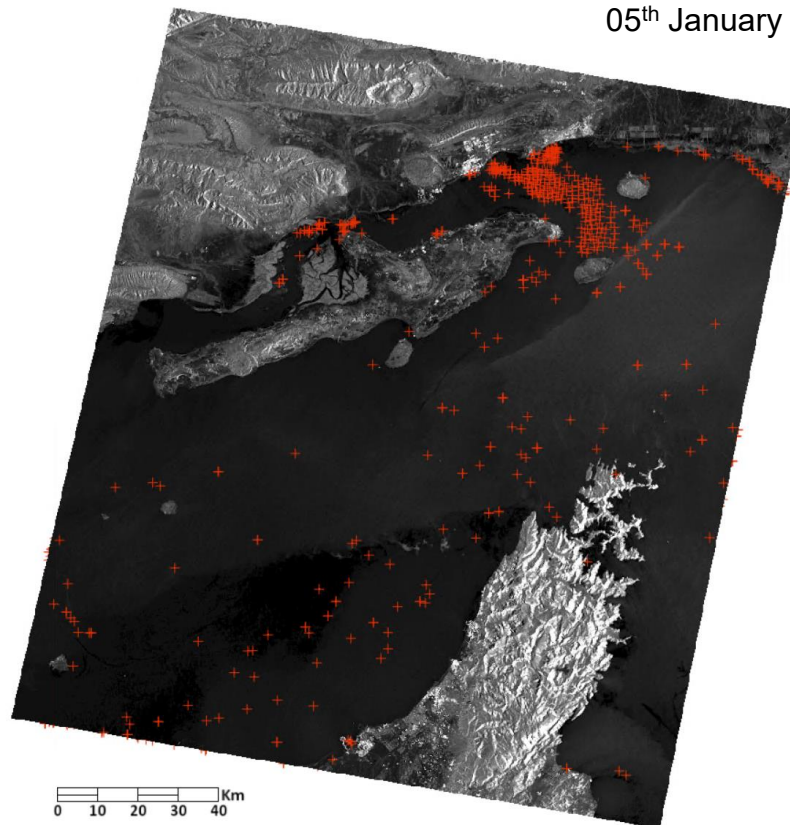


Tanker traffic in the Strait of Hormuz came to a near standstill after the U.S. and Israel launched air attacks on Iran, on February 28th.



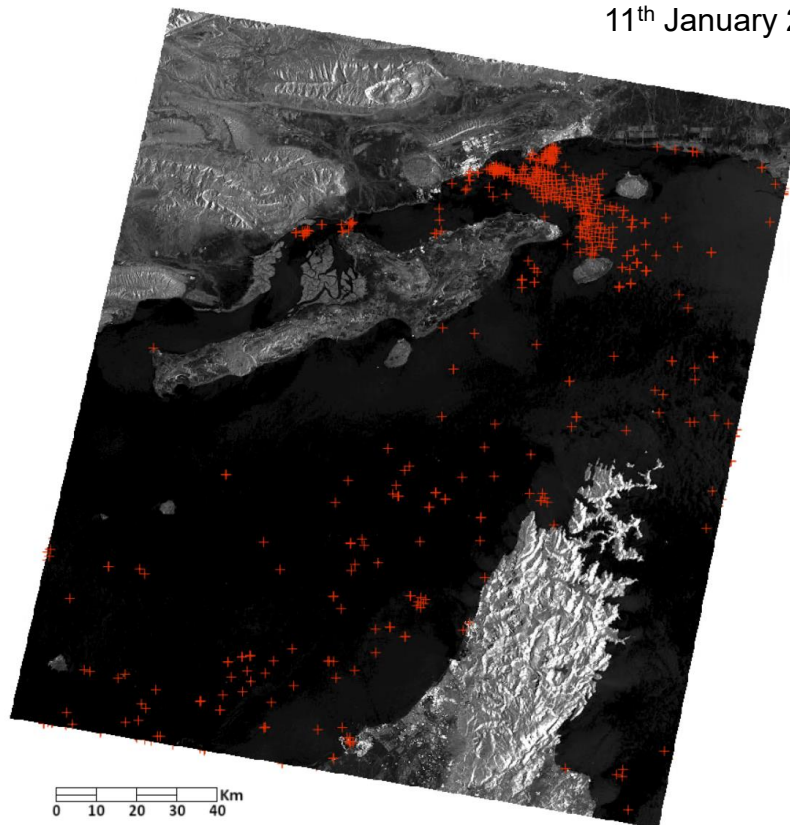
Ship Detection: Strait of Hormuz

05th January 2026



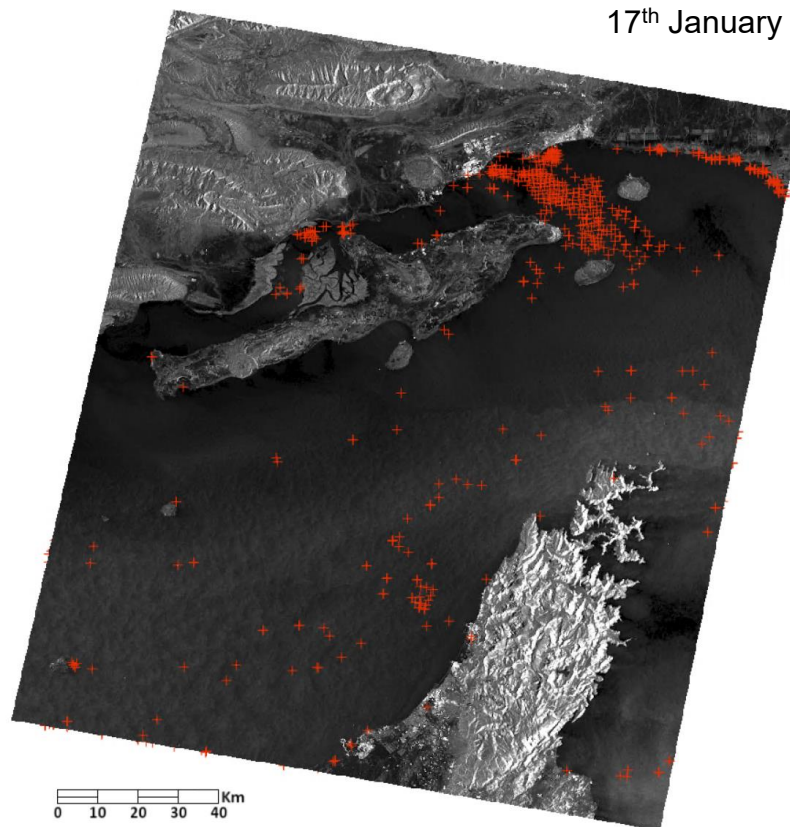
Ship Detection: Strait of Hormuz

11th January 2026



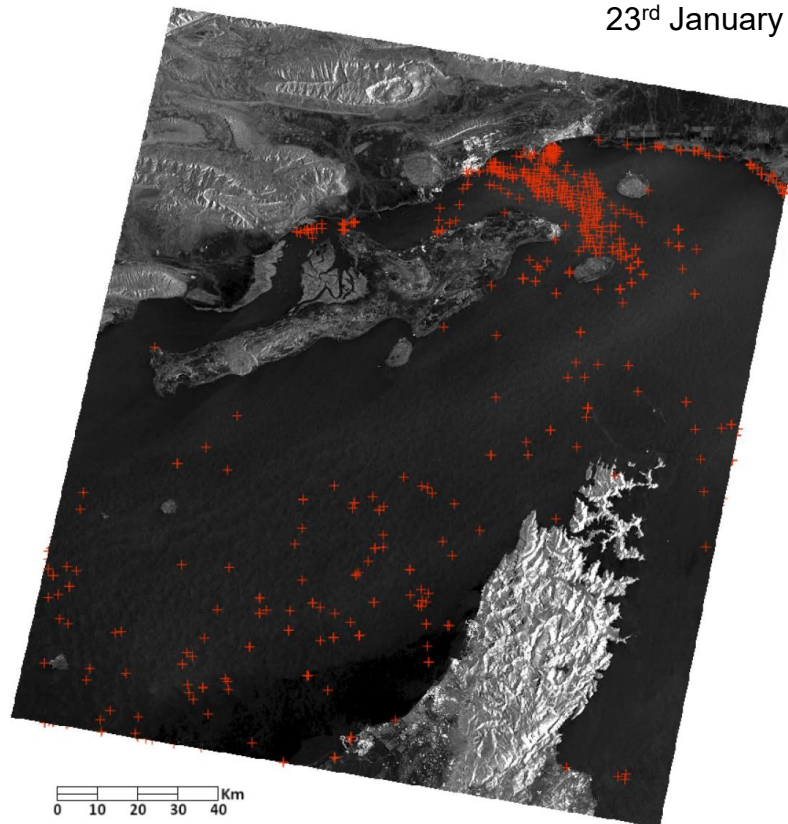
Ship Detection: Strait of Hormuz

17th January 2026



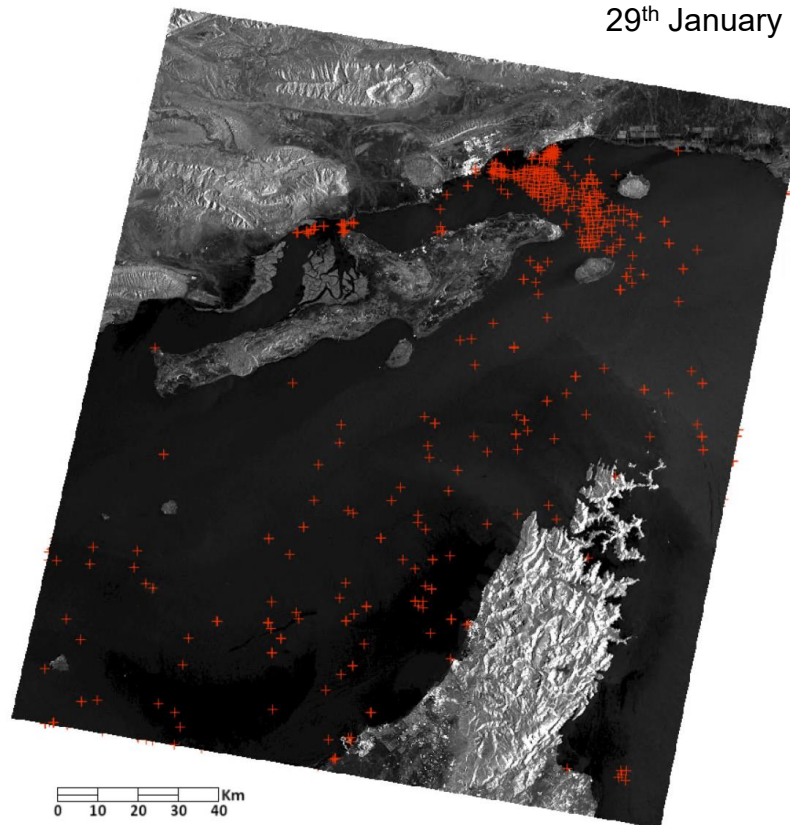
Ship Detection: Strait of Hormuz

23rd January 2026



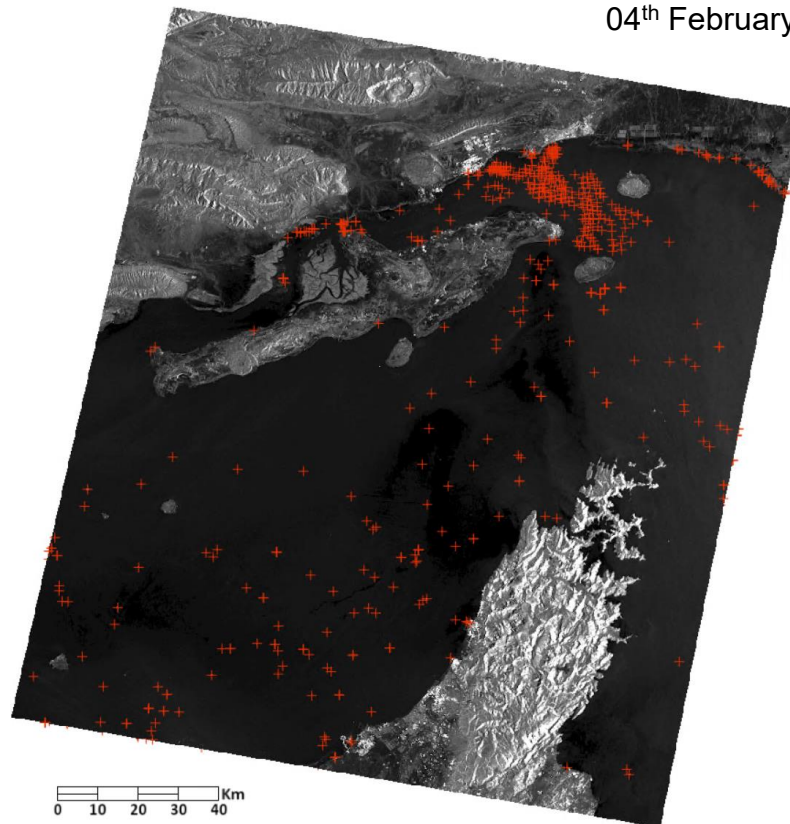
Ship Detection: Strait of Hormuz

29th January 2026



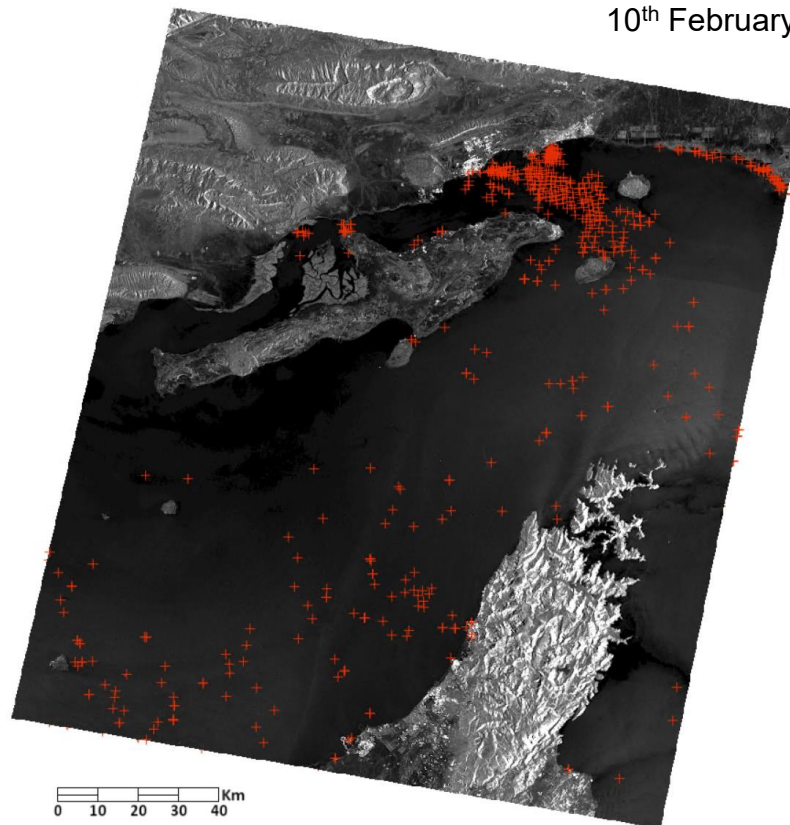
Ship Detection: Strait of Hormuz

04th February 2026



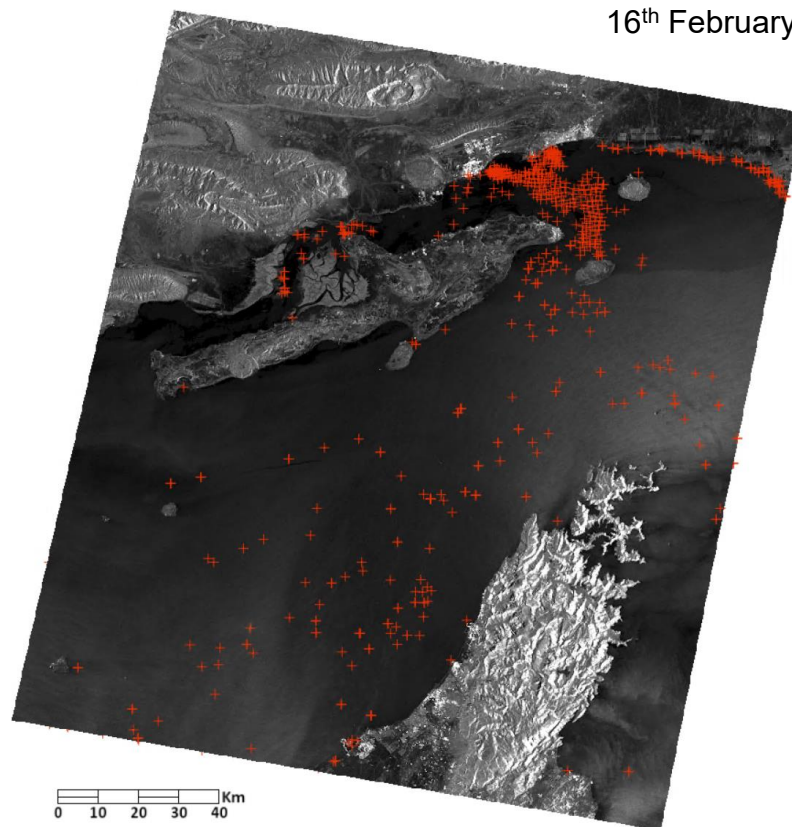
Ship Detection: Strait of Hormuz

10th February 2026



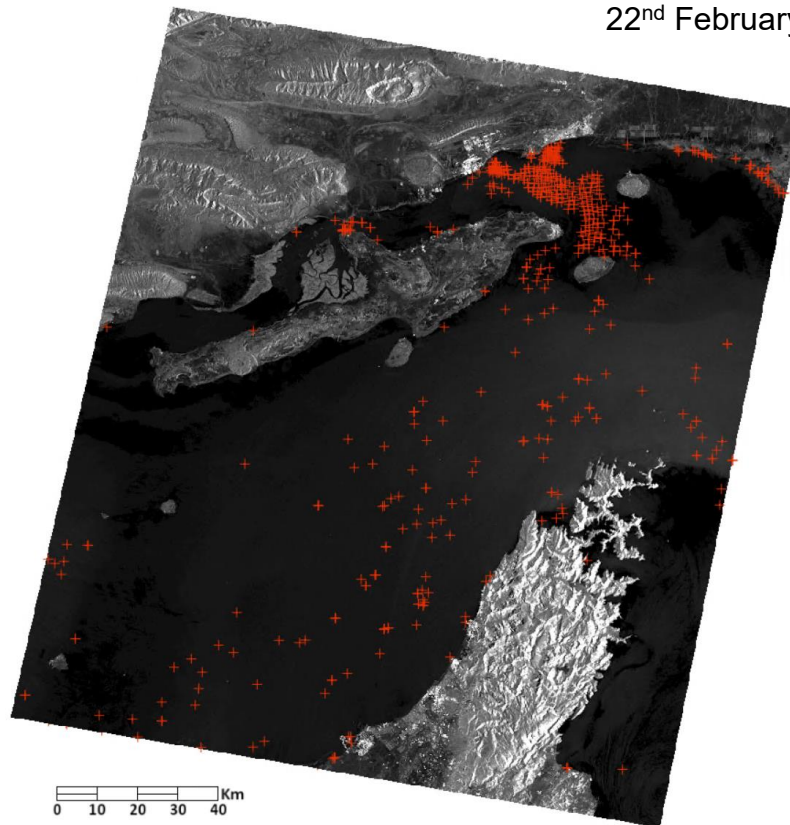
Ship Detection: Strait of Hormuz

16th February 2026



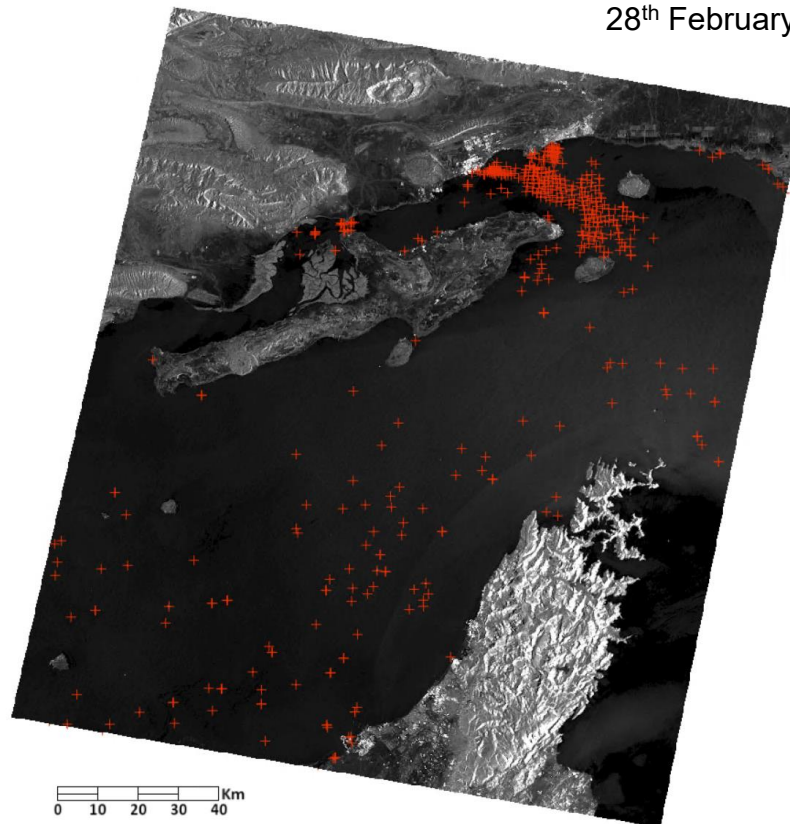
Ship Detection: Strait of Hormuz

22nd February 2026



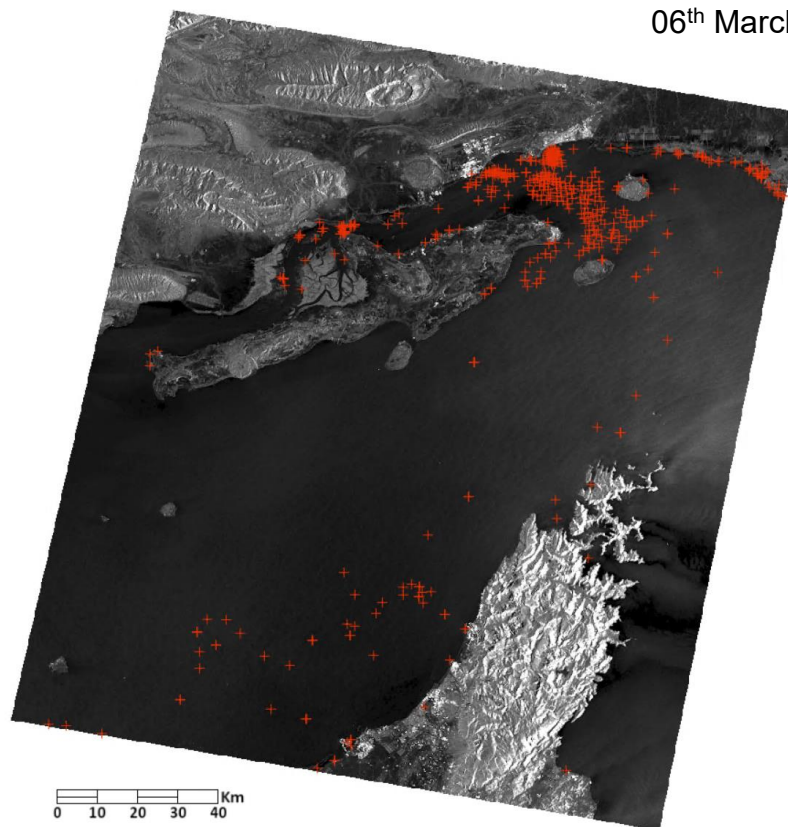
Ship Detection: Strait of Hormuz

28th February 2026

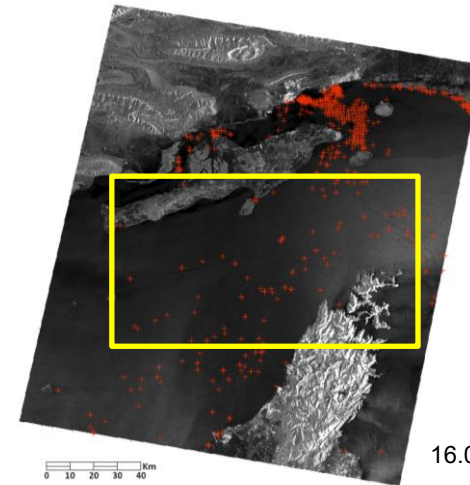
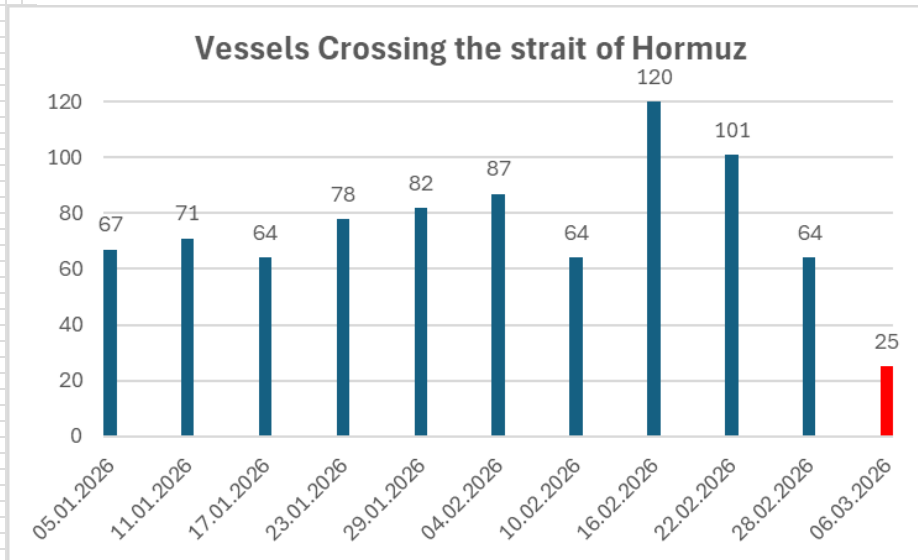


Ship Detection: Strait of Hormuz

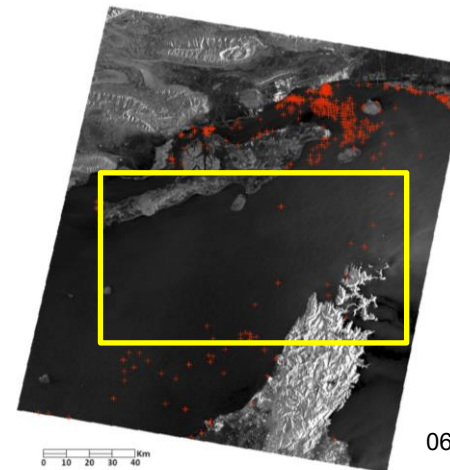
06th March 2026



Ship Detection: Strait of Hormuz

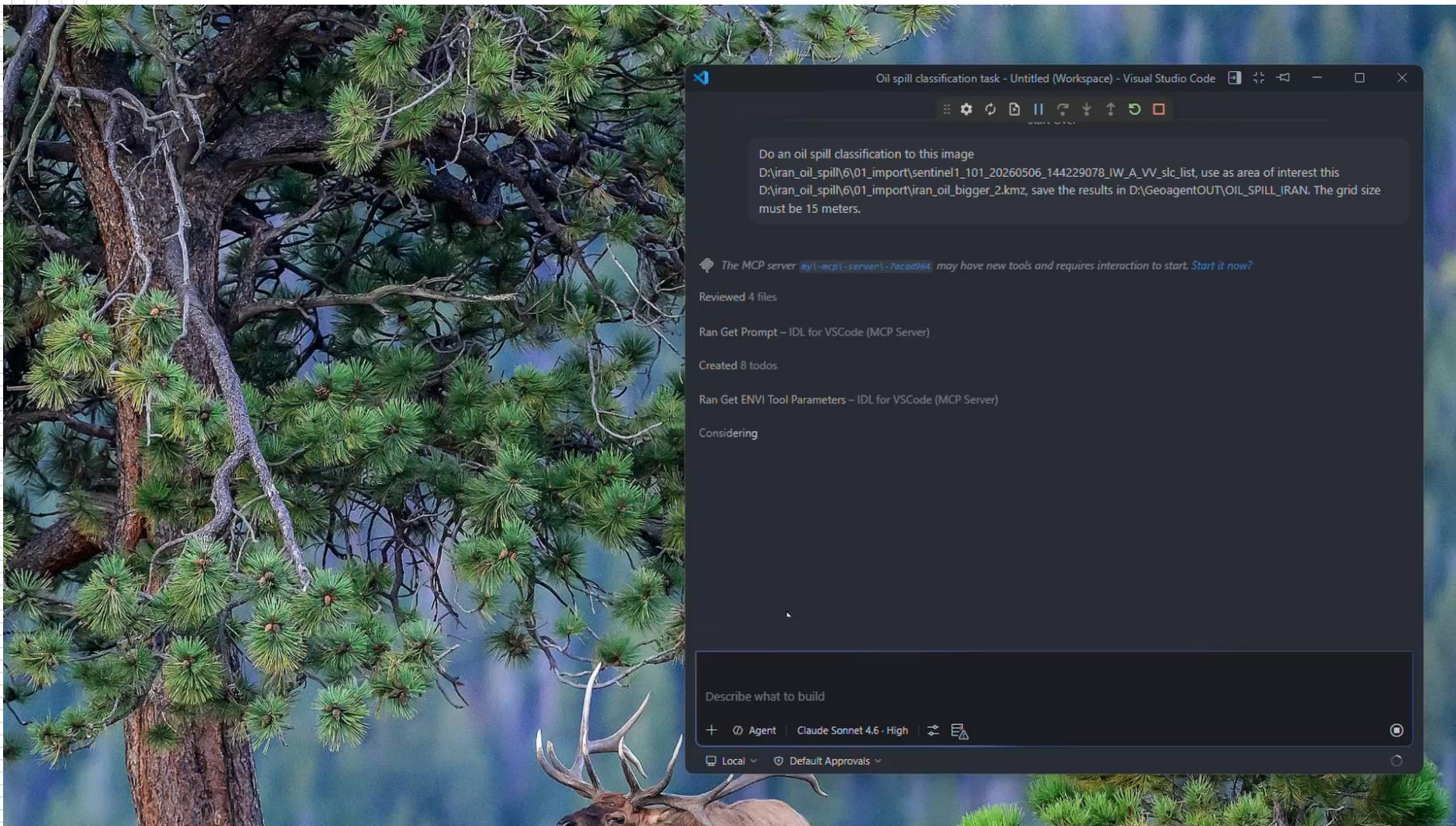


16.02.2026



06.03.2026

ENVI Agent & SARscape



ENVI Agent & SARscape

1) User request

Do an oil spill classification to this image
D:\iran_oil_spill\6\01_import\sentinel1_101_20260506_144229078_IW_A_VV_slc_list, use as area of interest this
D:\iran_oil_spill\6\01_import\iran_oil_bigger_2.kmz, save the results in D:\GeoagentOUT\OIL_SPILL_IRAN. The grid size must be 15 meters.

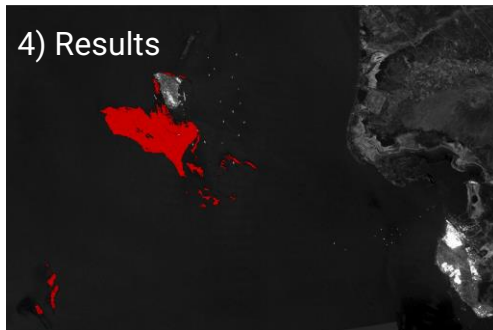
2) Agent settings

Do an oil spill classification to this image
D:\iran_oil_spill\6\01_import\sentinel1_101_20260506_144229078_IW_A_VV_slc_list, use as area of interest this
D:\iran_oil_spill\6\01_import\iran_oil_bigger_2.kmz, save the results in D:\GeoagentOUT\OIL_SPILL_IRAN. The grid size must be 15 meters.

Todos (8/8)

- ✓ Step 2: Suggest Looks (SARscapeSuggestLooks)
- ✓ Step 3: Multilooking (SARsBasicMultilooking)
- ✓ Step 4: Speckle Filter
- ✓ Step 5: DEM Extraction (SRTM4)
- ✓ Step 6: Geocoding (15m grid)
- ✓ Step 7: Oil Spill Classification

4) Results



3) Agent proceeding on the steps

Q: Do you want to change any filter parameters?
A: Proceed with same defaults (Refined Lee)

Considered output path adjustments for existing file constraints

Re-running the filter. Since the previous output is already open in ENVI (file locked), I'll use a new output path, then redo downstream steps automatically.

Created 4 todos

Running Run ENVI Tool – IDL for VSCode (MCP Server)

▼ Todos (1/4)

- Step 4: Speckle Filter (redo)
- Step 6: Geocoding (redo)
- AOI Cut (redo)
- Step 7: Oil Spill Classification (redo)

+ oilspill.md

Describe what to build

+ Agent | Claude Sonnet 4.6 · High

Local | Default Approvals

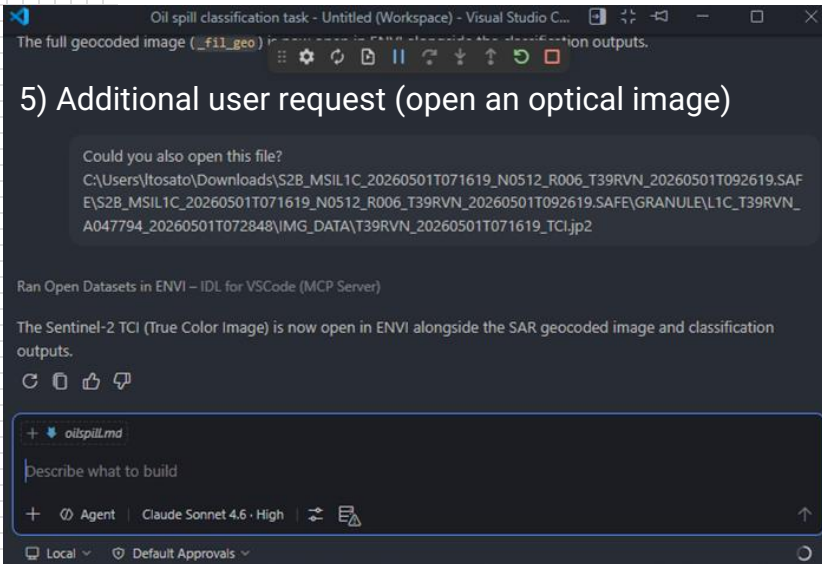
SARscape: Generic FilterGeneric Filter

Generate QL image[1] : [sentinel1_101_20260506_144229078_IW_A_V

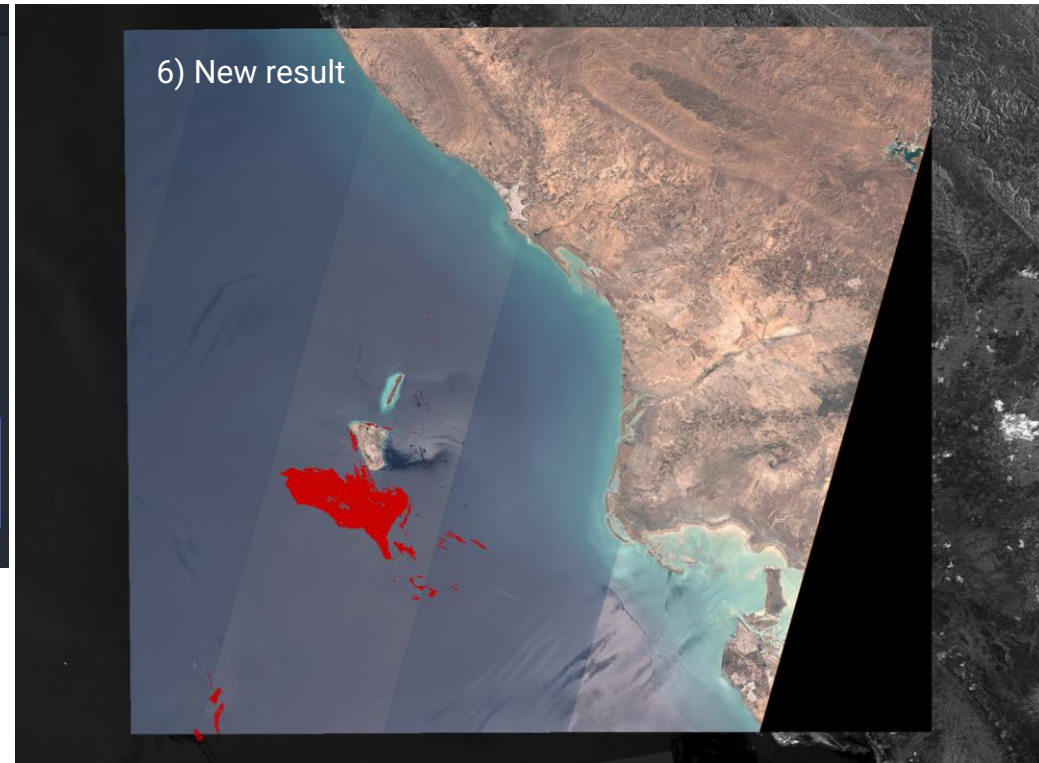
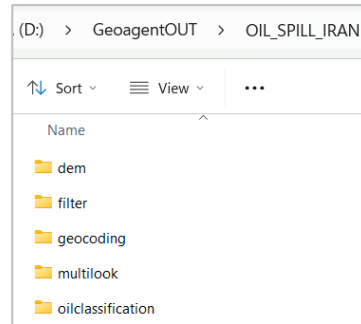
Cancel

New features (6.3.1)

ENVI Agent & SARscape



7) Output folder organisation



New features (6.3.1)

Now is your turn!

- ¿What could you use SARscape Agent for?
 1. Decision making
 2. Selecting existing workflows
 3. Creating new workflows from existing tasks
 4. Creating scripts & metatasks for automation
 5. Optimizing processing parameters
 6. ...

ENVI Agent & SARscape

Currently, SARscape provides possibility to run the following workflows with ENVI Agent:

- Intensity Single Image
- Intensity Time Series
- Amplitude Classifier
- Flooding Classification
- Ship Detection
- Oil Spill Classification
- Inverse-SAR Detection and Refocusing
- Moving Target Detection
- InSAR DEM
- InSAR DEM with GCP
- DInSAR Displacement
- DInSAR Displacement with GCP
- Stereo DEM
- Stereo DEM with GCP
- Amplitude Tracking
- Amplitude Tracking with GCP
- Coherence and Amplitude Classifier
- Coherence CCD Timeline
- Coherence CCD Timeline & Power
- Coherence MICCD RGB

New features (6.3.1)

What's New in SARscape® 6.3.0 and 6.3.1 (1/3)

<i>ENVI SARscape Workflow GUI</i>		New GUI for workflows, new interactive tools	6.3.0
<i>Import Data</i>	<i>SAR Spaceborne/Single Sensor</i>	AIRSAT (AIRSAT01, AIRSAT02, AIRSAT04)	6.3.0
		AIRSAT-HS (AIRSAT05-HS01, AIRSAT08-HS01)	6.3.0
		ALOS PALSAR-3	6.3.0
		BIOMASS	6.3.0
		Capella (TIFF + JSON)	6.3.0
		ICEYE (Cloud Optimised GeoTIFF + JSON, slant plane geometry in HDF5)	6.3.0
		NISAR (RSLC and GSLC format), A and B bands	6.3.0
		Synspective (STRIX GRD and GRD-SR)	6.3.0
	<i>DEM extraction/ GLO 30</i>		6.3.1
	<i>Download/ NISAR Download</i>		6.3.1

New features

What's New in SARscape® 6.3.0 and 6.3.1 (2/3)

The newest releases introduces several algorithmic improvements and new features.

Basic module	Workflows	Ship Detection	6.3.0
		Oil Spill Classification	6.3.0
		Inverse-SAR Detection and Refocusing	6.3.0
		Radar Cross Section	6.3.0
		Compatibility Check	6.3.1
	Feature Characteristics/ RGIQE-RNIIRS		6.3.0
	Oil Spill Classification		6.3.0
	Oil Tank Detection		6.3.0
	Moving Target Detection	Inverse-SAR Detection	6.3.0
		Inverse-SAR Refocusing	6.3.0
	Height Estimation	3D Point Estimation	6.3.0
		Height Estimation	6.3.0

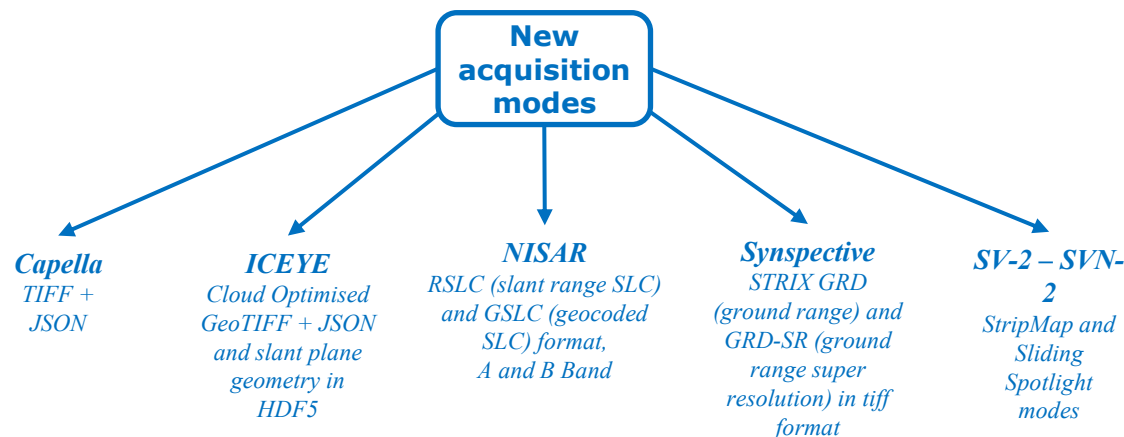
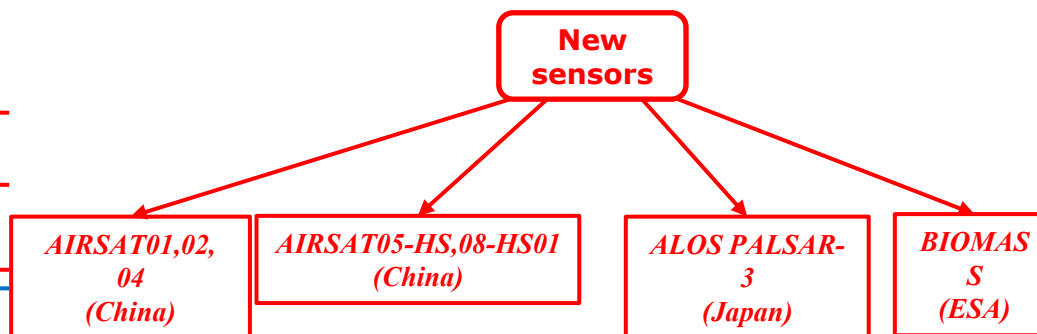
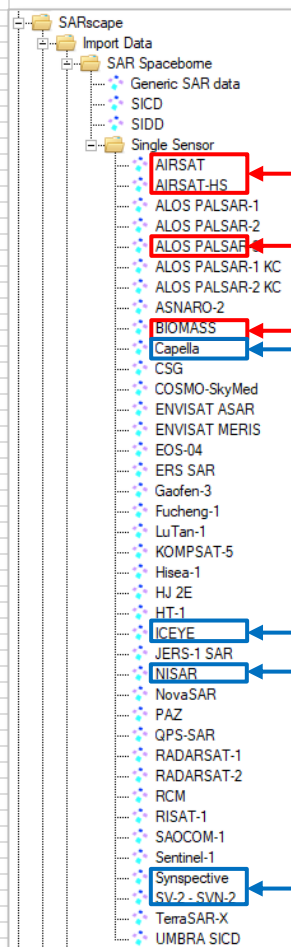
New features

What's New in SARscape® 6.3.0 and 6.3.1 (3/3)

General Tools	Orbital Corrections/Update to Precise Orbits/ Slant Range Update from IONEX		6.3.1
	Data and Quality Analysis/ Sub-Look Degradation		6.3.1
Interferometry module	Phase Processing/ Interferogram Generation	Option for Ionospheric Contribution Removal	6.3.1
		Improved Sentinel-1 A/B/C/D compatibility	6.3.1
	Displacement Modeling	New multitemporal displacement modelling	6.3.0
		New and improved damping options (Linear inversion)	6.3.0
		Improved uncertainty analysis and plot (Non-linear inversion)	6.3.0
Preferences	Preferences common	Directories and batch file name/ IONEX files directories	6.3.1
		User accounts/ EOSDIS services username and EOSDIS services password	6.3.1
	Preferences specific	Feature extraction, Stereo-Radargrammetry, Displacement Amplitude Tracking sections	6.3.0
		Umbra preferences	6.3.0
Help	New structure fully integrated within the ENVI help content		6.3.0

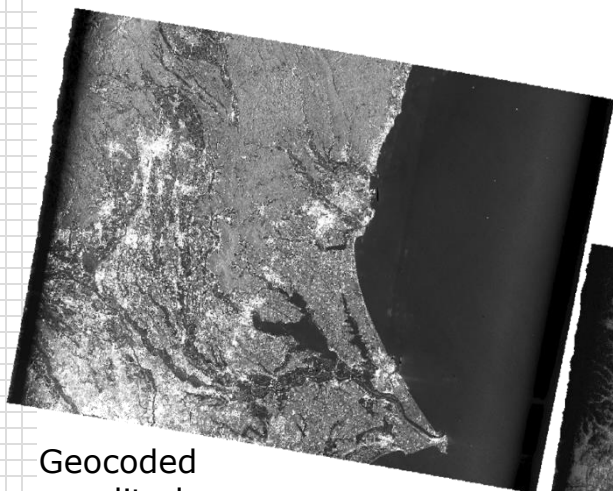
New features

SAR Spaceborne Import Data

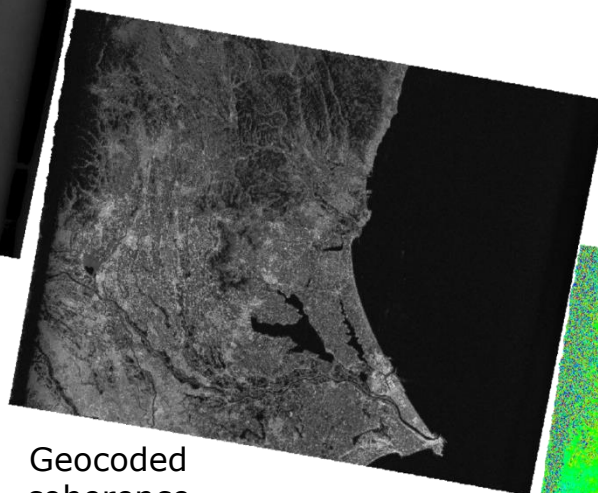


New features (6.3.0 and 6.3.1)

PALSAR-3 Support

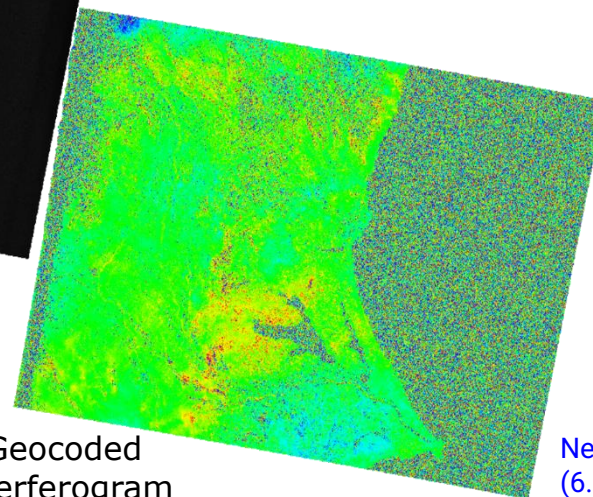


Geocoded
amplitude



Geocoded
coherence

Based on the data kindly made available by Jaxa,
ScanSAR at this time



Geocoded
interferogram

New features
(6.3.0)



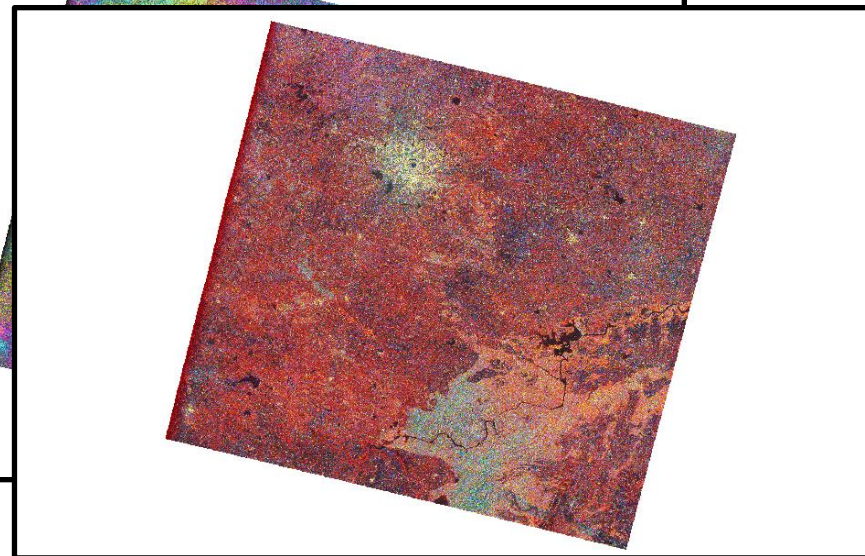
Date: 2025 May 02 - 02:42

NISAR Support

S-Band

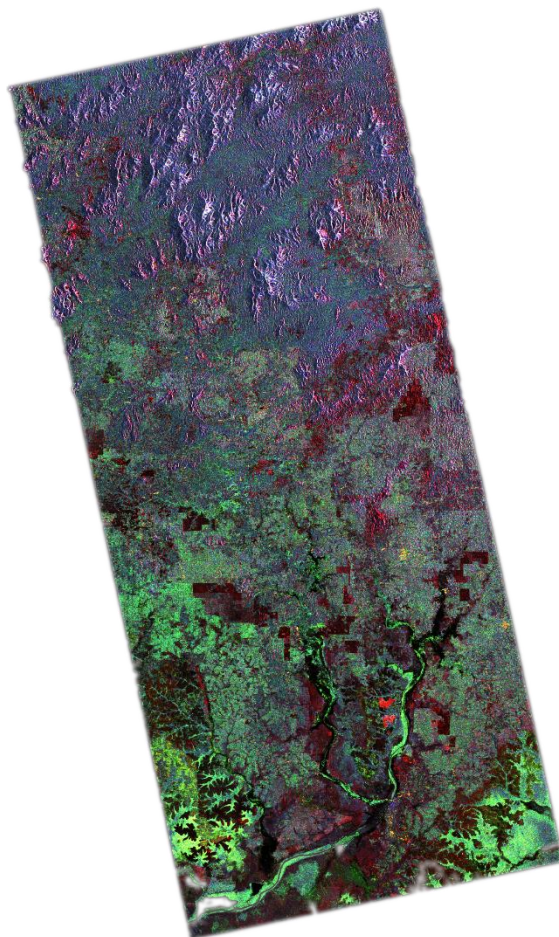
Based on real data over
India

L-Band



New features (6.3.0)

BIOMASS Support



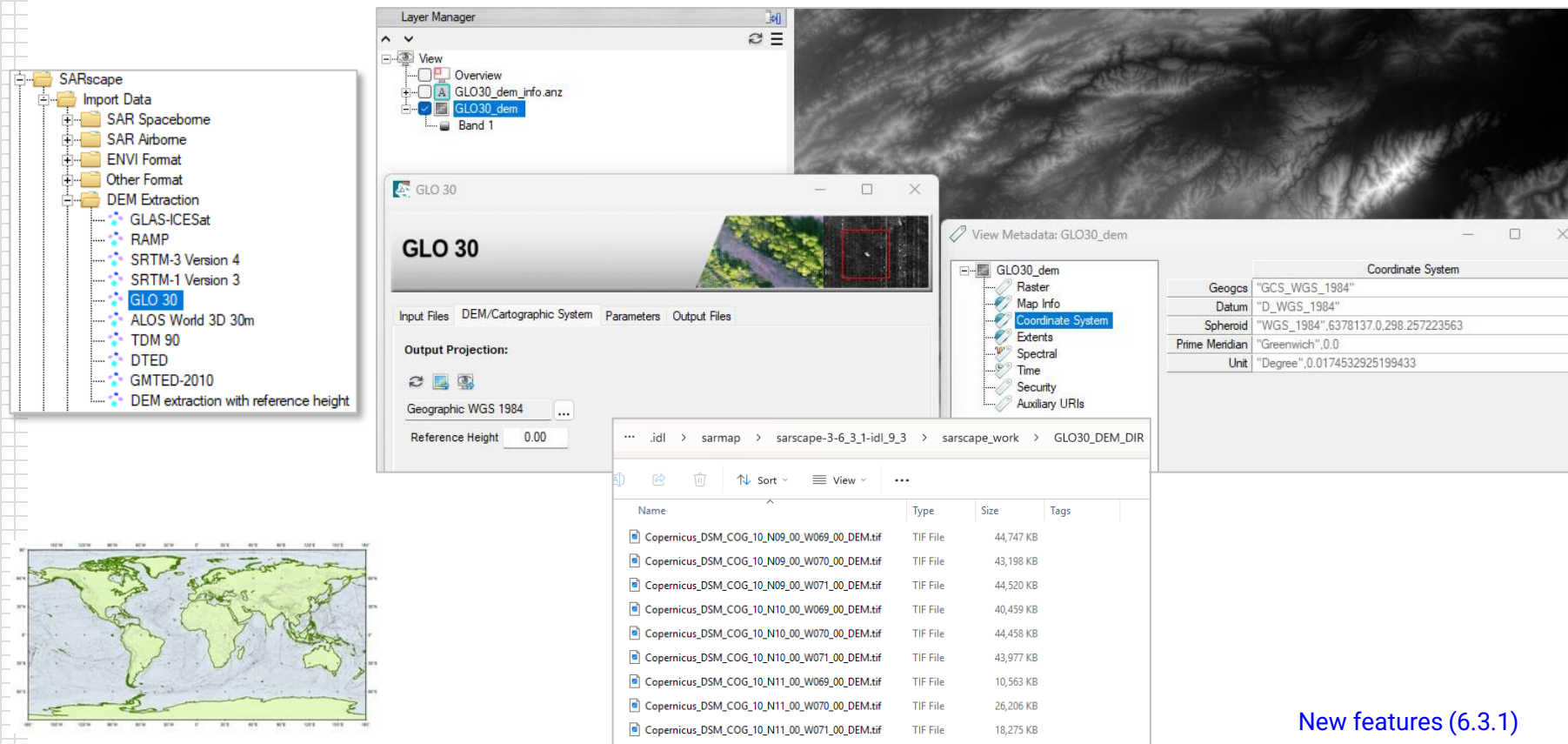
Pauli decomposition of a full-pol BIOMASS image over Borneo, where:

- R: even-bounce (HH-VV)
- G: dihedral rotated 45 degree (HV+VH)
- B: odd-bounce (HH+VV)

New features (6.3.0)

GLO 30 DEM Download

A new tool query and download Copernicus DEM - Global and European Digital Elevation Model with 30-meter resolution from data acquired by the TanDEM-X mission between 2011 and 2015.



The screenshot displays the SARscape software interface with several windows open:

- Layer Manager:** Shows a tree view of data layers. Under 'DEM Extraction', 'GLO 30' is selected.
- GLO 30:** A window showing a preview of the DEM data with a red bounding box.
- View Metadata: GLO30_dem:** A window showing the metadata for the selected layer, including the coordinate system.
- Coordinate System:** A table showing the coordinate system details.
- File Explorer:** A window showing the output files in the 'GLO30_DEM_DIR' directory.

Coordinate System Table:

Coordinate System	
Geogcs	"GCS_WGS_1984"
Datum	"D_WGS_1984"
Spheroid	"WGS_1984", 6378137.0, 298.257223563
Prime Meridian	"Greenwich", 0.0
Unit	"Degree", 0.0174532925199433

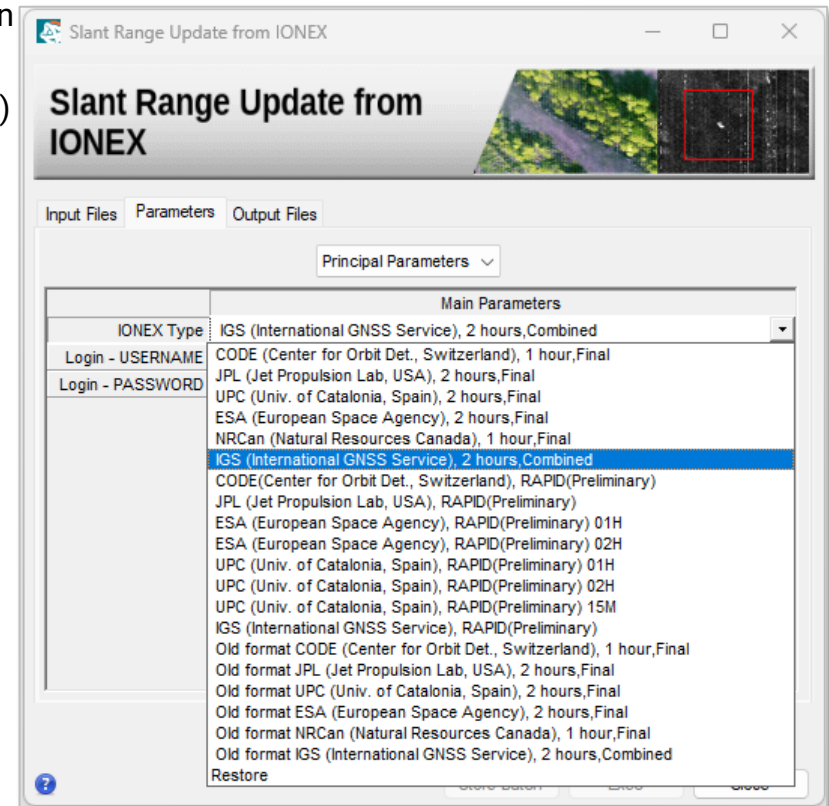
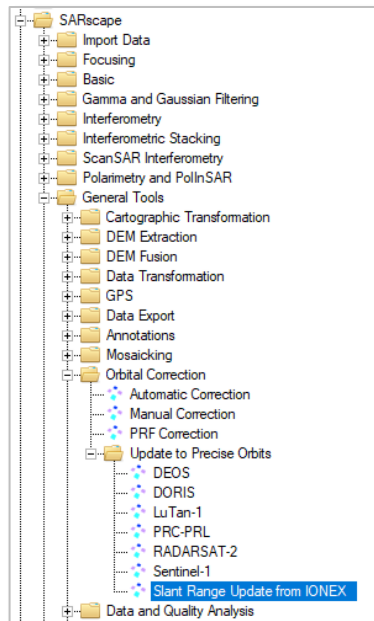
File Explorer Table:

Name	Type	Size	Tags
Copernicus_DSM_COG_10_N09_00_W069_00_DEM.tif	TIF File	44,747 KB	
Copernicus_DSM_COG_10_N09_00_W070_00_DEM.tif	TIF File	43,198 KB	
Copernicus_DSM_COG_10_N09_00_W071_00_DEM.tif	TIF File	44,520 KB	
Copernicus_DSM_COG_10_N10_00_W069_00_DEM.tif	TIF File	40,459 KB	
Copernicus_DSM_COG_10_N10_00_W070_00_DEM.tif	TIF File	44,458 KB	
Copernicus_DSM_COG_10_N10_00_W071_00_DEM.tif	TIF File	43,977 KB	
Copernicus_DSM_COG_10_N11_00_W069_00_DEM.tif	TIF File	10,563 KB	
Copernicus_DSM_COG_10_N11_00_W070_00_DEM.tif	TIF File	26,206 KB	
Copernicus_DSM_COG_10_N11_00_W071_00_DEM.tif	TIF File	18,275 KB	

New features (6.3.1)

Slant Range Update from IONEX

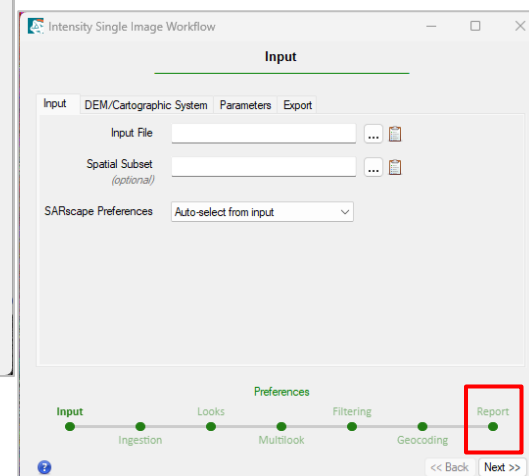
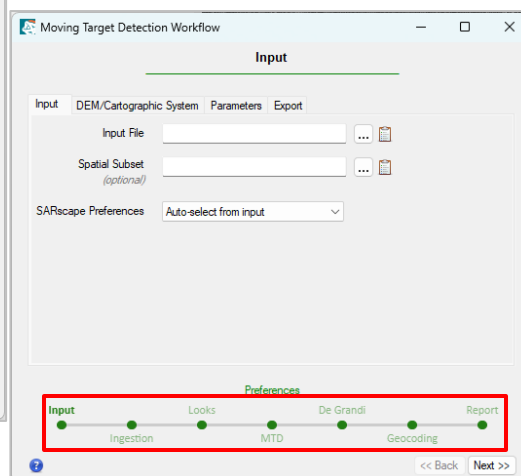
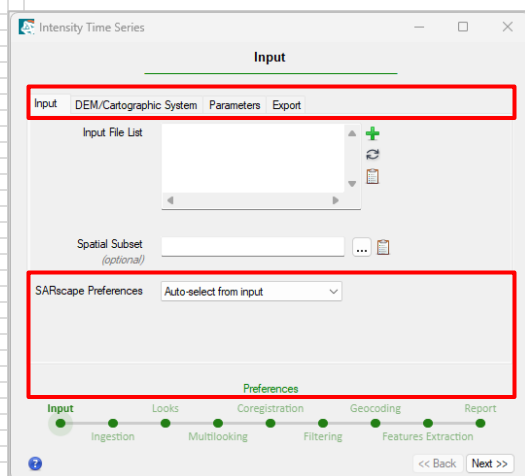
- Possibility to download and apply IONEX file to correct slant range data for signal time delay caused by the free electron density in the ionosphere.
- The ionosphere maps contain Total Electron Content (TEC) grids provided by the International GNSS Service or other global and regional services.
- Credentials for the Earth Observing System Data and Information System (EOSDIS) are required.



New features (6.3.1)

New graphic interface for SARscape workflows

Updated streamlined and more user-friendly workflows graphic interface with direct access to the list of predefined SARscape preferences for chosen type of data is introduced.



Improvements (6.3.0)

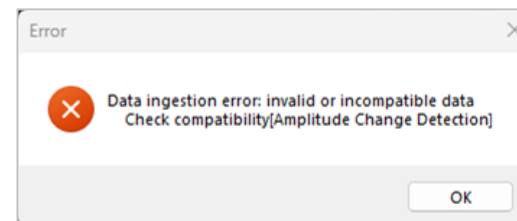
Input Compatibility Check in the new Workflows

A compatibility check for the input data has been introduced in the new workflows.

This feature allows the software to automatically identify and report datasets that are not suitable for a specific processing workflow, together with the reason for the incompatibility.

For example, the system can detect inconsistencies such as:

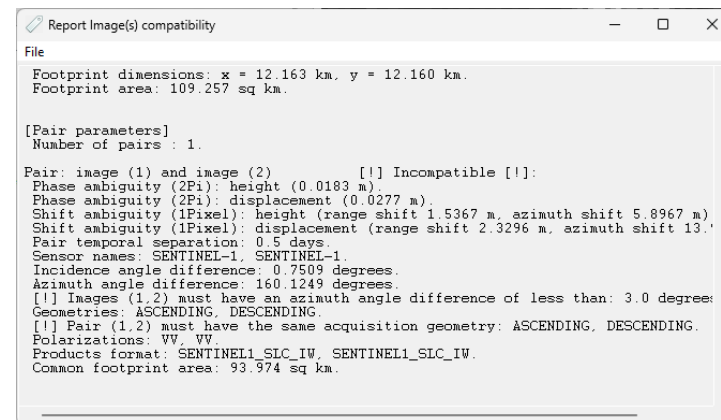
- Different acquisition geometries (Ascending / Descending)
- Different incidence angles
- Different polarizations
- Other acquisition parameter mismatches



This helps user quickly to identify potential issues before starting the processing and reduces the risk of incorrect or inconsistent results.

Workflow List:

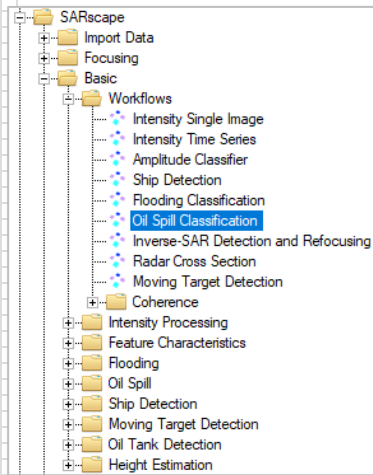
- Intensity Single Image
- Intensity Single Image
- Amplitude Classifier
- Ship Detection
- Inverse-SAR Detection and Refocusing
- Radar Cross Section
- Moving Target Detection
- Coherence & Amplitude Classifier



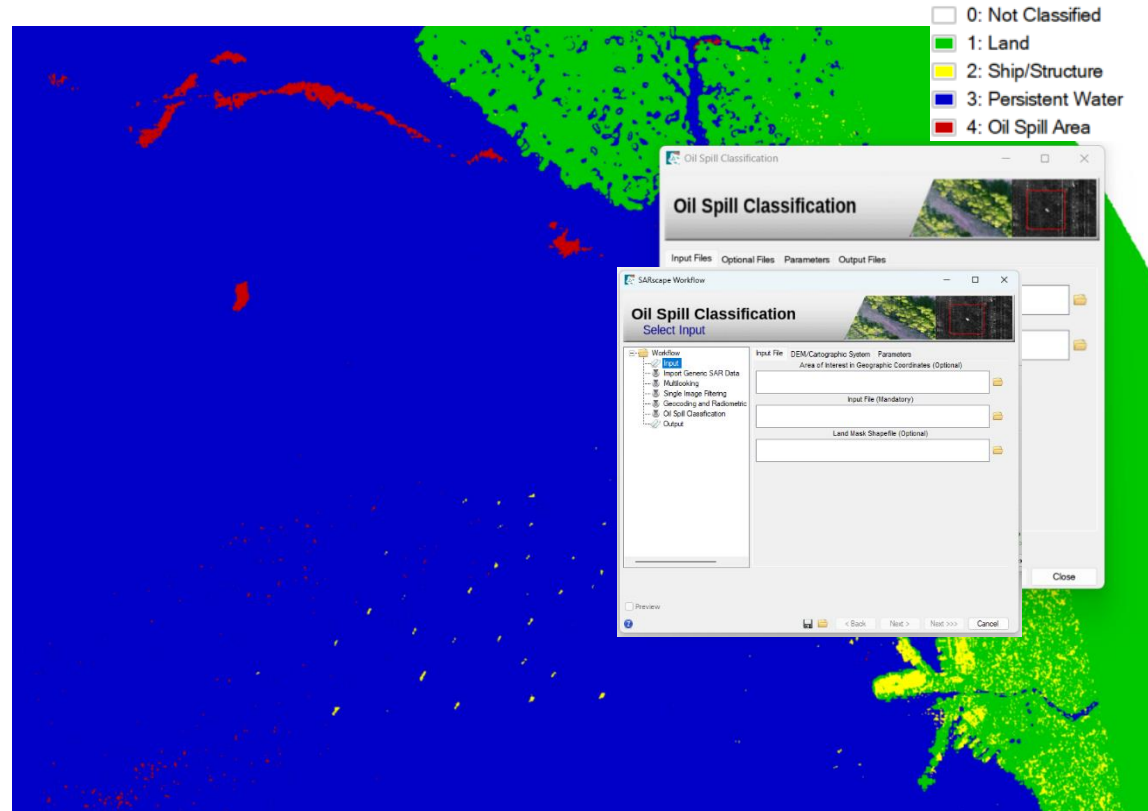
Improvements (6.3.1)

Oil Spill Classification & workflow

New workflow to identify and highlight oil spills over water bodies and also permanent water areas.



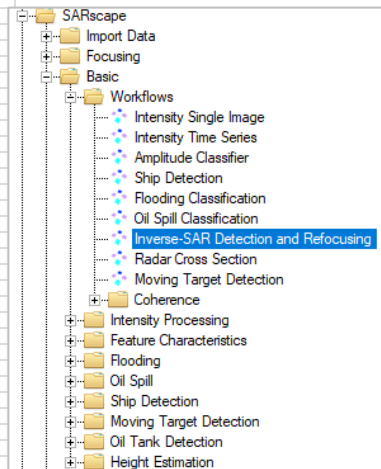
Both oil spill workflow and single tool are available.



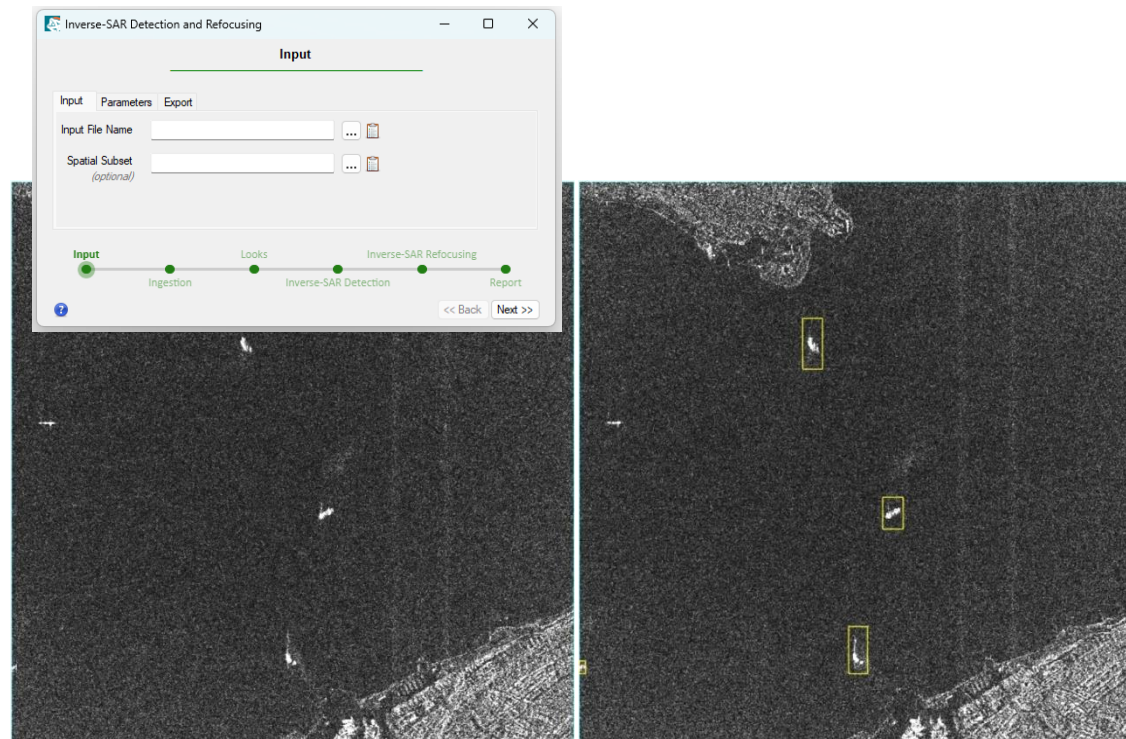
New features (6.3.0)

Inverse-SAR Detection and Refocusing

New workflow for Inverse-SAR Detection and Inverse-SAR Refocusing for moving targets in a single SAR image so displayed as unfocused lines in SAR SLC images. It also refocuses detected target in a SAR image that is moving in the azimuth direction.



Both workflow and step by step tools are available.

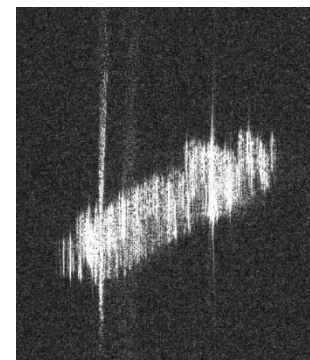
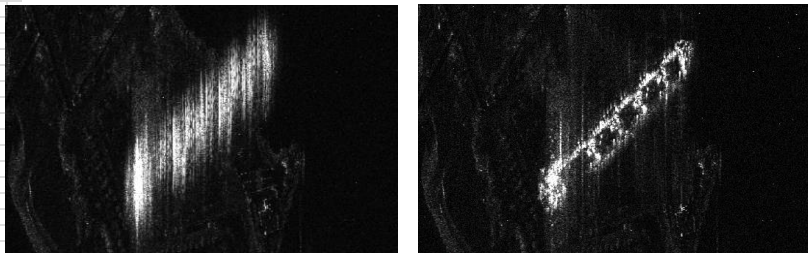


Data courtesy
Capella Space

New features (6.3.0)

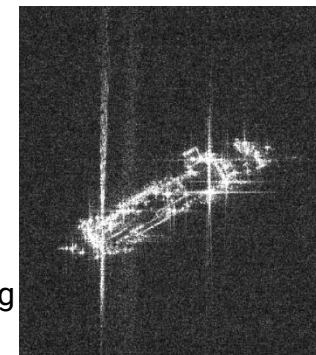
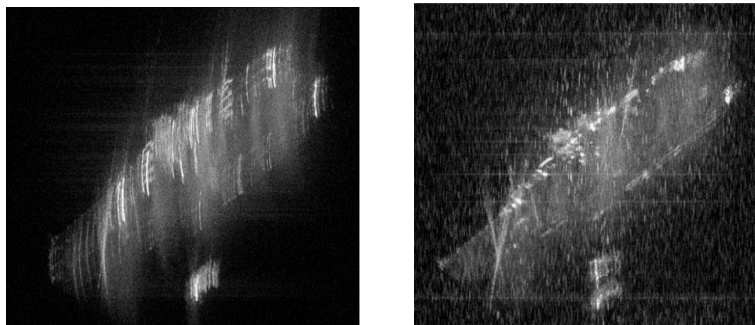
Inverse-SAR Detection and Refocusing

Refocused moving Bulk carrier in the Suez channel.
Estimated velocity: 7 knots



Before refocusing

Defocused Shandong Aircraft Carrier close to
Hainan island. Estimated velocity: 3 knots

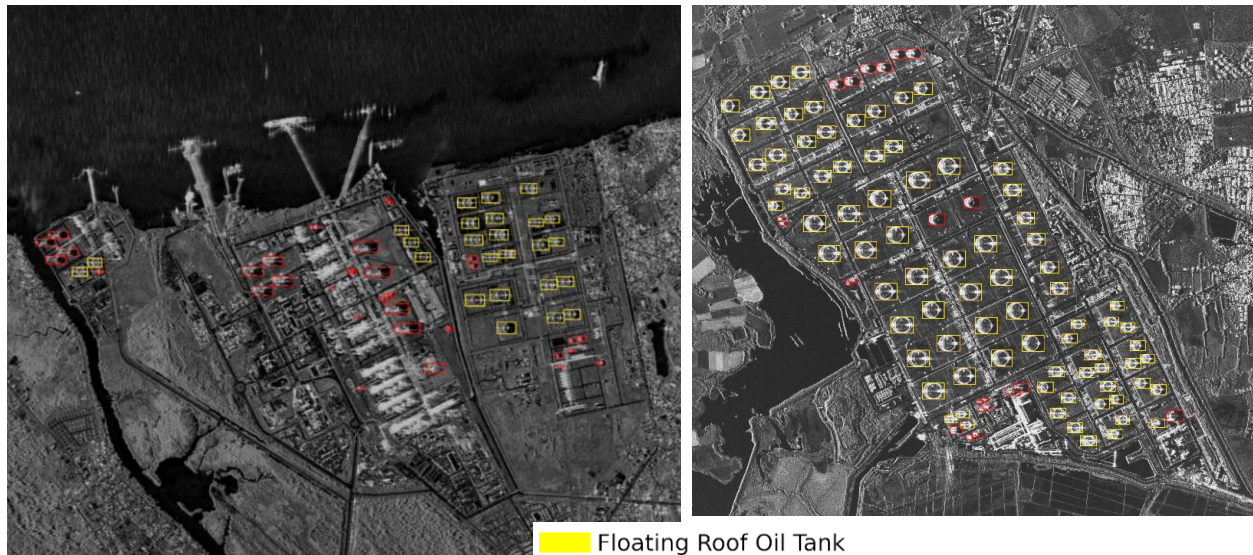
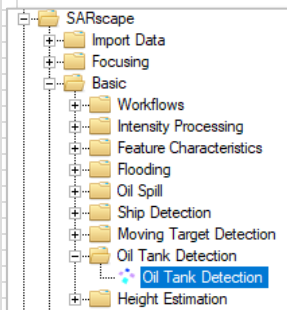


After refocusing

New features

Oil Tank Detection

New tool to perform AI-driven cylindrical oil tank detection.



Yellow Floating Roof Oil Tank
Red Fixed Roof Oil Tank

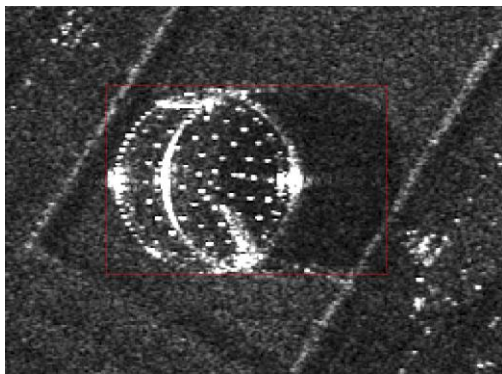
Data courtesy
Capella Space

New tools (6.3.0)

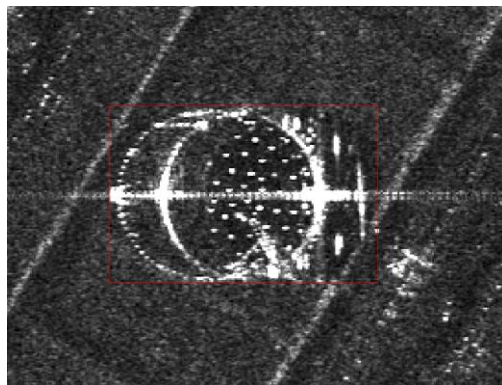
Oil Tank Monitoring

Estimate of the height of the tank for fixed-roof tanks or the oil level for floating-roof tanks.

Floating-roof Oil Tank



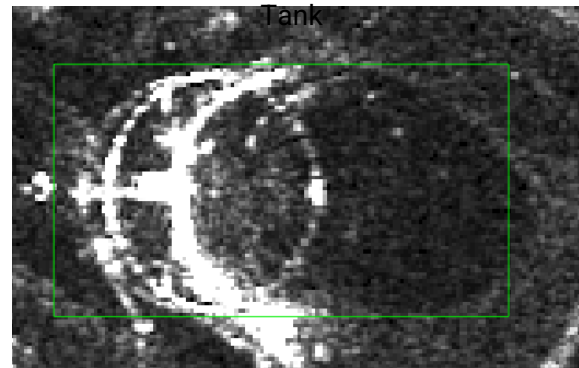
Total Height = 16.229m
Roof Height = 11.128m



Total Height = 13.096m
Roof Height = 8.297m

Data
courtesy
Capella
Space

Fixed-roof Oil
Tank

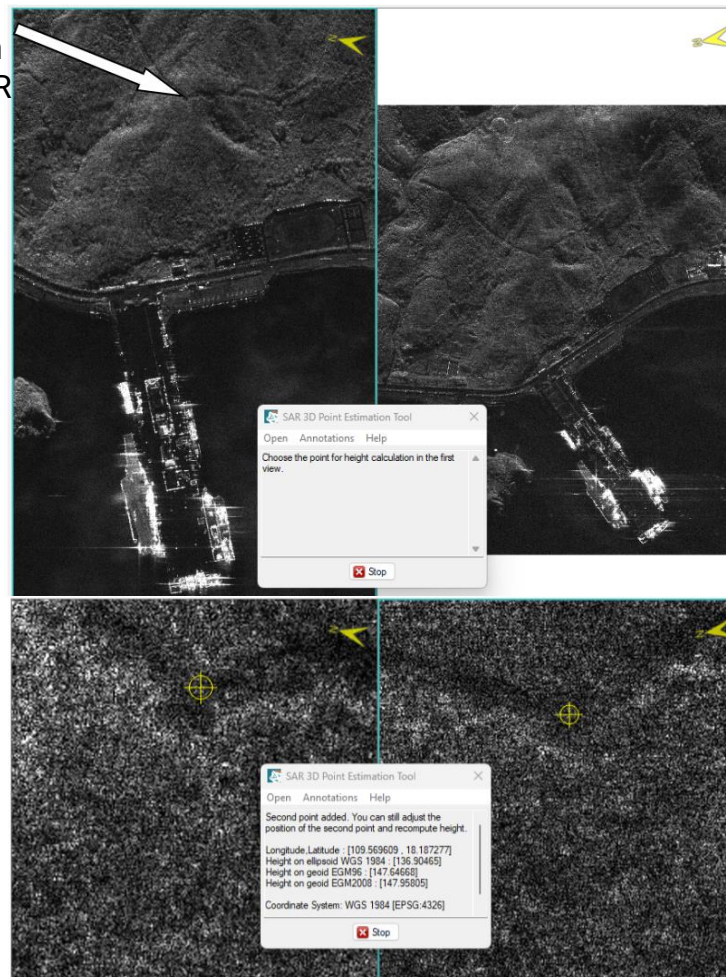
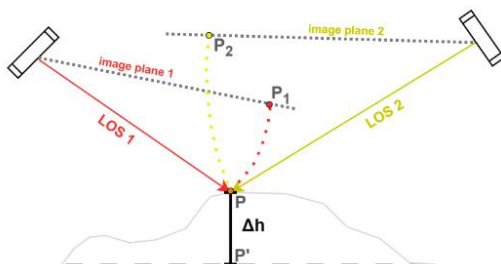
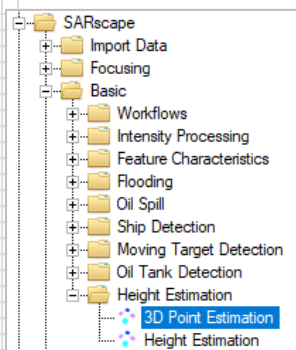


Total Height = 15.619m

New tools (6.3.0)

3D Point Estimation

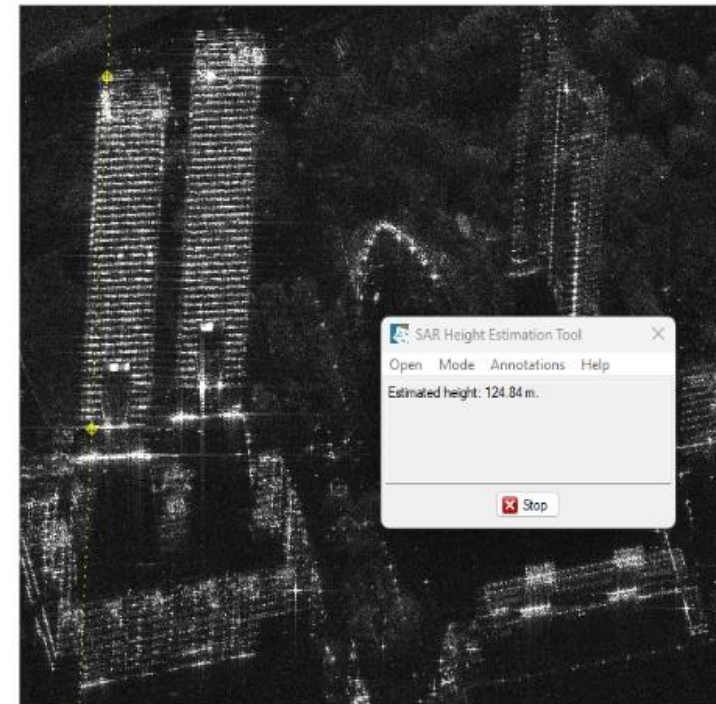
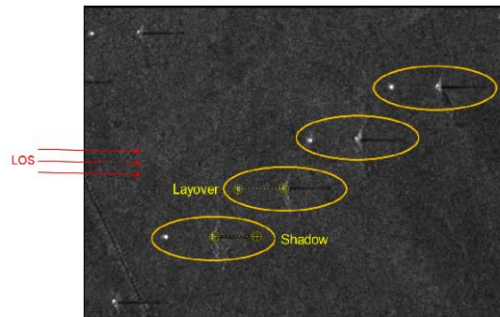
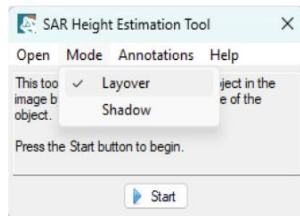
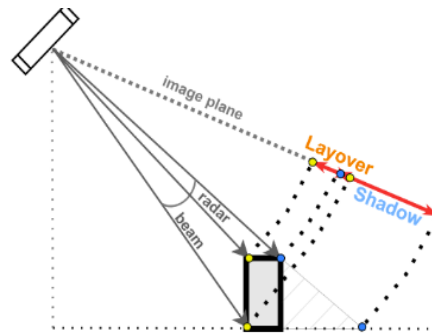
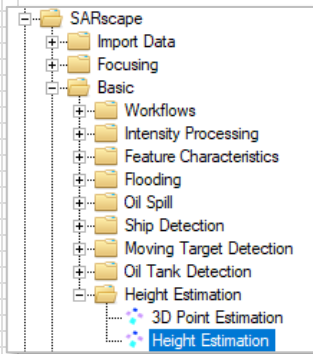
This tool calculates the height and horizontal position (3D coordinates) of a point using two overlapping SAR stereo-images of the same location.



New tools (6.3.0)

Height Estimation

This tool estimates the height of a vertical object from layover or shadow features in a single image by interactively locating the top and the base of the object of interest.

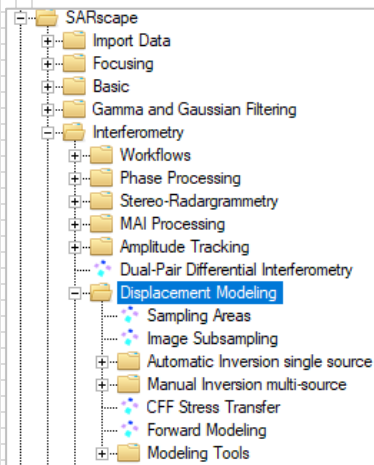


Skyscraper height estimation using an Umbra acquisition over Buenos Aires.

New tools (6.3.0)

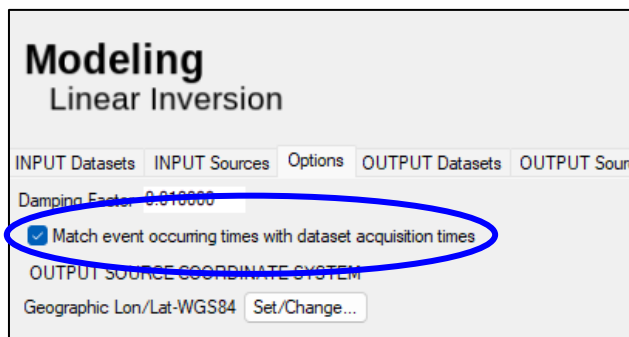
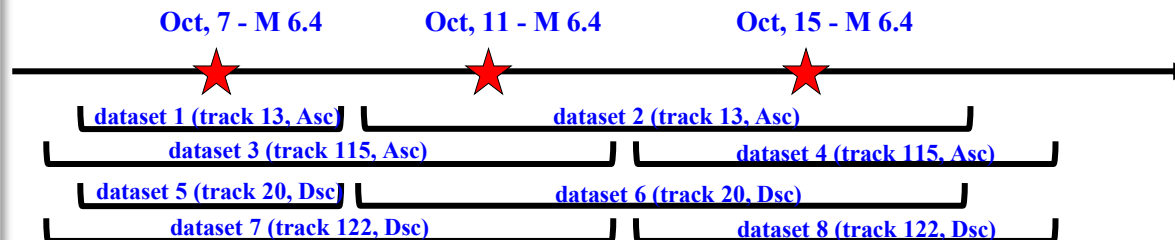
Multitemporal displacement modelling

Improved inversion algorithm accounting for multitemporal data.



This tool allows the geophysical modelling of a sequence of seismic events (or volcanic eruptions or nuclear explosions).

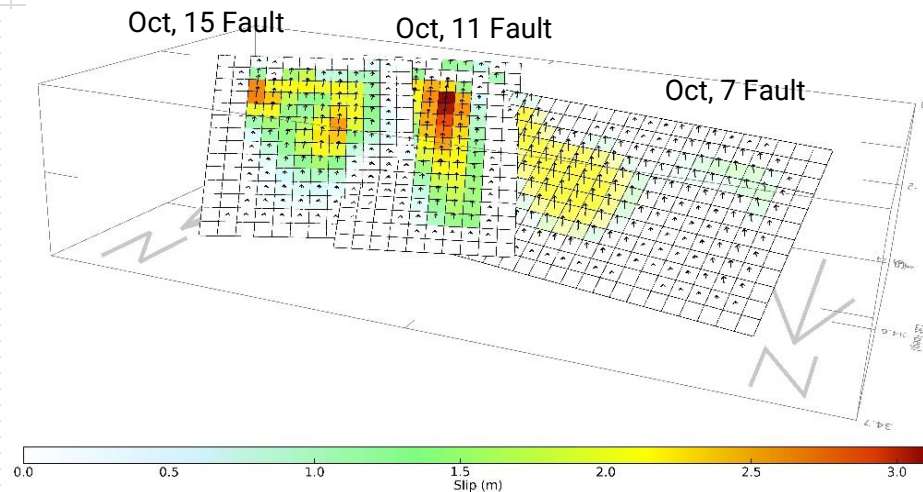
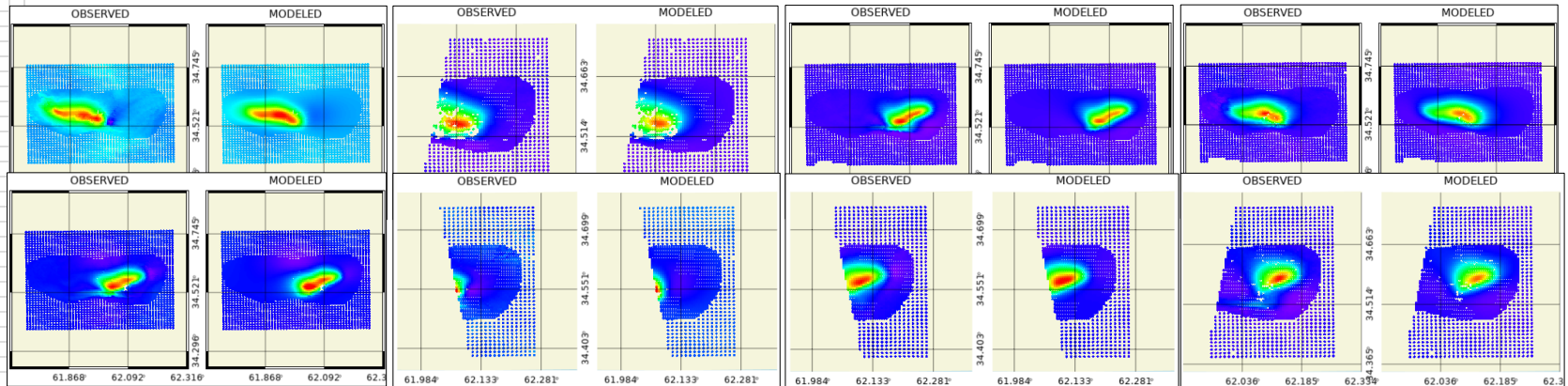
Test case: the 2023 Afghanistan sequences



With the *match event occurring times with dataset acquisition times* option (for Non-Linear and Linear inversions) the algorithm, in the simultaneous joint inversion, ensures that only the sources of events that occurred within the specific time interval contribute to the modeling of each individual dataset.

New features (6.3.0)

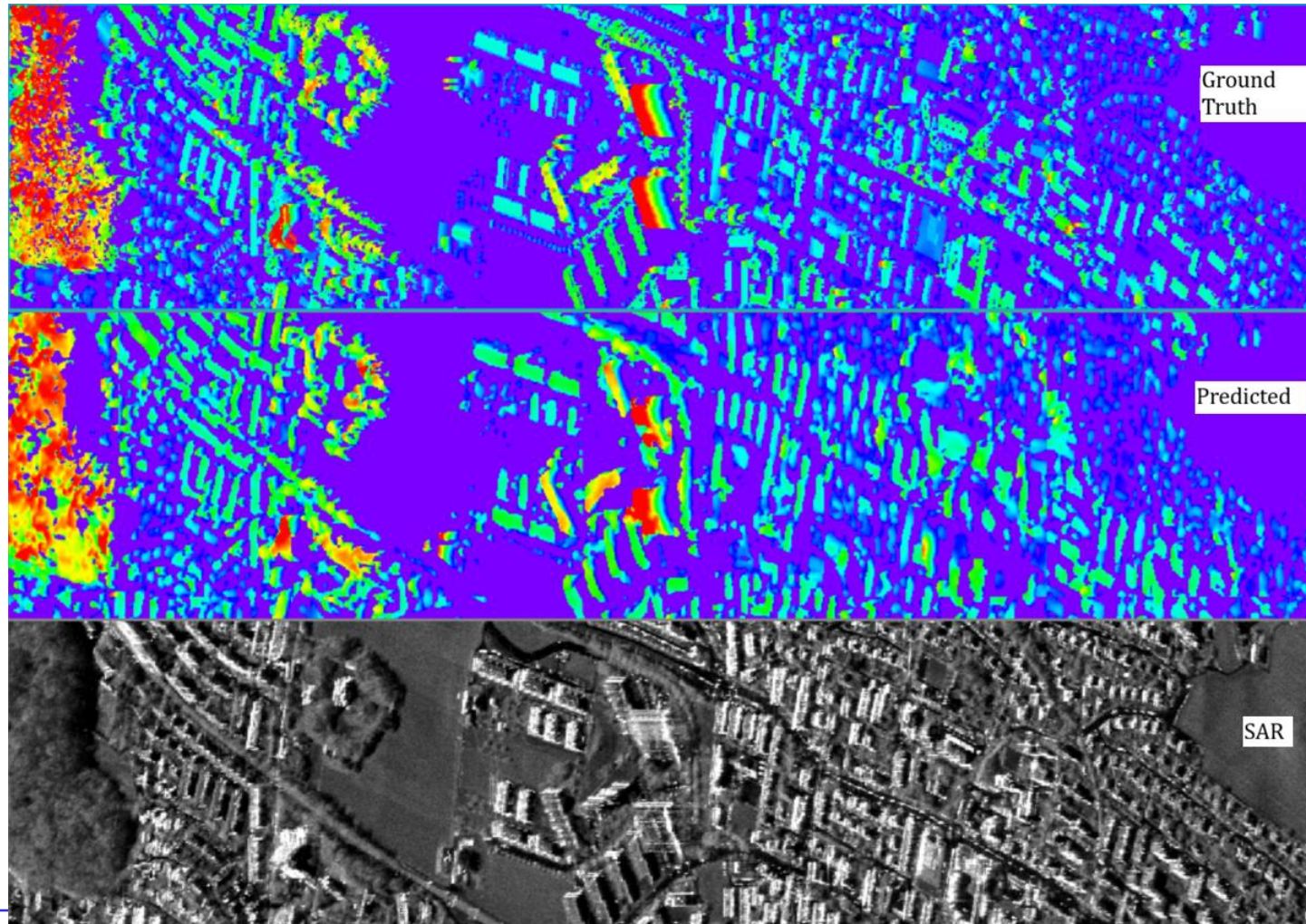
Multitemporal displacement modelling



Joint inversion of 8 InSAR datasets with 3 sources: this new option makes it possible to correctly reconstruct the contributions of each seismic source by fully exploiting the informational content of the data in a single inversion.

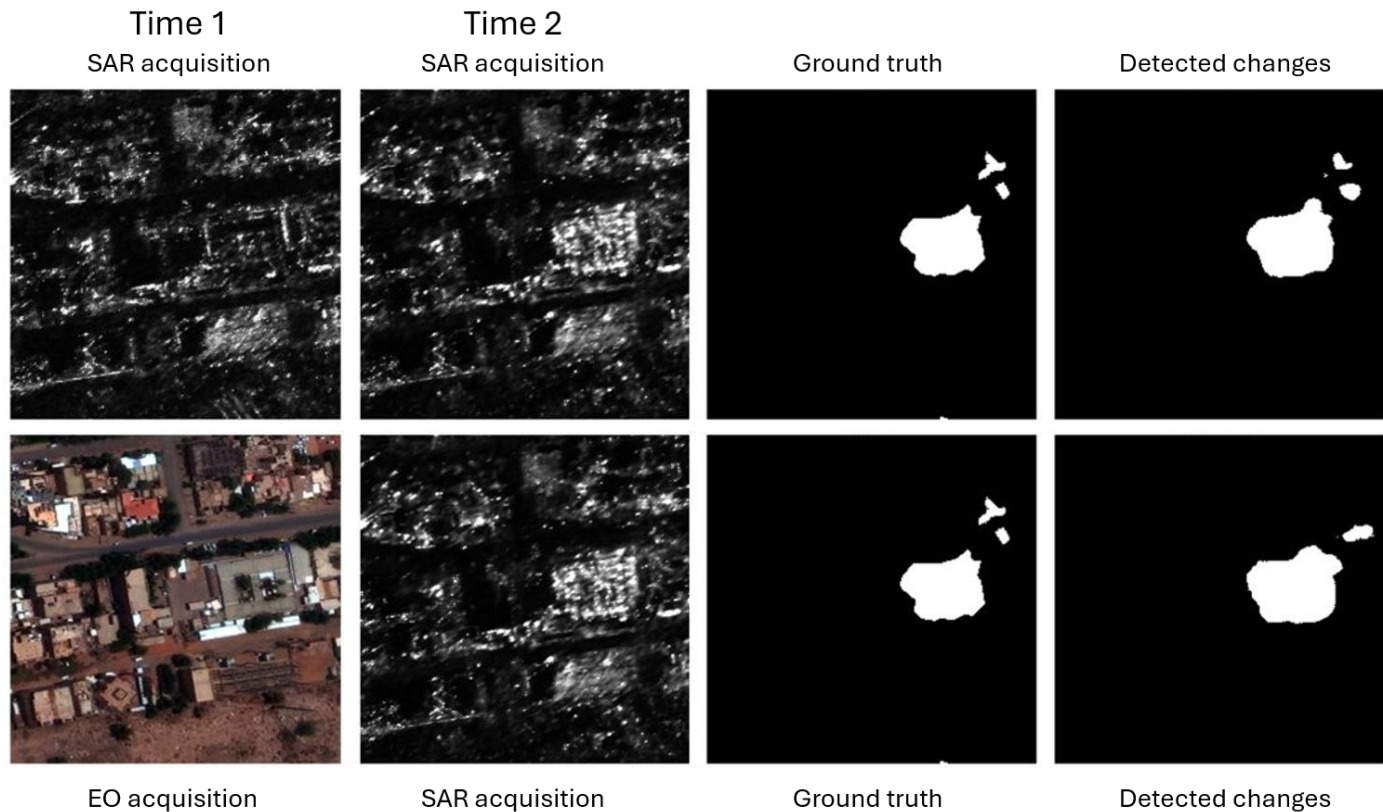
New features (6.3.0)

Building height estimation from single SAR images

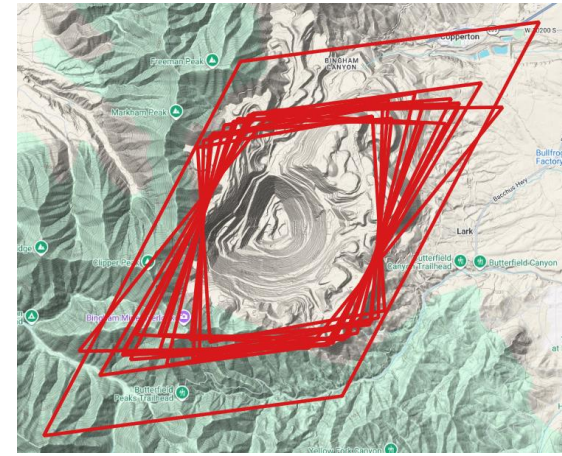
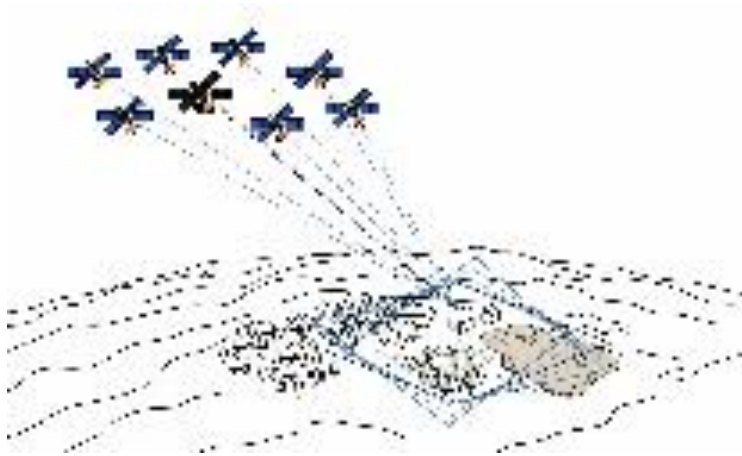


Visual Foundation Models - EO vs. SAR Change Detection

Comparable
results achievable
with SAR – SAR
and EO – SAR
combinations
exploiting **V**isual
Foundation
Models

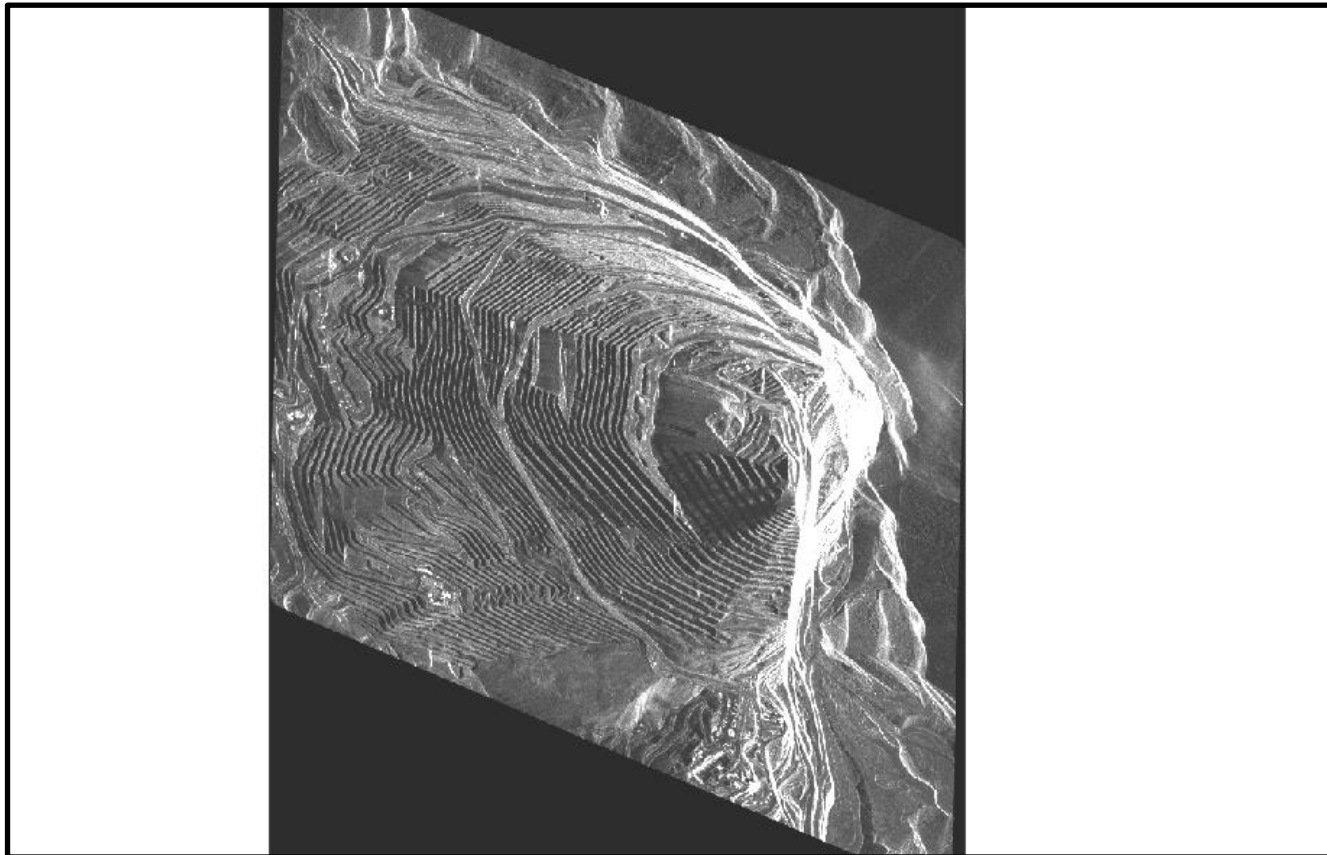


Multi-stereo

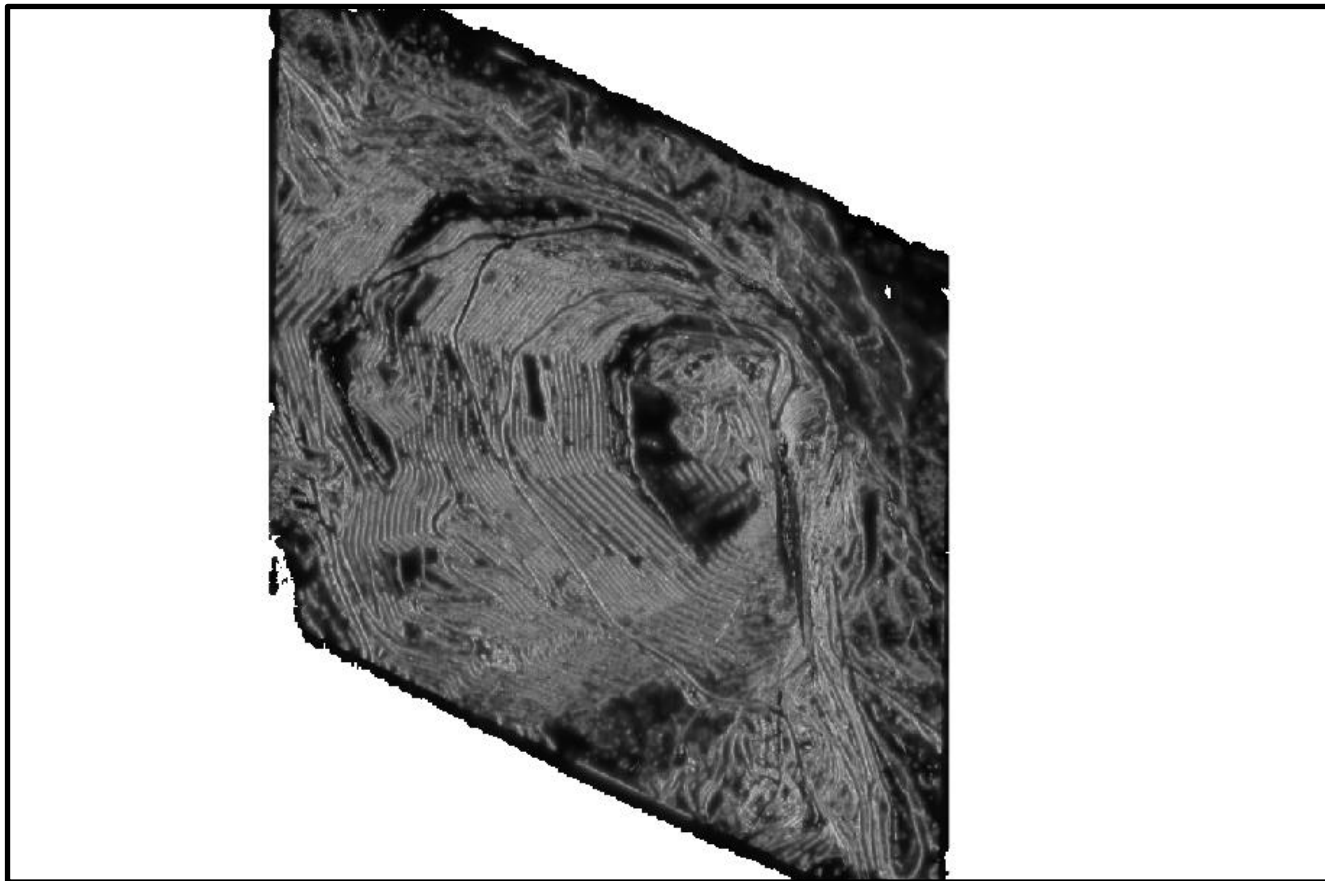


Exploiting multi-angle acquisitions to achieve
high height sensitivity and
robust matching

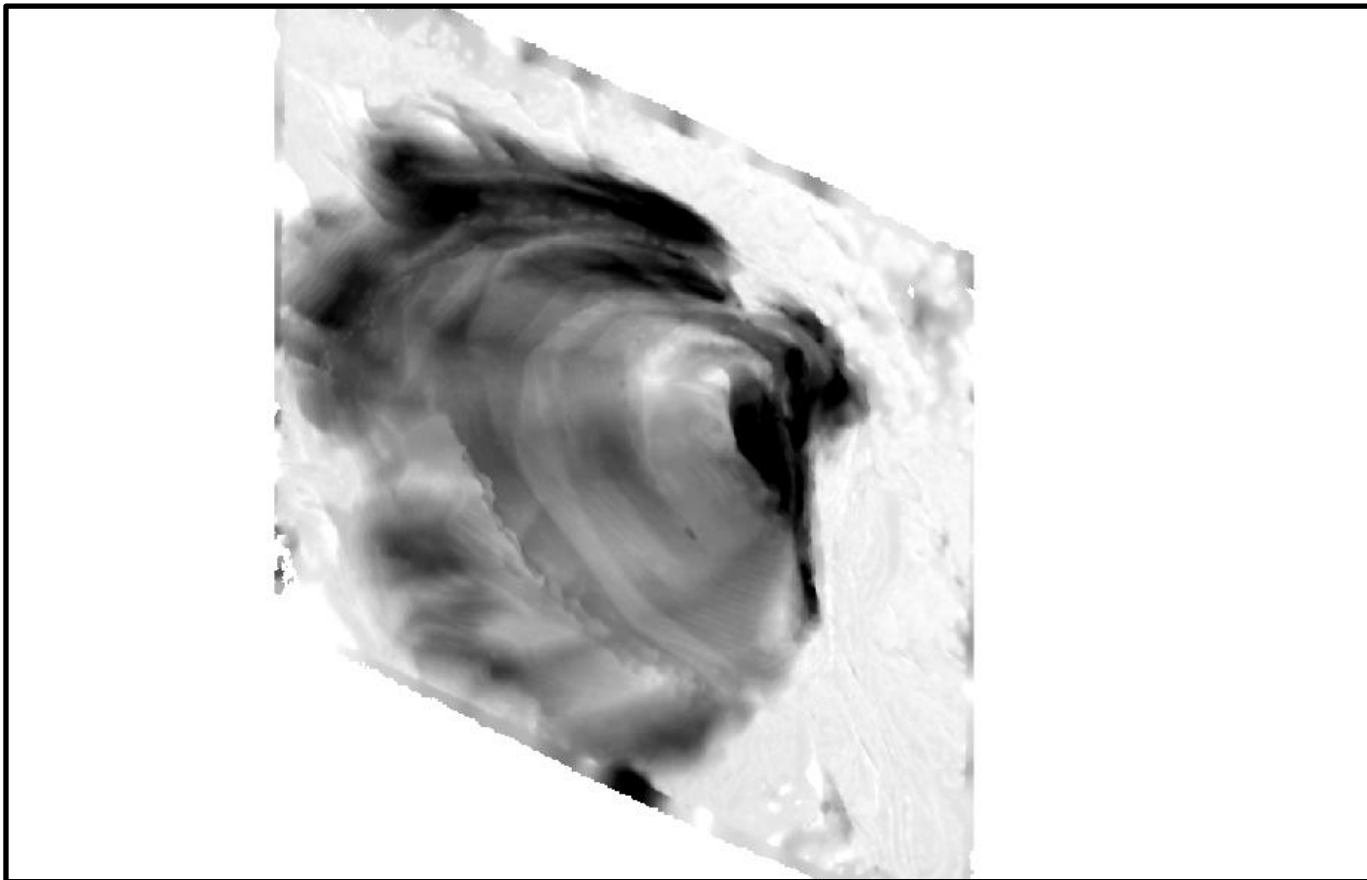
Bingham copper Mine: amplitude



Bingham copper Mine: overall cross-correlation



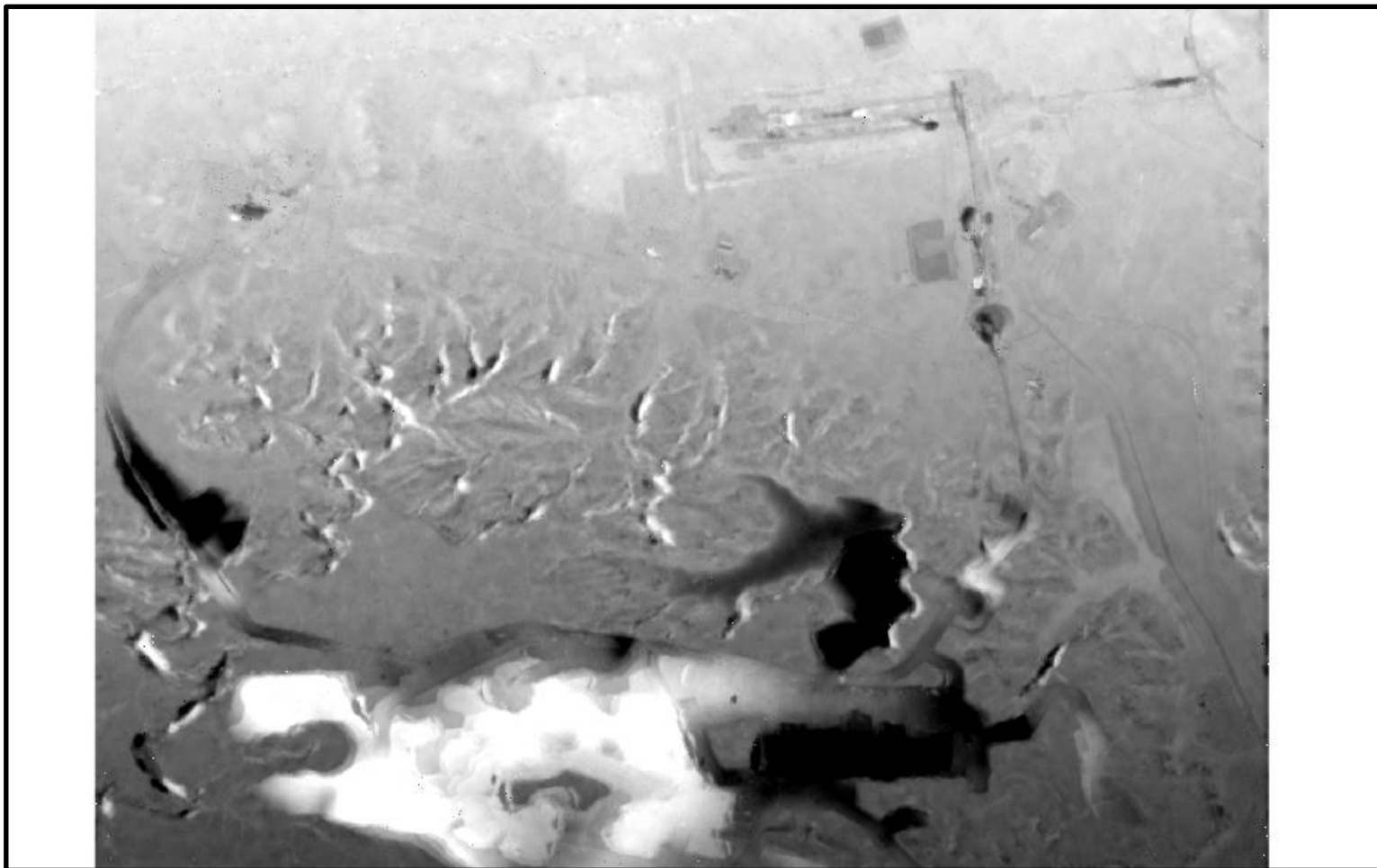
Bingham copper Mine: residual height



West Angelas Mine: residual height SARscape 6.3.1



West Angelas Mine: residual height SARscape 6.4.0



どうもありがとうございます!