



NASA CSDA Program Vendor Focus

February 19, 2025

Today's Presenters from Airbus:

Jen Kennedy
Peter Barren
John Collins



Pléiades Neo 30cm image Sydney, Australia

AIRBUS

Welcome!

Poll: Where is this?

A: North Island, New Zealand

B: Sumatra, Indonesia

C: Hawaii, USA

D: Honshu, Japan



TerraSAR-X Wide ScanSAR image and SPOT 6 image

AIRBUS

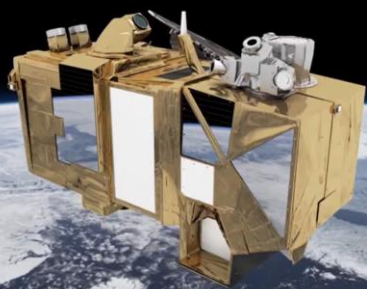
The Airbus you know...



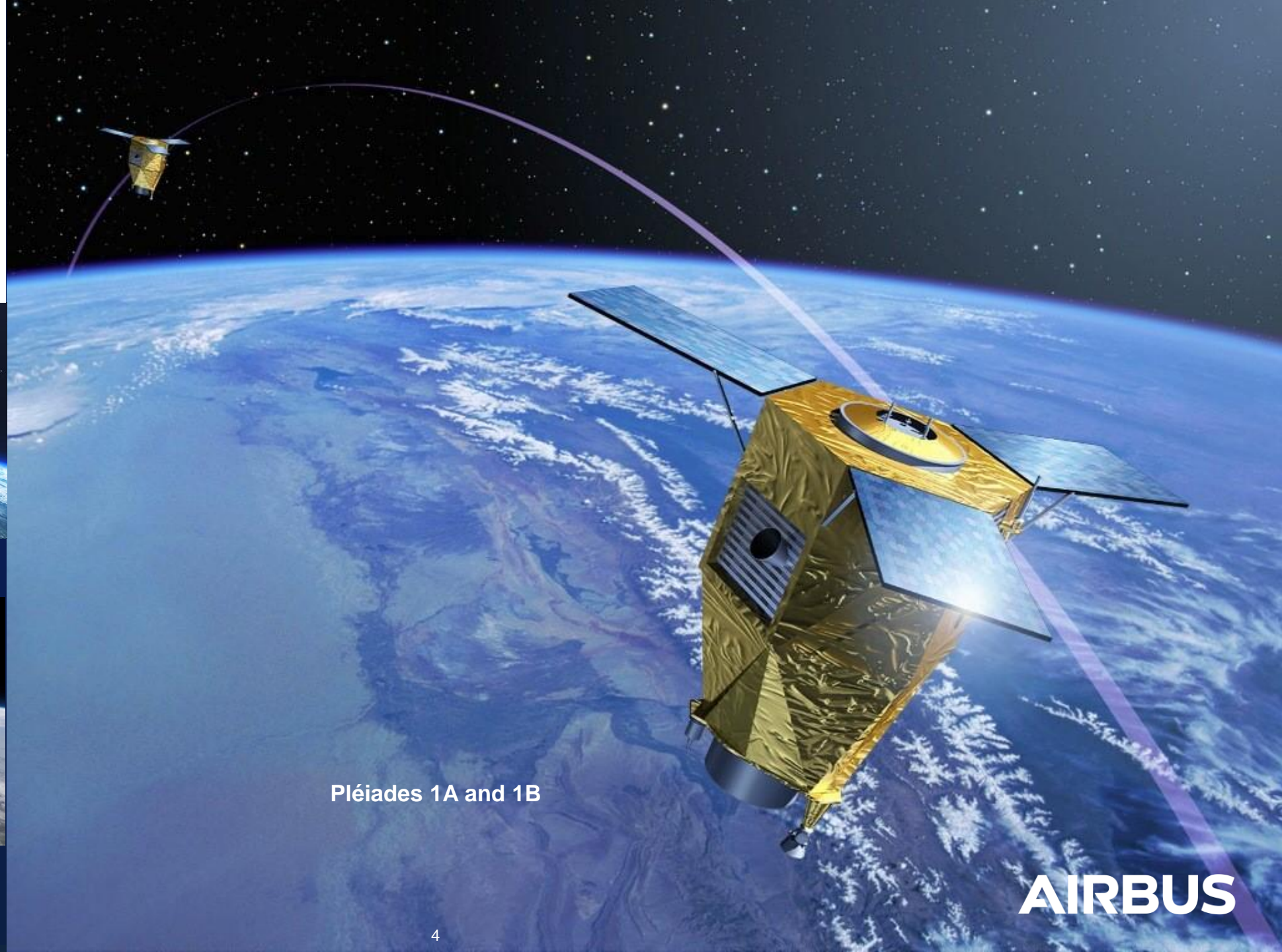
The Airbus you *might* not know...



Galileo Second Generation



Sentinel 2



Pléiades 1A and 1B

AIRBUS

Over 40 Years of Remote Sensing



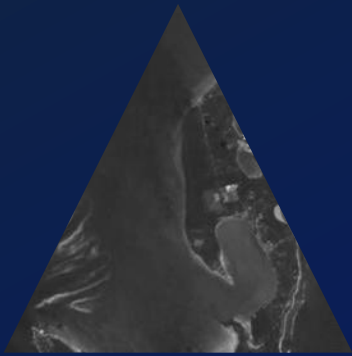
Corporate History



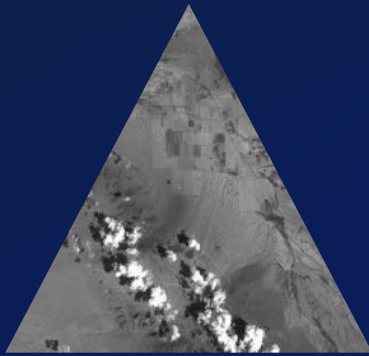
Airbus: Your Trusted Partner for Geospatial Products and Services

Our Mission: Protect people, make the Earth and Space more sustainable, and support our customers by responding to their challenges with greater speed and higher certainty.

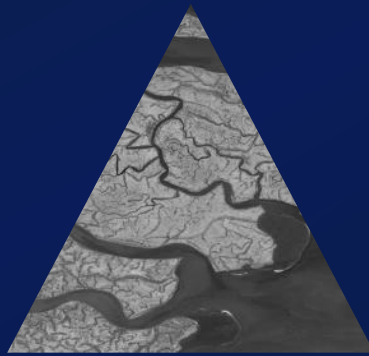
Commercial Remote Sensing Launch Timeline



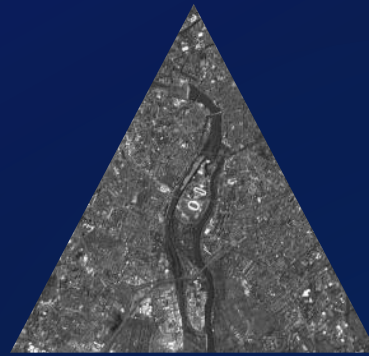
1986
SPOT 1



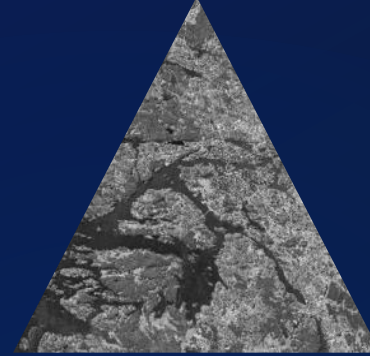
1990
SPOT 2



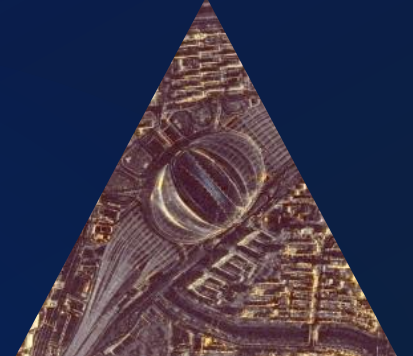
1993
SPOT 3



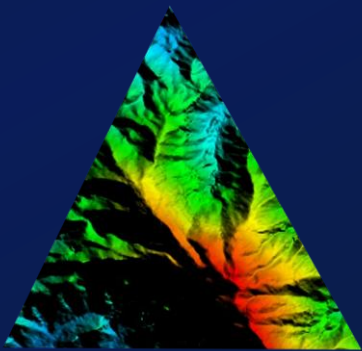
1998
SPOT 4



2002
SPOT 5



2007
TerraSAR-X



2010
TanDEM-X



2011
Pléiades 1A



2012
Pléiades 1B &
SPOT 6



2014
SPOT 7



2018
PAZ



2021
Pléiades Neo 3 & 4

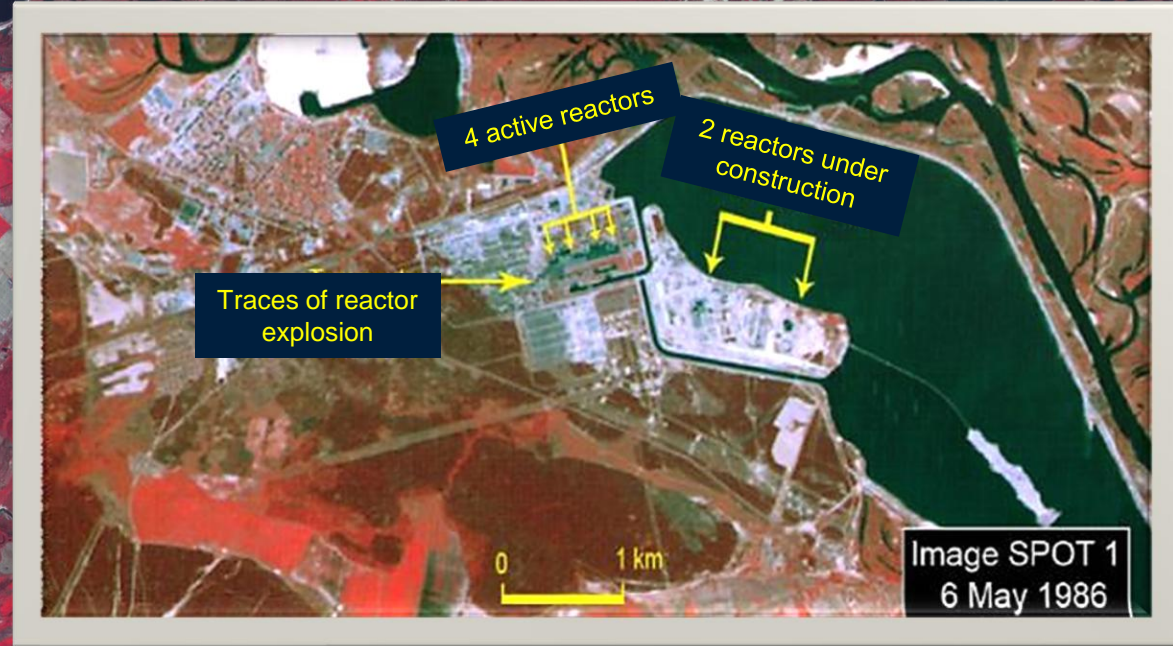
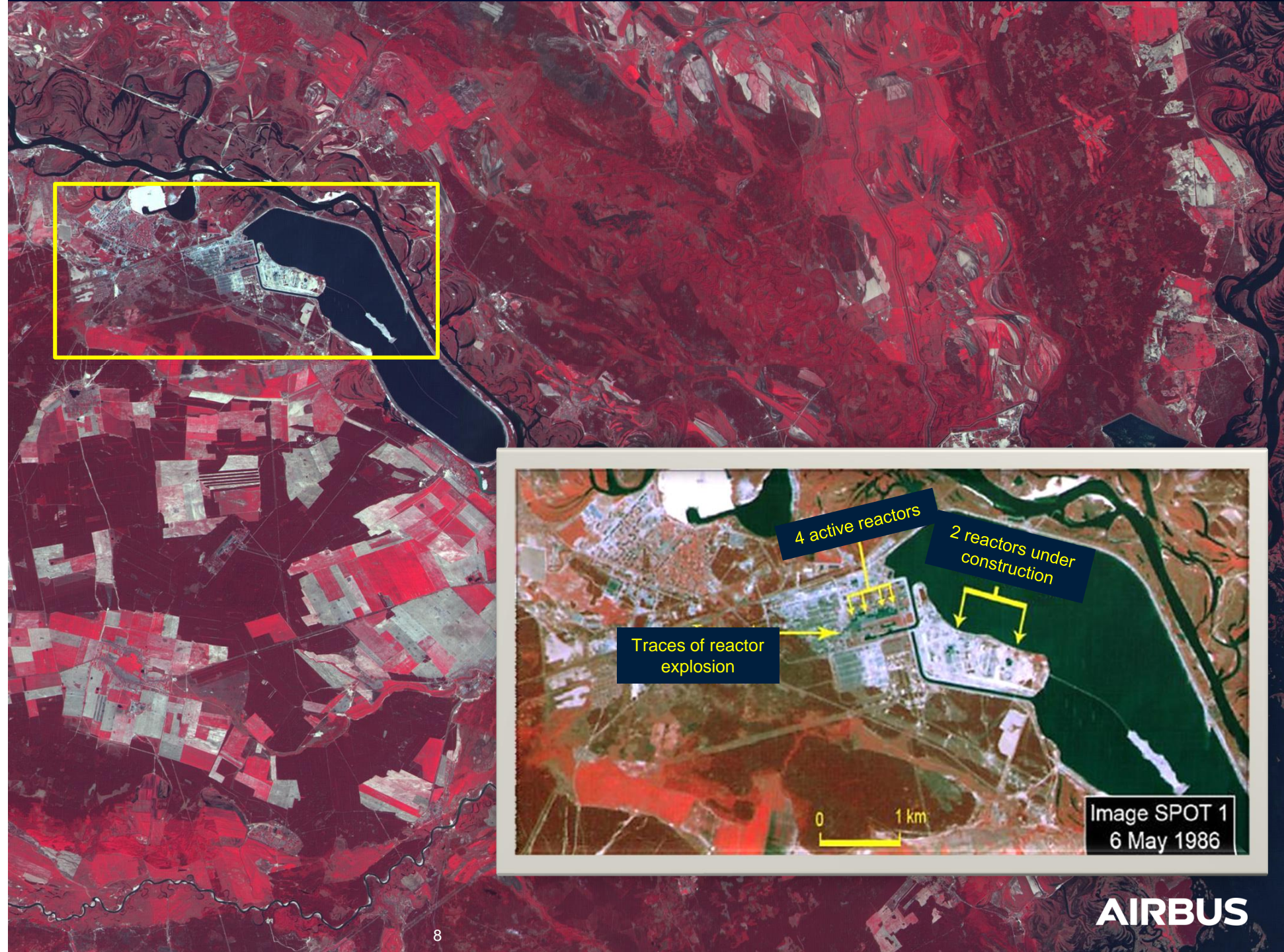
Chernobyl Over the Years

SPOT 1 20m Resolution

The first commercial satellite images of the Chernobyl disaster - May 1986



Explosion Aftermath –
Helicopter View – 1986



Chernobyl Over the Years

Pléiades Neo
30cm Resolution

The full extent of the
Chernobyl reactor building -
May 2022



Building the New Safe
Confinement

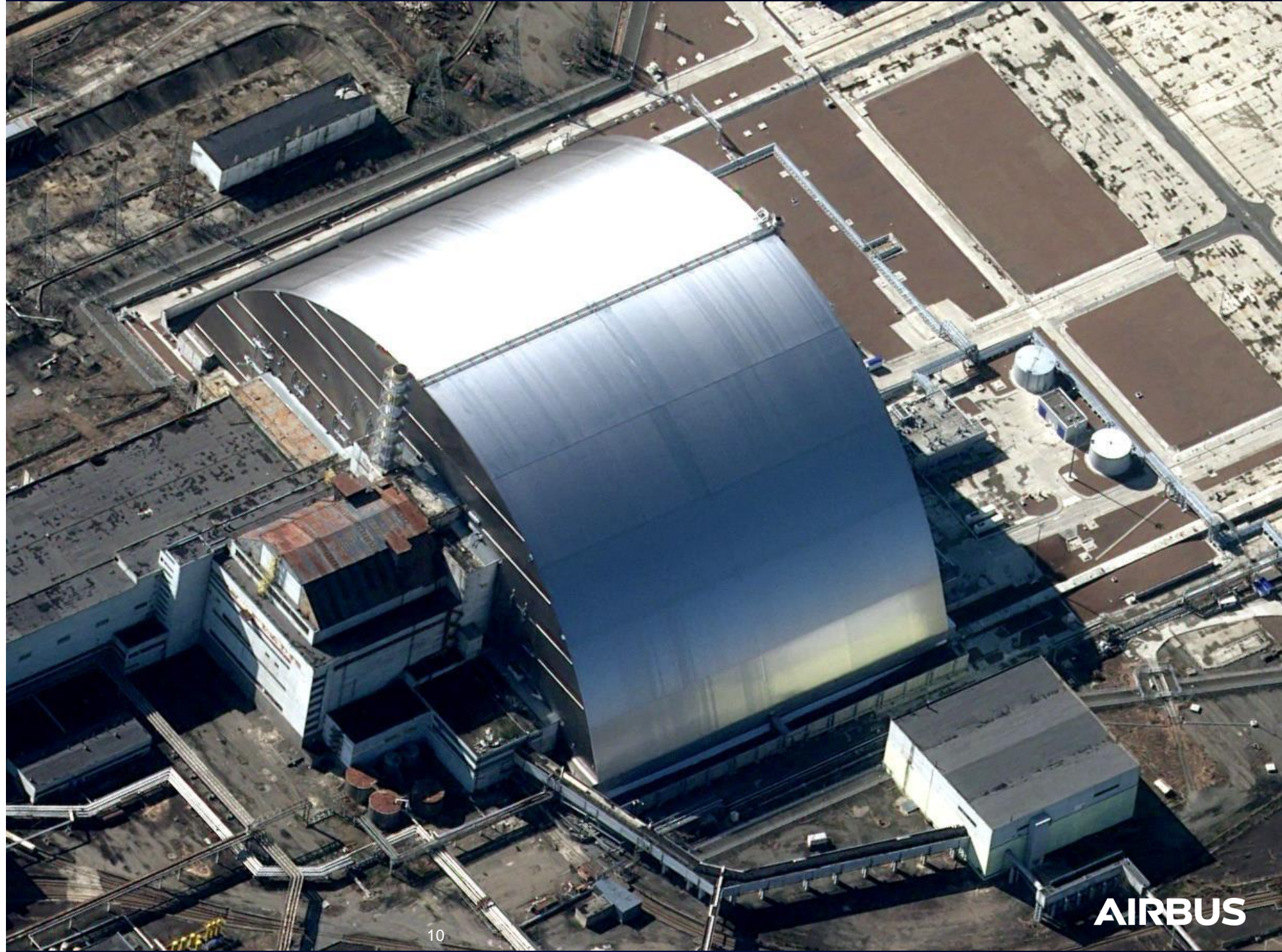


Chernobyl Over the Years

Pléiades Neo HD15

High Definition 15cm
image product

Detail of the New Safe
Confinement building,
covering the damaged
Reactor #2 - May 2022



Airbus' CSDA Product Catalog

Optical

Radar

Sensors

- Pléiades Neo – 30cm & HD15 (High Definition 15cm)
- Pléiades – 50cm
- SPOT – 1.5m & 6m (Multispectral only)

Archive

- Mono / Stereo / Tri-Stereo

Tasking

- OnePlan
 - All satellites/modes
- OnePlan Monitoring
 - Pléiades & SPOT* / Mono only
- OneDay
 - All satellites/Mono only

Elevation Products

- Elevation 0.5 DSM
- Elevation 1 DSM & DTM
- Elevation 4 DSM & DTM

**SPOT1.5m Only*

Sensors

- TerraSAR-X
- TanDEM-X
- PAZ

Archive

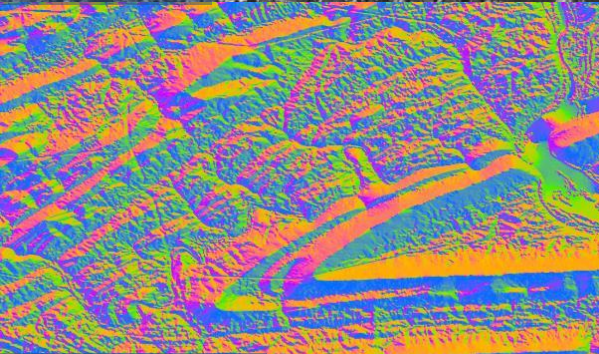
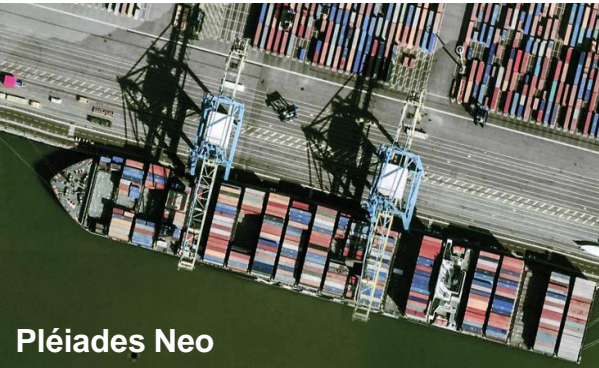
- Modes: ST, HS, SL, SM, SC, WSC

Tasking

- All Radar modes
- InSAR (Interferometric data stacks) ST, HS, SL, SM
- Maritime Monitoring Data Stacks: All Radar modes

Elevation Products

- WorldDEM Neo DSM & DTM
- WorldDEM DSM & DTM
- Ground Control Point (GCP) Packages



Poll: What type of Airbus satellite imagery/data would you most likely request for your current or future research?

A: Optical imagery

B: Radar imagery

C: SAR interferometry data

D: Digital Elevation Models (DSMs or DTMs)

TerraSAR-X Stripmap 3m image
Pléiades Neo 30cm image
WorldDEM Neo DSM

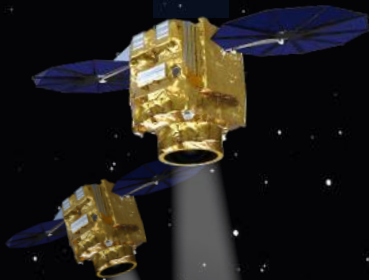
Grindavik, Iceland

AIRBUS

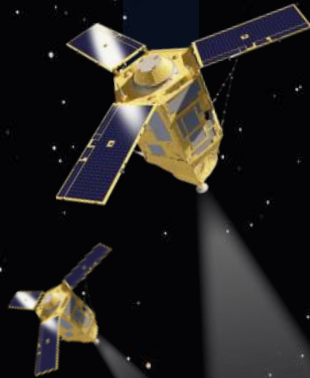
Airbus' Current Earth Observation Constellations

OPTICAL CONSTELLATION

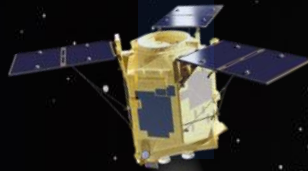
Pléiades Neo
0.3m



Pléiades
0.5m

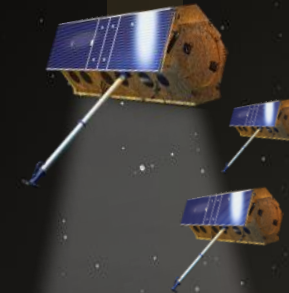


SPOT
1.5m

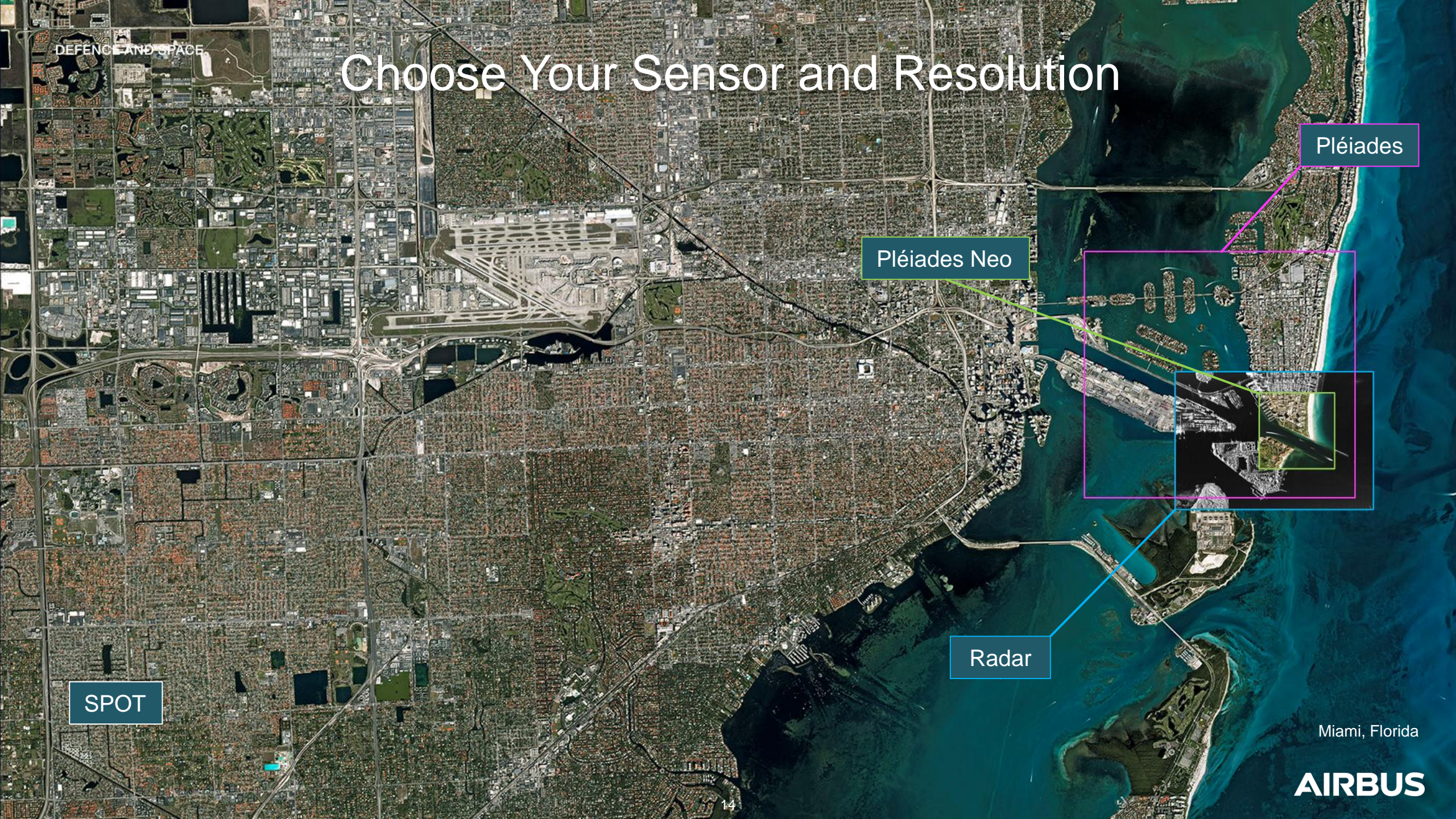


RADAR CONSTELLATION

TerraSAR-X / TanDEM-X / PAZ
0.25m to 40m



Choose Your Sensor and Resolution



Pléiades

Pléiades Neo

Radar

SPOT

Miami, Florida

Airbus Imagery



SPOT

1.5m
RESOLUTION

Radar Constellation

0.25m to 40m
RESOLUTION

Pléiades

0.5m
RESOLUTION

Pléiades Neo

0.3m
RESOLUTION

Pléiades Neo HD15

0.15m
RESAMPLING

AIRBUS

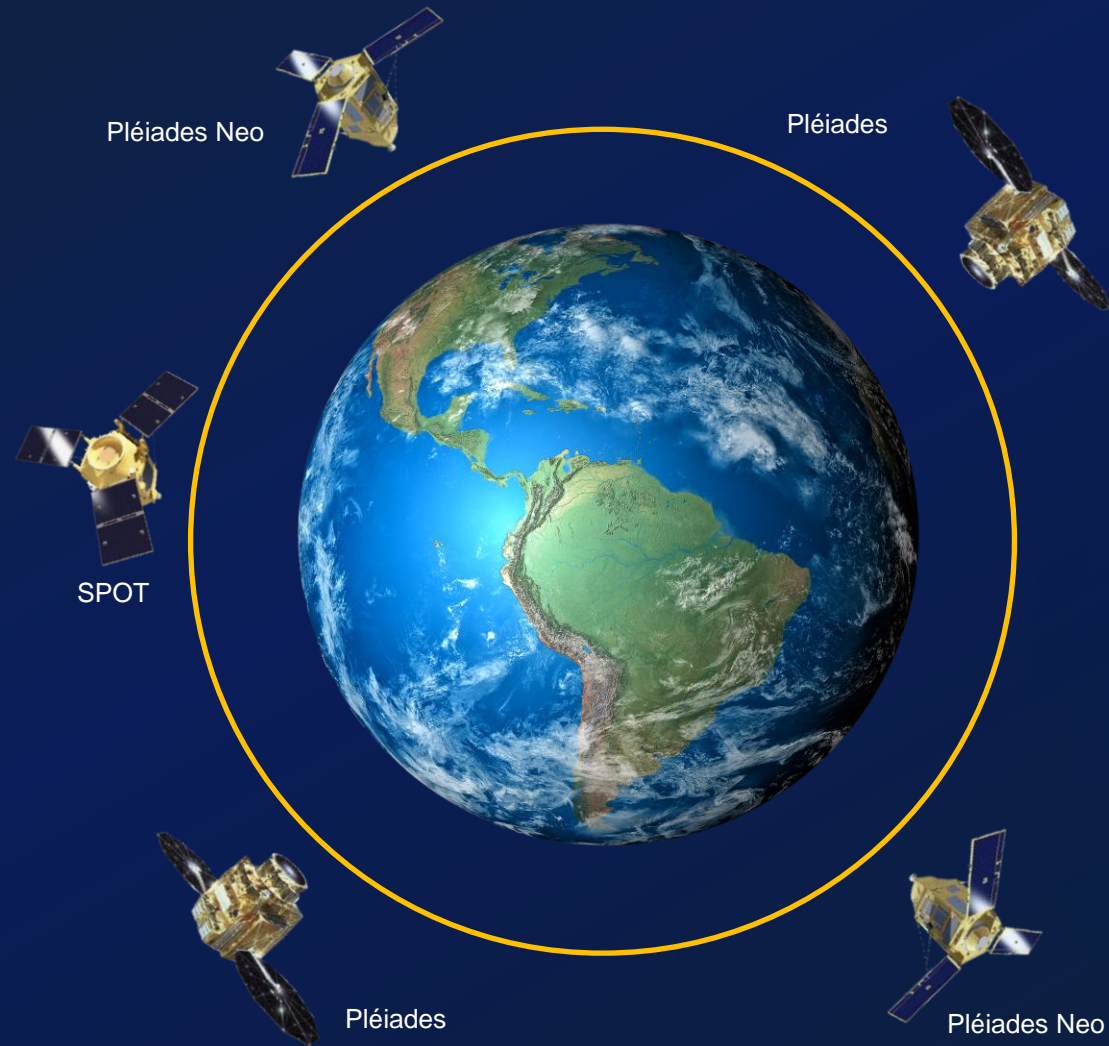


Optical Constellation & Imagery

Golden Gate Bridge San Francisco, CA
Pléiades Neo 30cm image

AIRBUS

Optical Satellite Constellation



	SPOT	Pléiades	Pléiades Neo
Active Satellites	1	2	2
Resolution	Panchromatic: 1.5m Multispectral: 6m	Panchromatic: 0.5m Multispectral: 2m	Panchromatic: 0.3m Multispectral: 1.2m
Global Revisit	1 to 3 days	Daily	Daily
Altitude	694km	694km	620km
Local Access Time	10:00am	10:30am	10:30am
Orbit	Sun-synchronous		
Acquisition Capacity	Up to 3M km ² /day (~500 images /day)	Up to 1M km ² day (~1000 images /day)	Up to 1M km ² /day (~1000 images /day)
Archive	>14,400,000,000 km ²	>2,000,000,000 km ²	>426,000,000 km ²

SPOT 6 & 7

Technical Specifications

[Link: SPOT User Guide](#)

SPOT	
Active Satellites	1
Resolution	Panchromatic: 1.5m Multispectral: 6m
Swath	60 km at Nadir
Location Accuracy CE90	15m
Viewing Angle	-45° to +45°
Imaging Modes	Mono, stereo, tri-stereo
Image Depth	12 bits
Spectral Bands (in nm)	Pan: 455-744 Blue: 454-519 Green: 527-587 Red: 624-694 NIR: 756-880
Products	Pan 1.5m (1 band) Pansharpened 1.5m (3 or 4 bands) Multispectral 6m (4 bands) Bundle: Pan 1.5m + MS 6m (4 bands)

Pléiades

Technical Specifications

[Link: Pléiades User Guide](#)

Pléiades	
Active Satellites	2
Resolution	Panchromatic: 0.5m Multispectral: 2m
Swath	20 km at Nadir
Location Accuracy CE90	6.5m
Viewing Angle	-45° to +45°
Imaging Modes	Mono, stereo, tri-stereo
Image Depth	12 bits
Spectral Bands (in nm)	Pan: 470-830 Blue: 430-550 Green: 500-620 Red: 590-710 NIR: 740-940
Products	Pan 0.5m (1 band) Pansharpened 0.5m (3 or 4 bands) Multispectral 2m (4 bands) Bundle: Pan 0.5m + MS 2m (4 bands)

Pléiades Neo

Technical Specifications

[Link: Pléiades Neo User Guide](#)

Pléiades Neo	
Active Satellites	2
Resolution	Panchromatic: 0.3m Multispectral: 1.2m
Swath	14 km at Nadir
Location Accuracy CE90	3.5m
Viewing Angle	-45° to +45°
Imaging Modes	Mono, stereo, tri-stereo
Image Depth	12 bits
Spectral Bands (in nm)	Pan: 450-800 Deep Blue: 400-450 Blue: 450-520 Green: 530-590 Red: 620-690 Red Edge: 700-750 NIR: 770-880
Products	Pan 0.3m (1 band) Pansharpened 0.3m (3, 4 or 6 bands) Multispectral 1.2m (4 or 6 bands) Bundle: Pan 0.3m + MS 1.2m (4 or 6 bands)

Pléiades Neo 30cm NIR false color wildfire imagery over Los Angeles, CA

OneTasking Fundamentals

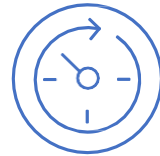
Optical Tasking Options



Singapore

ONE DAY

Specifications



Timeframe
Customer-selected day



Cloud Cover Validation
Not applicable



Incidence Angle
 $\leq 52^\circ$ by default



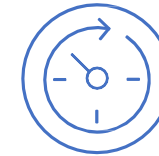
Number of acquisitions
One



Delivery
Rush

ONE PLAN

Specifications



Timeframe
Weather-dependent



Cloud Cover Validation
 $\leq 10\%$ by default



Incidence Angle
0 - 30° by default

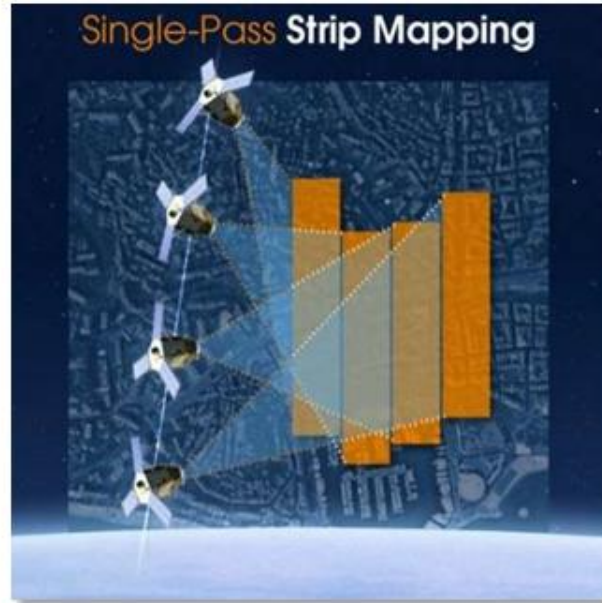


Number of acquisitions
Based on feasibility study



Delivery
Standard by default

Optical Acquisition Modes



Optical Acquisition Modes

Acquisition modes

- North / South Strips
- Target
- Stereo / Tri-Stereo

Pléiades Neo: 14km Swath

Video does not play
in PDF file

Optical Processing Options

Radiometry & Geometry

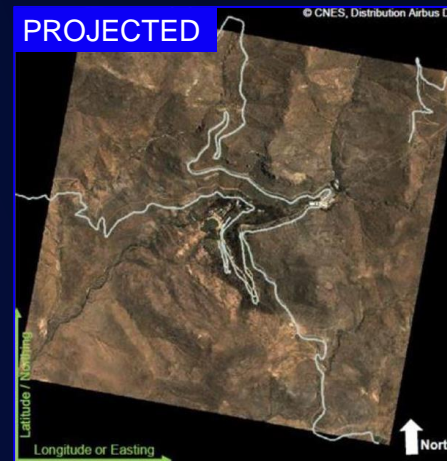


Cairo, Egypt

Geometric Processing



Perfect sensor
No cartographic projection



Georeferenced
Projection at constant altitude



Georeferenced
Projection on DEM

Radiometric Processing



8 or 12 bits depth
No atmospheric correction
Spectral applications

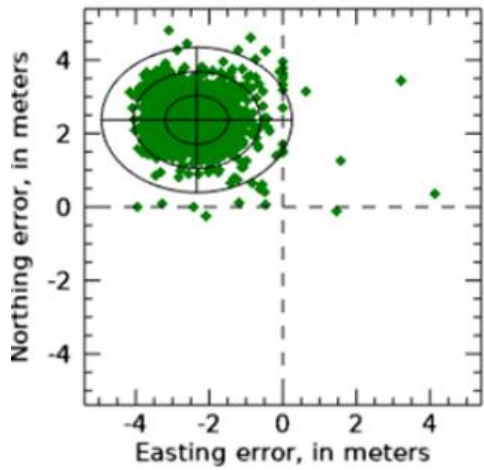


16 bits depth
Raleigh atmospheric correction
Spectral applications



8 bits depth
Raleigh atmospheric correction
Visual applications

Geolocation Accuracy of Pléiades Neo



Pléiades Neo Ortho NIR band
– Horizontal Error

[Link: USGS System Characterization Report - Pléiades Neo](#)



Pléiades Neo 30cm image
Sydney Airport, Australia

AIRBUS

Pléiades Neo HD15

Enhancing visual rendering
for geospatial applications



Statue of Liberty, New York

**Coming Soon
from Airbus**

Pléiades Neo
Constellation
Continuity



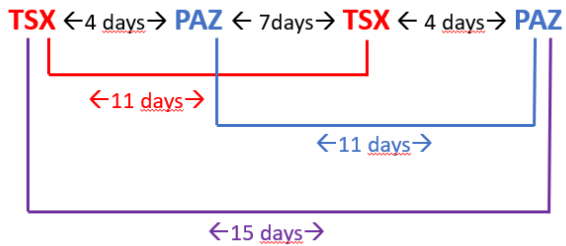
AIRBUS

A grayscale Synthetic Aperture Radar (SAR) image showing a coastal region. The image displays a large body of water on the left, a prominent bay or inlet in the center, and a river delta or estuary on the right. The land areas are textured, showing various features like roads and buildings. The water surface shows some small-scale details like waves or ice. The overall image is in grayscale, typical of SAR data.

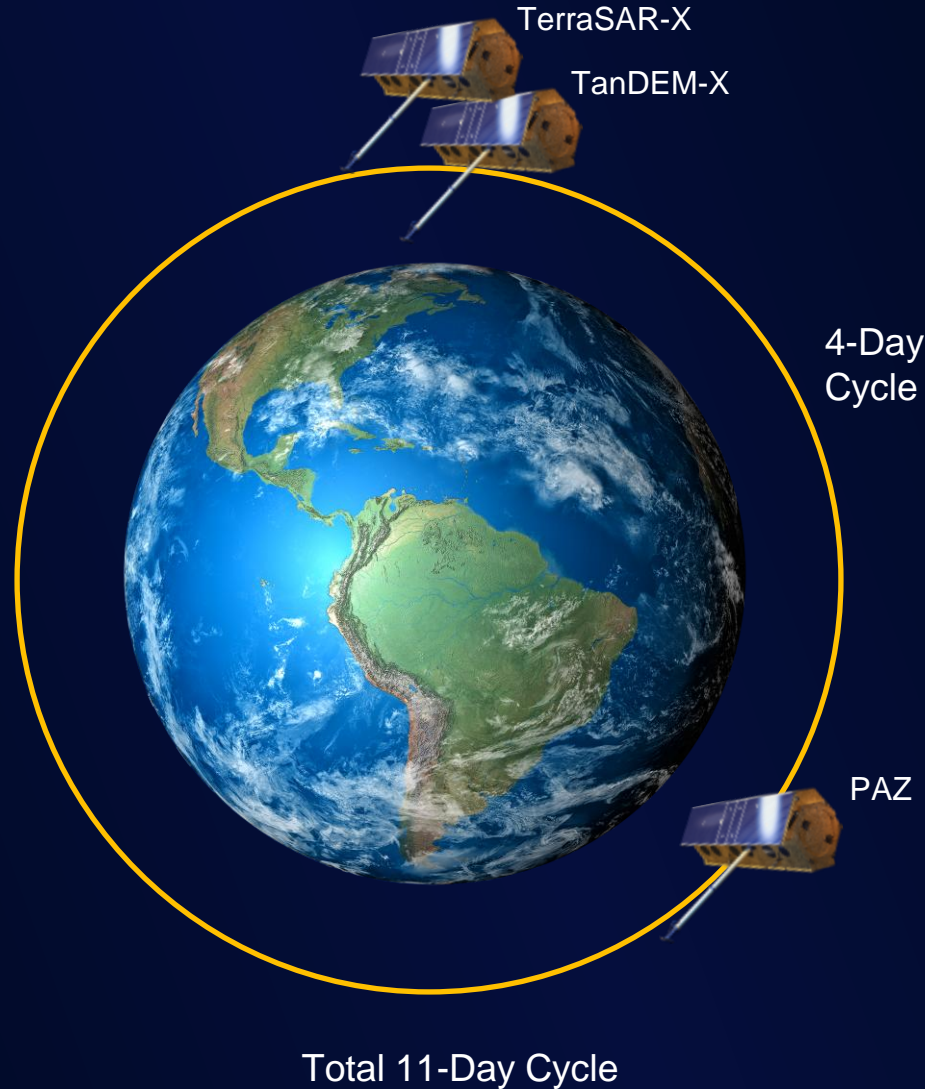
Radar Constellation and Data

Radar Constellation Fundamentals

All three SAR satellites are operationally identical



Constellation Repeat Cycle

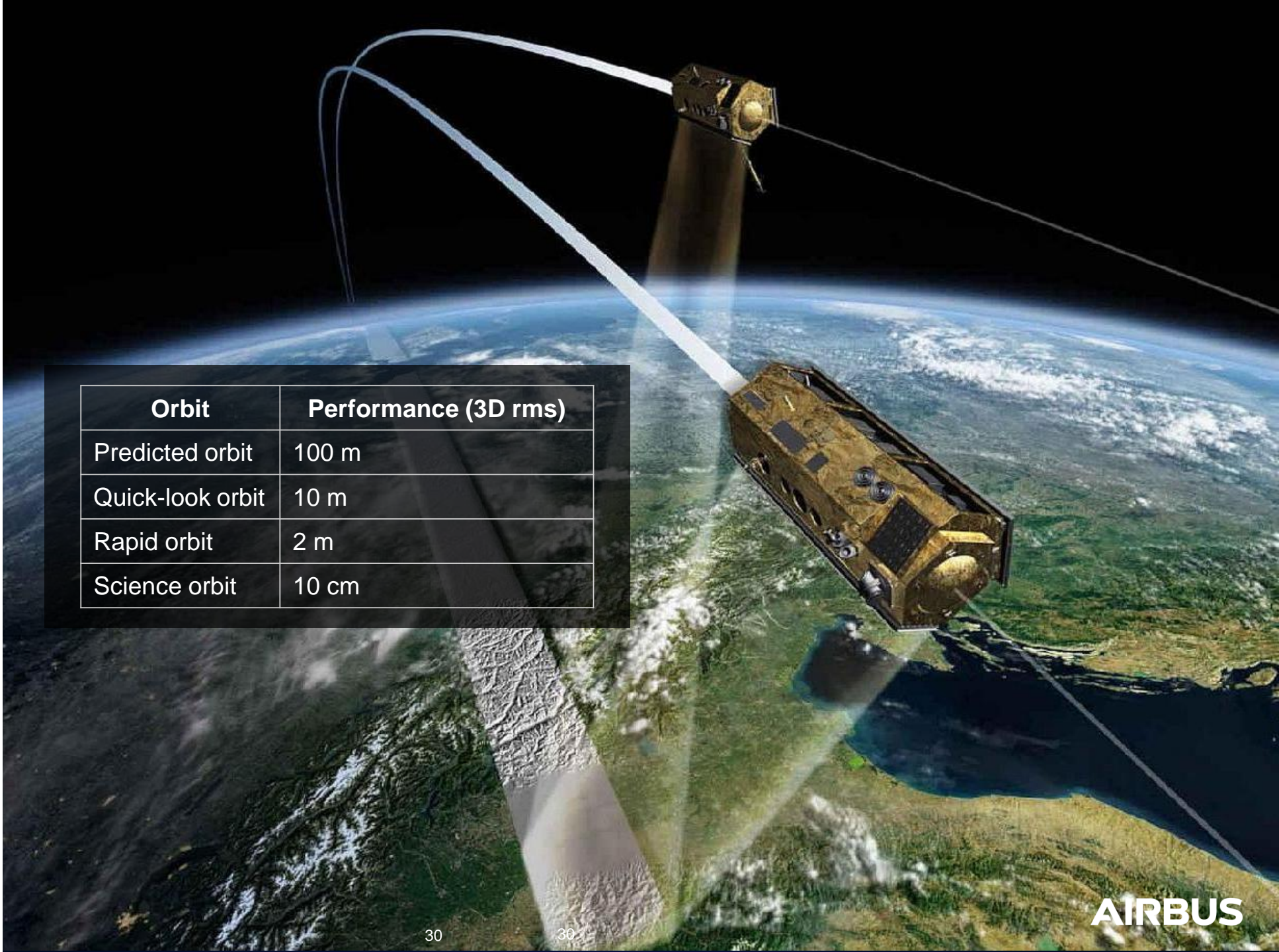


Launch Dates	TerraSAR-X: 2007 TanDEM-X: 2010 PAZ: 2018
Frequency Band	X-Band
Channel Polarization	Single, Dual
Nominal Target Revisit Time at Mid-Latitudes	1.5 days
Interferometry Repeat Cycle	4, 7 & 11 Days
Highest Resolution	0.25 m x 1.0 m
Widest Swath	270 km
Archive Coverage	Over 640,000 images All 6 collection modes since 2007

[Link: Radar Constellation Guide](#)


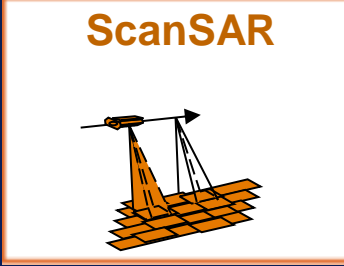
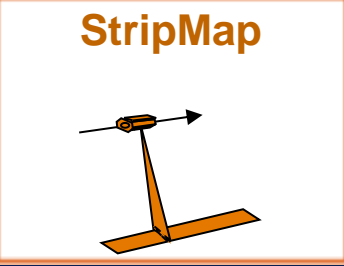



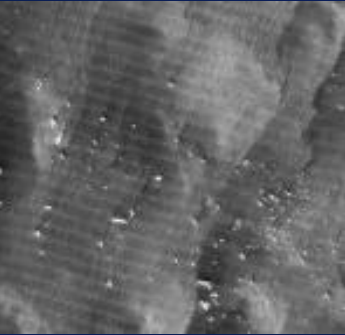


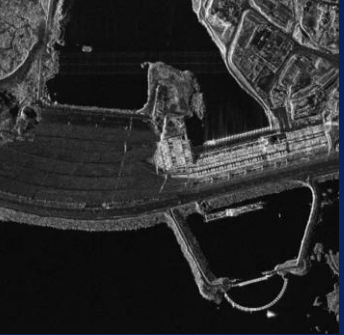


SAR Interferometry Precision

- TerraSAR-X, TanDEM-X and PAZ maintain among the **most precise orbit “tubes”** of any remote-sensing satellites
- This ensures **consistent stacks of interferometric data**
- With the *Science orbit* ephemeris information, satellite location can be as precise as **10cm** in space



Orbit	Performance (3D rms)
Predicted orbit	100 m
Quick-look orbit	10 m
Rapid orbit	2 m
Science orbit	10 cm

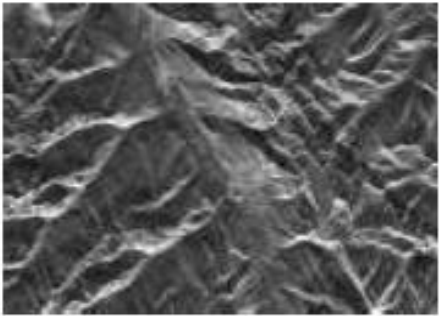
Radar Constellation: Collection Modes / Image Products

Wide ScanSAR	ScanSAR	StripMap	SpotLight	High Resolution SpotLight	Staring SpotLight
					
					
Resolution: 40m 200 - 270 x 200km	Resolution: 18m 100 x 150km	Resolution: 3m 30 x 50km	Resolution: 2m 10 x 5km	Resolution: 1m 10 x 5km	Resolution: 0.25m 4 x 3.7km or 2.5 x 7.5km

Lowest Resolution Highest Resolution

Radar Constellation: Processing Levels

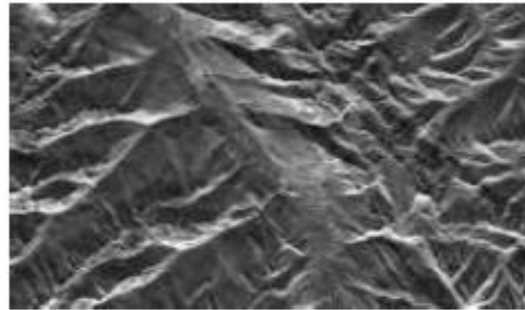
SSC



Single Look Slant Range Complex

Interpretation of small sensitive features

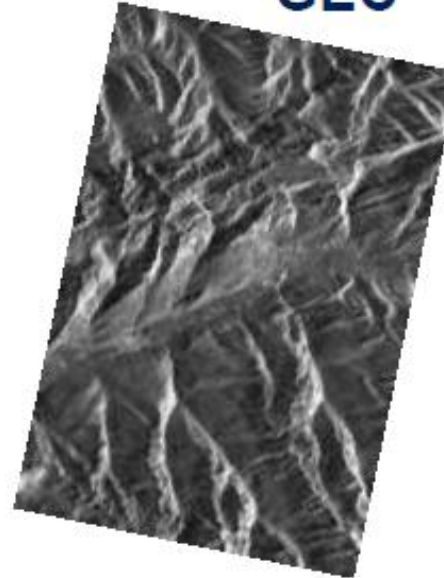
MGD



Multi Look Ground Range Detected

Fast interpretation and relative reporting

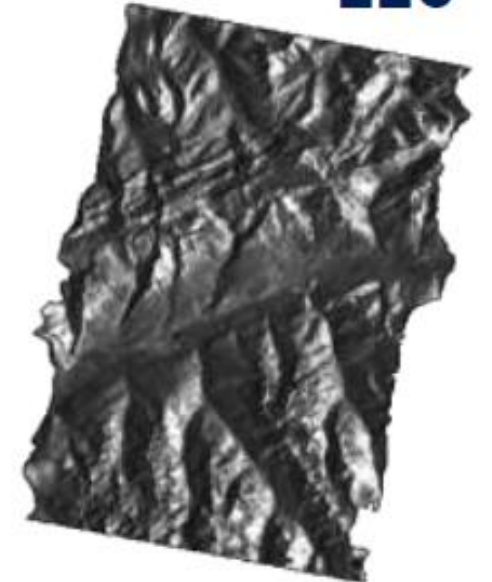
GEC



Geocoded Ellipsoid Corrected

Fast matching with relative reference data

EEC



Enhanced Ellipsoid Corrected

High spatial accuracy requirements

Least Processed

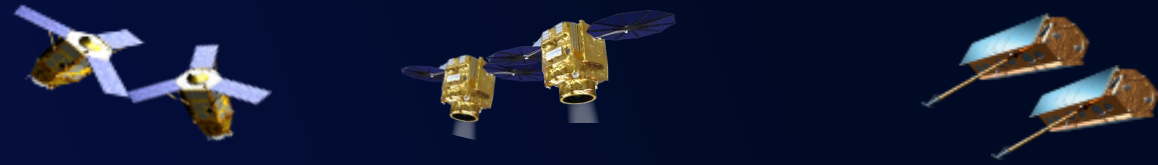
Most Processed



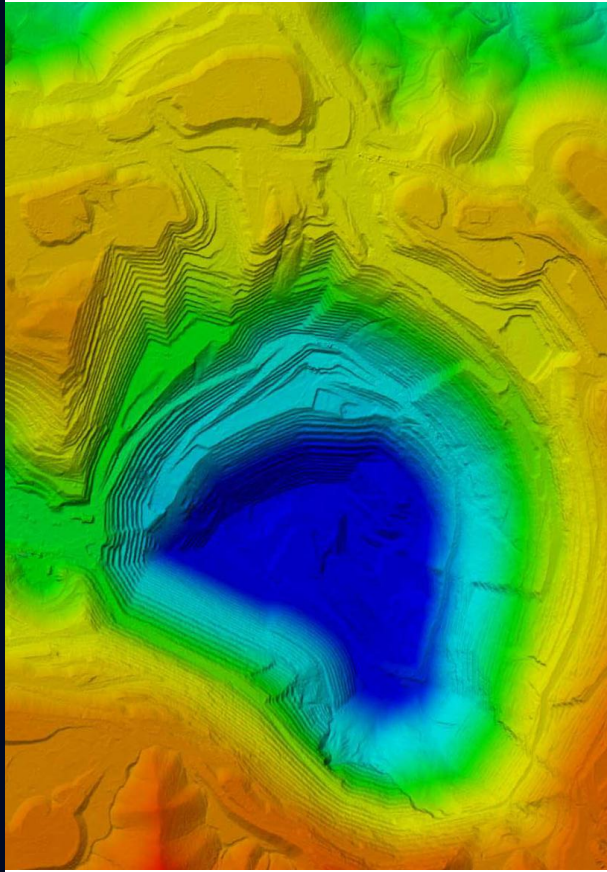
Elevation Products

Cape Town South Africa
Elevation 0.5

Elevation Data Overview



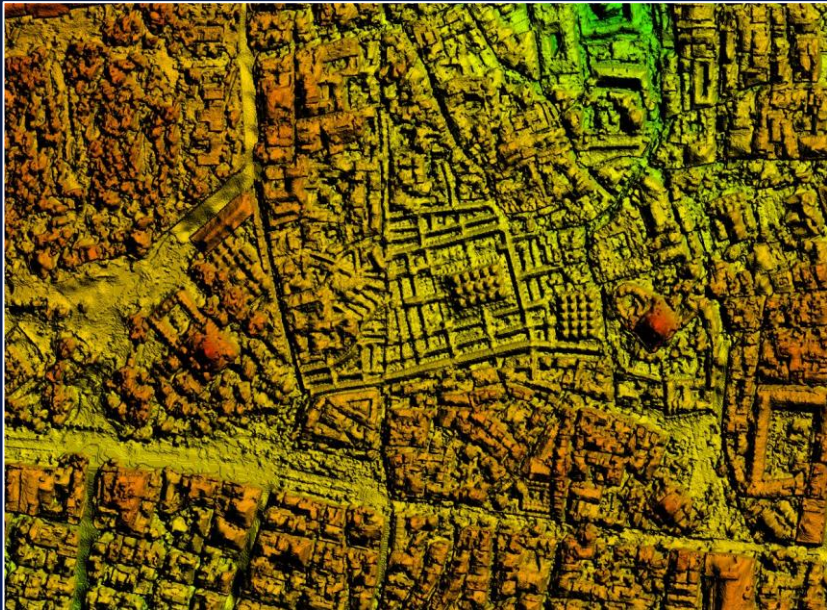
Sensor	Pléiades		Pléiades Neo	TerraSAR-X/TanDEM-X		
Product	Elevation4	Elevation1	Elevation 0.5	WorldDEM	WorldDEM Neo	GCPs
Resolution	4m	1m	0.5m	12m	5m	N/A
Accuracy (abs. vertical LE90)	1.5m	1.5m	0.5m	2.5m	1.4m	30cm to 1m
Product	DSM & DTM	DSM & DTM	DSM & DTM	DSM & DTM	DSM & DTM	GCP points
Availability	On demand	On demand	On demand	Off-the-shelf	Off-the-shelf	On demand
Up-to-date	Fresh data	Fresh data	Fresh data	2010-2014	2017-2021	Fresh data
Coverage	Local to regional	Local to regional	Local to regional	Global	Global	Global



Elevation1
Bingham Canyon, Utah

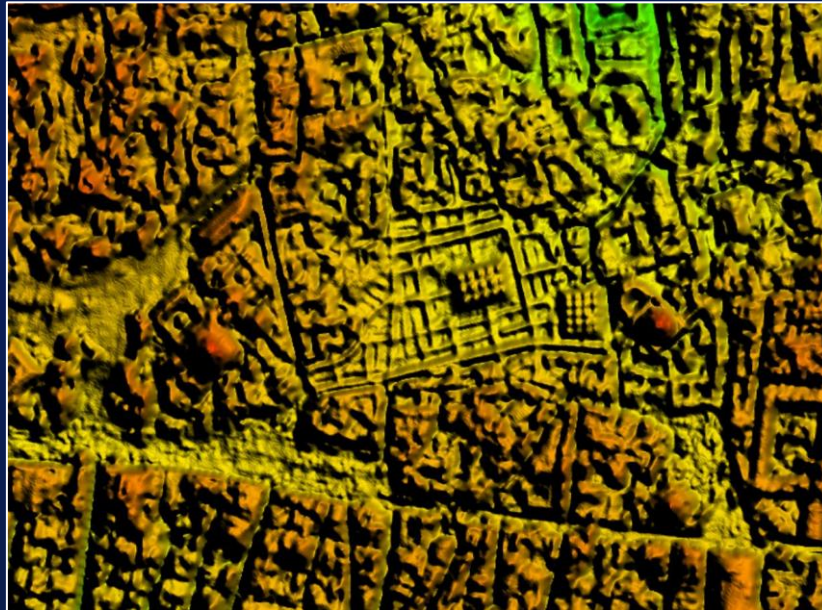
- DSM = Digital Surface Model
- DTM = Digital Terrain Model
- Off-the-shelf data is available for **immediate delivery**, or access via Portal or API
- On-demand data usually requires satellite tasking, imagery collection and **additional DSM/DTM processing**

Optical Elevation Products



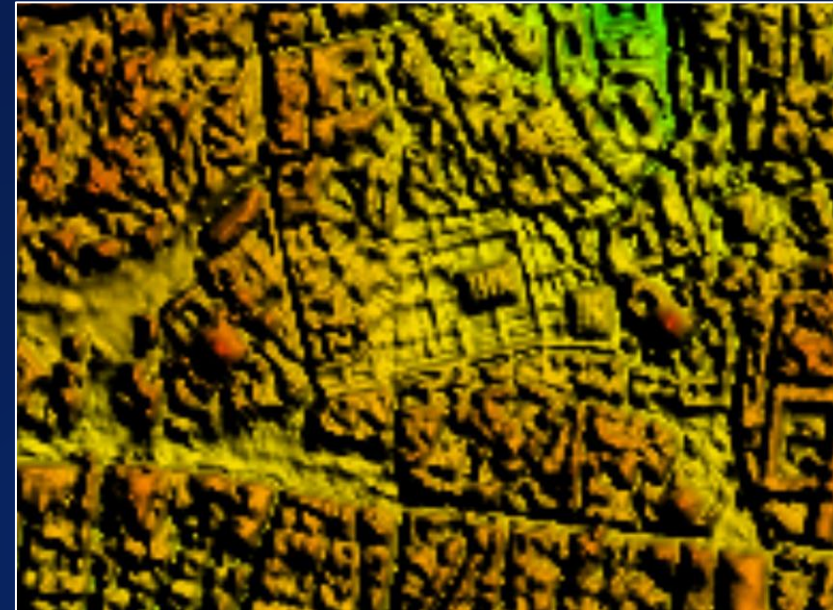
Elevation 0.5 - DSM

0.5m resolution



Elevation 1 - DSM

1m resolution

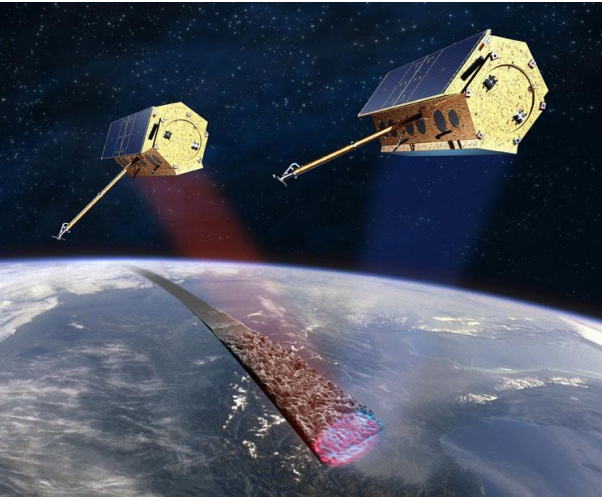


Elevation 4 - DSM

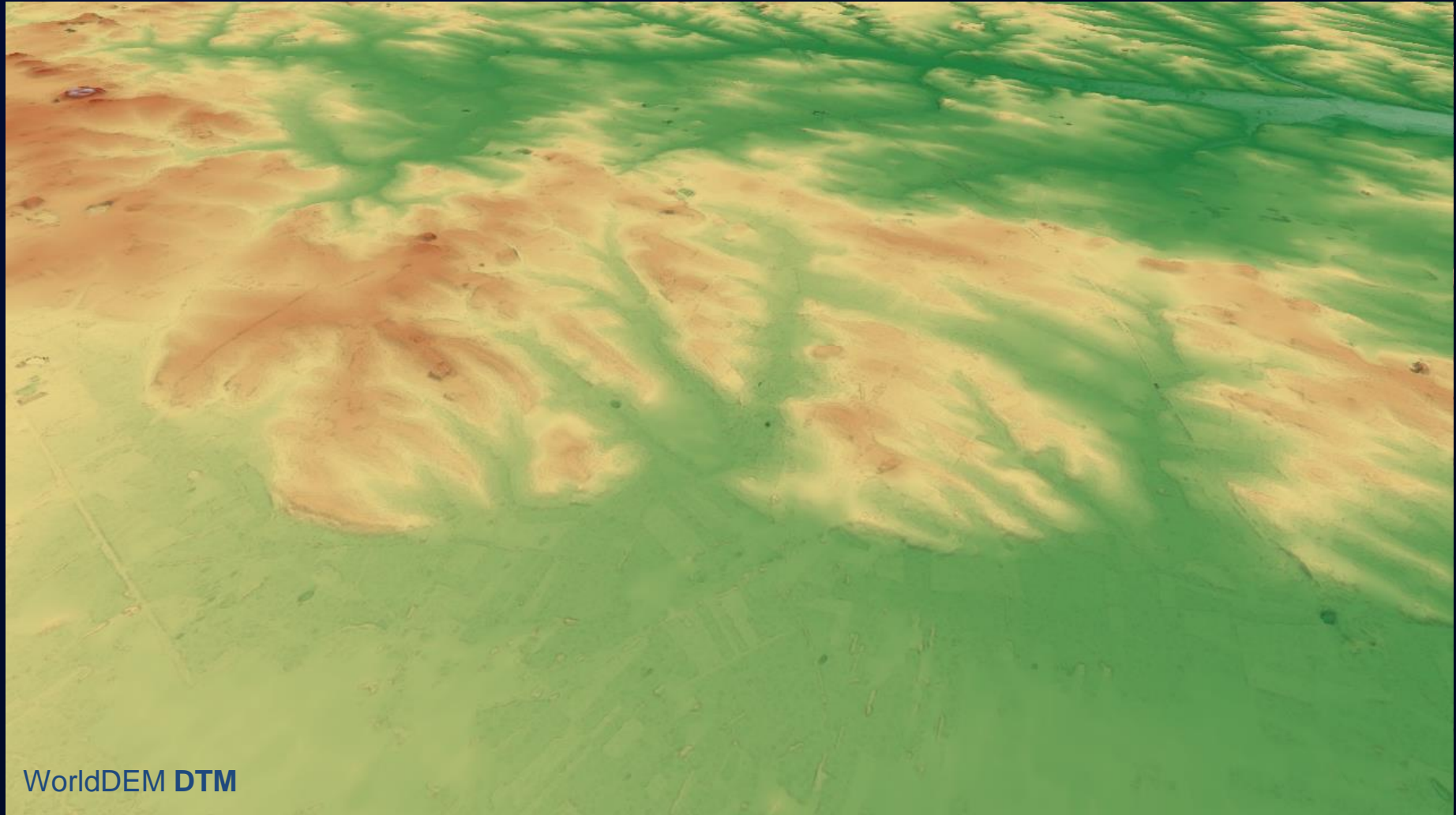
4m resolution

WorldDEM™ Neo

A global (148 million square km) 5m ground-spacing DSM and/or DTM



WorldDEM Neo is generated using the interferometric outputs from the TerraSAR-X and TanDEM-X satellites



Near Munich, Germany



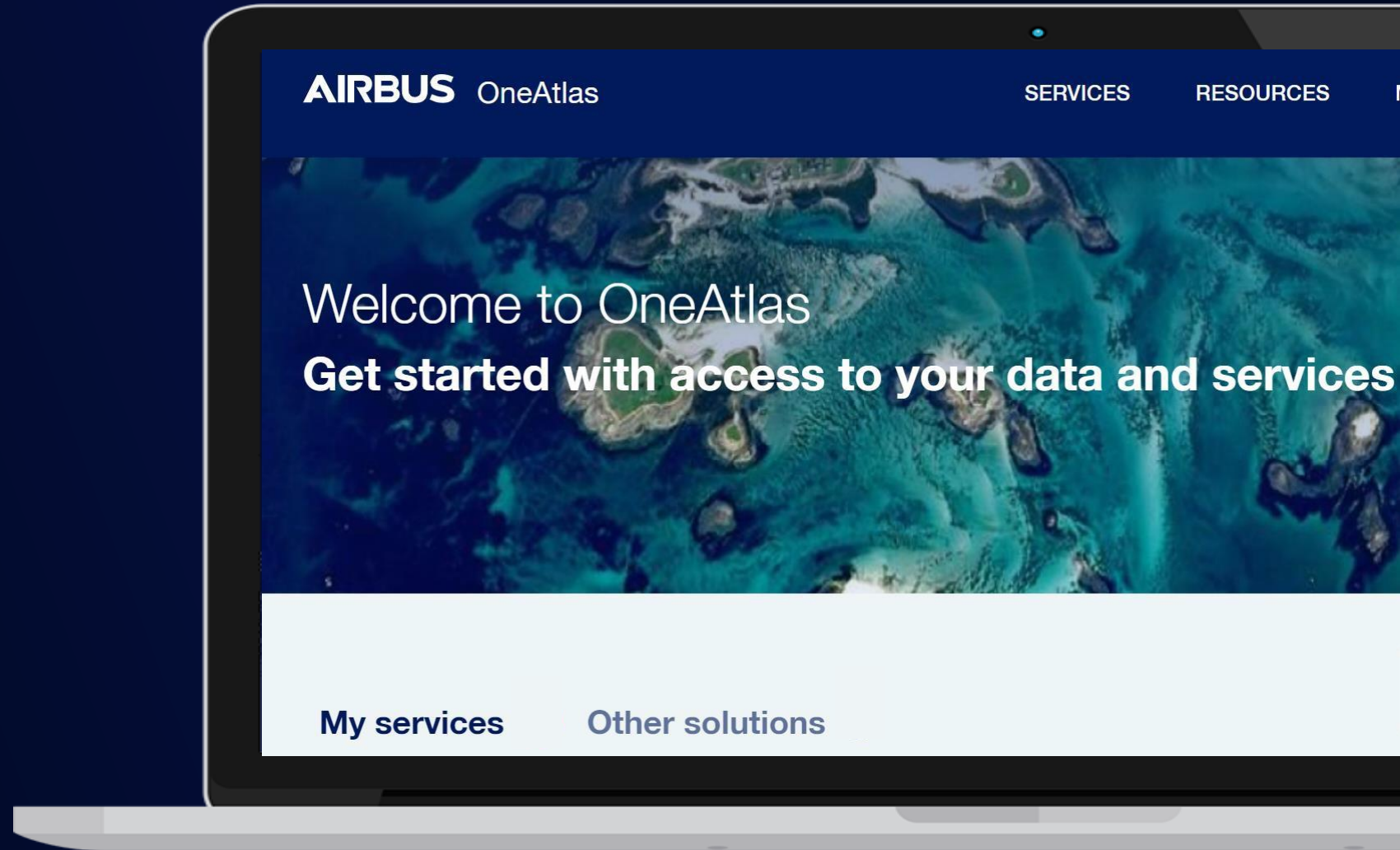
Accessing Data: OneAtlas Platform

How to Access Airbus Imagery & Data

One single platform to easily
access Airbus data services

Available via Web Portal
and/or API

Airbus' OneAtlas Platform



Airbus' OneAtlas Platform

How to Access Airbus Imagery & Data

Search, Discover, Select & Download Optical and Radar Imagery and DEMs via OneAtlas

Available via Web Portal and/or API

The screenshot displays the Airbus OneAtlas platform interface. At the top, there are navigation tabs for "My Services" (6) and "More Services" (1). Below this, a search bar prompts users to "Find here all services you have subscribed to." The main content area features six service cards arranged in a 2x3 grid:

- Pléiades Neo archive and tasking**: DATA SERVICES, PAY PER ORDER, Access button, Details icon.
- Pléiades & SPOT archive and tasking**: DATA SERVICES, PAY PER ORDER, Access button, Details icon.
- Living Library**: DATA SERVICES, SUBSCRIPTION (Active until 30.12.2025), Access button, Details icon.
- Radar archive and tasking**: DATA SERVICES, PAY PER ORDER, Access button, Details icon.
- Global Basemap**: DATA SERVICES, SUBSCRIPTION (Active until 30.12.2025), Access button, Details icon.
- Elevation Portal**: DATA SERVICES, PAY PER ORDER, Access button, Details icon.

On the right side, there is a "Notifications" dropdown menu and a "Quick access" section with links for "Developer Portal", "OneAccess", and a prominent "Partner Portal" button. Below this is a "Looking for information?" section with links for "Technical Support" and "Sales Team".

How to Access Airbus Imagery & Data

Access optical imagery, radar data and DEM via the OneAtlas Portals

Airbus' OneAtlas Platform

AIRBUS OneAtlas Radar Tasking & Archive

- Draw an AOI
- Import AOI
- Import an AOI from file
- Search
- Search Results
- Shopping Cart
- Order Tracking
- Getting Started
- Archive
- About This Portal
- Feedback
- Legal

AIRBUS OneAtlas Data

Search by location or coordinates

Map of the United States showing state boundaries and major cities.

AIRBUS OneAtlas Elevation

- Draw an AOI
- Delete AOI
- Place Order
- Shopping Cart
- Order Tracking
- Accounting
- Getting Started
- About This Portal
- Feedback
- Legal

Map of South America showing elevation data.

Map of the United States showing optical imagery.

Map of Europe showing radar imagery.

Living Library Subscription

How to Access Airbus Archive Imagery

A library of multi-resolution optical archive imagery

- Full access to archive dating back to 2012
- Worldwide coverage
- Daily revisits and updates

The screenshot displays the Airbus Archive Imagery web interface. On the left, a sidebar shows a search bar for 'Segment ID(s)', a 'Living Library only' toggle, and a list of 8 items sorted by acquisition date. The items are:

Date	Time (UTC)	Satellite	Resolution	Angle	Cloud	Coverage
05 Feb 2025	06:30	Pléiades	0.5m	7°	19%	100% covered (19.95 km²)
04 Feb 2025	06:36	Pléiades	0.5m	17°	7%	100% covered (19.95 km²)
18 Jan 2025	05:52	SPOT	1.5m	17°	7%	100% covered (19.95 km²)
01 Aug 2024	05:58	SPOT	1.5m	3°	0%	100% covered (19.95 km²)
20 Jul 2024	06:18					

On the right, a map view shows a selected polygon labeled 'Polygon 1 (19,95 km²)' over a coastal area. The map includes a toolbar with options for Resolution, Cloud, Angle, From, and To. The map also shows geographical labels like 'Ile aux Benitiers', 'La Gaulette', 'Rivière L'Embrazure', and 'Rivière St Pierre'.

OneAtlas Portal: Archive Search and Discovery



Video does not play
in PDF file

An aerial photograph of a tropical island, likely Bora Bora in French Polynesia. The image shows a lush green island with a white sandy beach and a red tennis court. Numerous overwater bungalows with thatched roofs are connected to the island by a network of wooden walkways. The surrounding water is a vibrant blue, with visible coral reefs and shallow areas. The text "Airbus Data for Research Purposes" is overlaid in the center of the image.

Airbus Data for Research Purposes

Research Using Airbus Data

Research undertaken using Airbus imagery and data

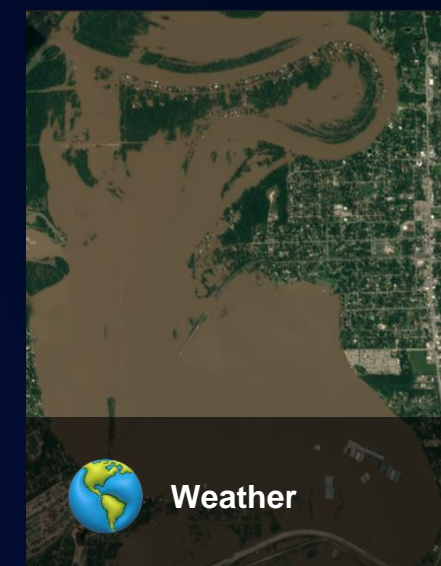
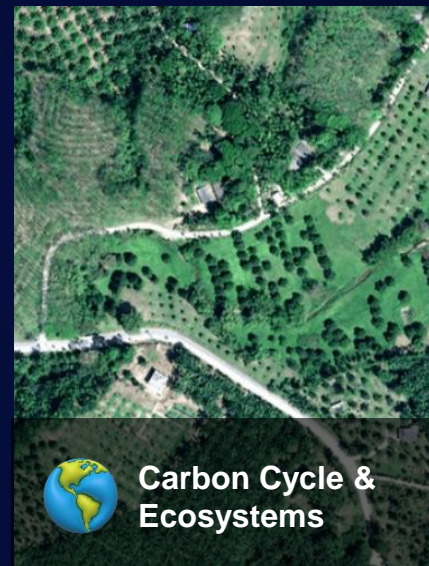
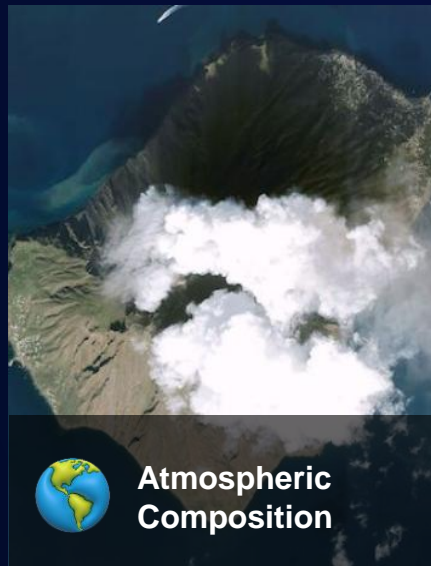
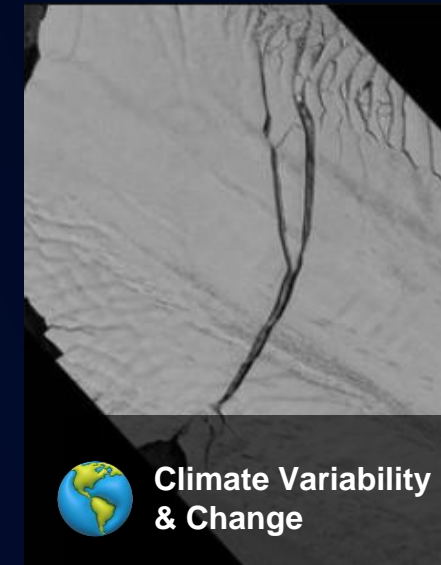
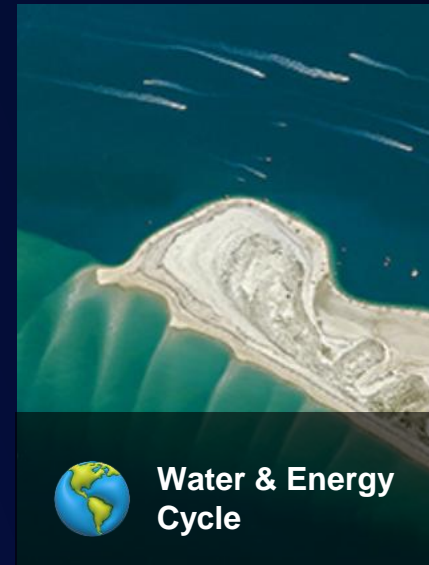
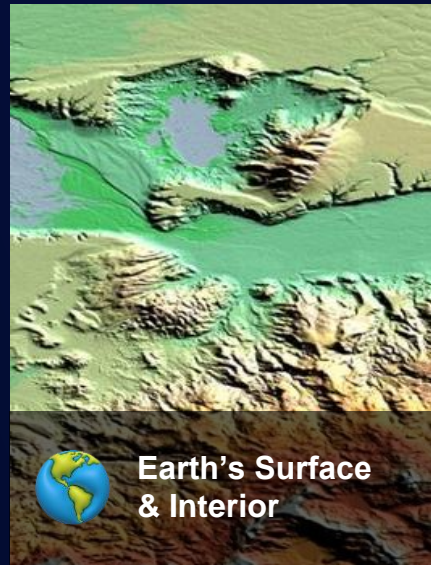
Thousands of peer-reviewed research papers have been published using Airbus Earth Observation data

Articles have appeared in:

- *Remote Sensing*
- *IEEE Journal of Selected topics in Applied Earth Observations and Remote Sensing*
- *ISPRS Journal of Photogrammetry and Remote Sensing*
- *Natural Hazards and Earth Systems Sciences*
- *The Cryosphere*
- *Forests*
- *Geomatics, Natural Hazards and Risks*
- *Applied Hydrogeology*
- And many, many more....

NASA Earth Science Division Study Areas

Airbus satellite imagery and data can be used for research in these 6 CSDA earth science study areas





Water & Energy
Cycle

Both Pléiades and Pléiades
Neo can assist with
bathymetric calculations

Shallow Bathymetry Determination Using Pléiades



Shallow bathymetry from pléiades data: the case study of the Grindavik volcanic crisis

Marcello de Michele, Daniel Raucoules, Virginie Pinel, Joaquín M C Belart

► To cite this version:

Marcello de Michele, Daniel Raucoules, Virginie Pinel, Joaquín M C Belart. Shallow bathymetry from pléiades data: the case study of the Grindavik volcanic crisis. 2024 IEEE International Geoscience and Remote Sensing Symposium, Institute of Electrical and Electronics Engineers, Jul 2024, Athènes, Greece. hal-04572360

HAL Id: hal-04572360

<https://brgm.hal.science/hal-04572360v1>

Submitted on 10 May 2024

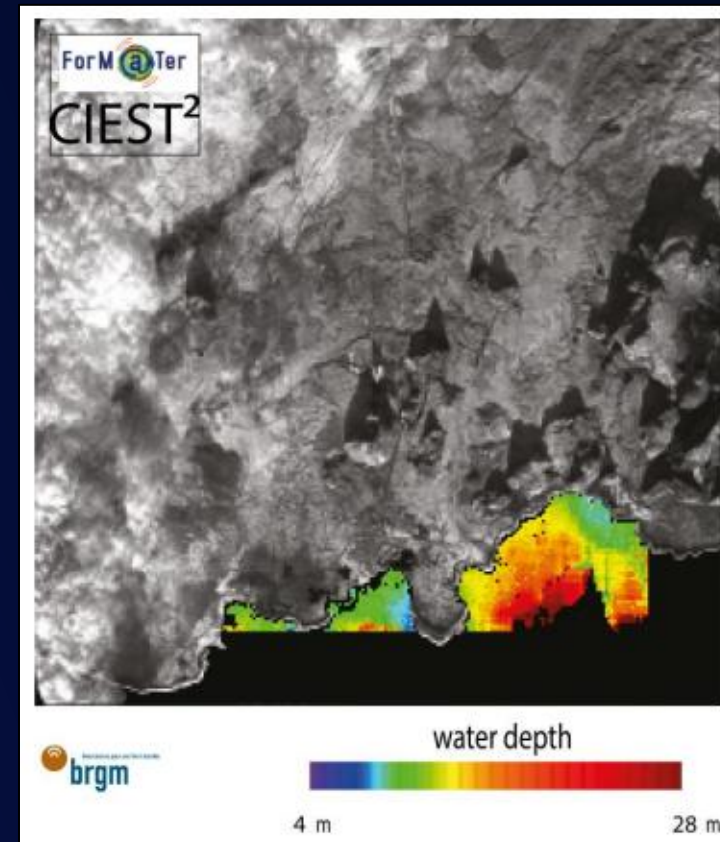
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- Pléiades 50cm images are used to map submarine topography
- Researchers calculated a shallow bathymetry map from 4 to 28 meters in depth

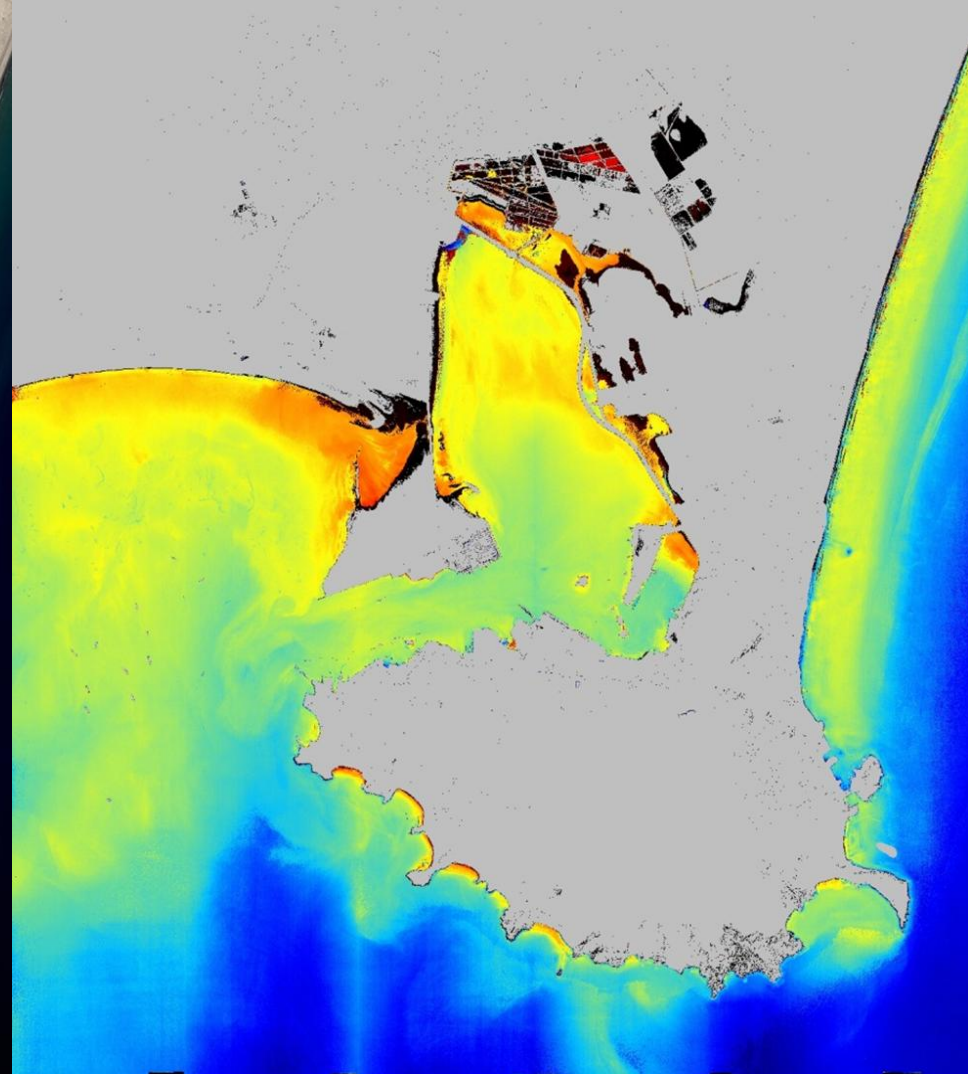


[Link to Full Paper](#)



Water & Energy Cycle

Pléiades Neo used to calculate bathymetry in Aden, Yemen



Sea Ice Classification Using TerraSAR-X

The Cryosphere, 17, 1279–1297, 2023
 https://doi.org/10.5194/tc-17-1279-2023
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Sea ice classification of TerraSAR-X ScanSAR images for the MOSAiC expedition incorporating per-class incidence angle dependency of image texture

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²Remote Sensing Technology Institute (IMF), German Aerospace Center (DLR), Bremen, Germany

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Received: 22 April 2022 – Discussion started: 3 May 2022

Revised: 8 February 2023 – Accepted: 15 February 2023 – Published: 16 March 2023

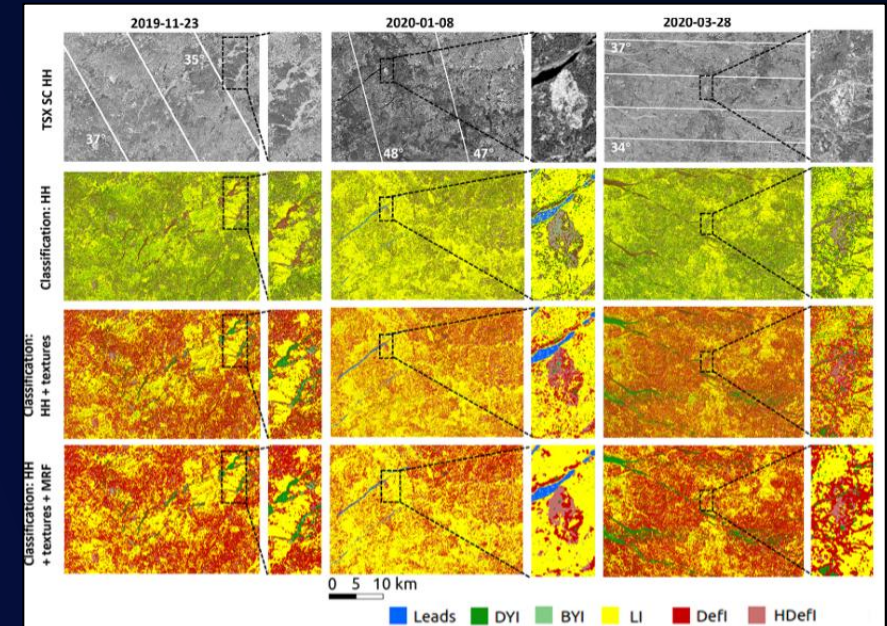
Abstract. We provide sea ice classification maps of a sub-weekly time series of single (horizontal–horizontal, HH) polarization X-band TerraSAR-X scanning synthetic aperture radar (TSX SC) images from November 2019 to March 2020, covering the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) expedition. This classified time series benefits from the wide spatial coverage and relatively high spatial resolution of TSX SC data and is a useful basic dataset for future MOSAiC studies on physical sea ice processes and ocean and climate modeling. Sea ice is classified into leads, young ice with different backscatter intensities, and first-year ice (FYI) or multiyear ice (MYI) with different degrees of deformation. We establish the per-class incidence angle (IA) dependencies of TSX SC intensities and gray-level co-occurrence matrix (GLCM) textures and use a classifier that corrects for the class-specific decreasing backscatter with increasing IAs, with both HH intensities and textures as input features. Optimal parameters for texture calculation are derived to achieve good class separation while maintaining maximum spatial detail and minimizing textural collinearity. Class probabilities yielded by the classifier are adjusted by Markov random field contextual smoothing to produce classification results. The texture-based classification process yields an average overall accuracy of 83.70% and good correspondence to geometric ice surface roughness derived from in situ ice thickness measurements (correspondence consistently close to or higher than 80%). A positive

logarithmic relationship is found between geometric ice surface roughness and TSX SC HH backscatter intensity, similar to previous C- and L-band studies. Areal fractions of classes representing ice openings (leads and young ice) show prominent increases in middle to late November 2019 and March 2020, corresponding well to ice-opening time series derived from in situ data in this study and those derived from satellite synthetic aperture radar (SAR) and optical data in other MOSAiC studies.

1 Introduction

During the 1-year-long Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) expedition from 2019 to 2020, the icebreaker RV *Polarstern* drifted with sea ice along the Transpolar Drift in the central Arctic Ocean, conducting the largest multidisciplinary Arctic research expedition in history (Nicolaus et al., 2022). Satellite data acquisitions from multiple platforms were coordinated to survey the sea ice area surrounding the expedition, enabling continuous, large-scale sea ice monitoring along the drift. Moreover, extensive on-ice, airborne, and ship-based in situ data were collected surrounding the MOSAiC ice floe, where RV *Polarstern* was moored and the Central Observatory (CO) was established. These include data from sources such as meteorological stations, airborne laser sur-

- TerraSAR-X ScanSAR images are used to **classify various sea-ice types**
- **Ground-truth** is provided by the Multidisciplinary drifting Observatory for the Study of Arctic Climate (MOSAIC) expedition
- **Good correspondence** is found between the classification results and the in-situ ice-thickness measurements



[Link to Full Paper](#)



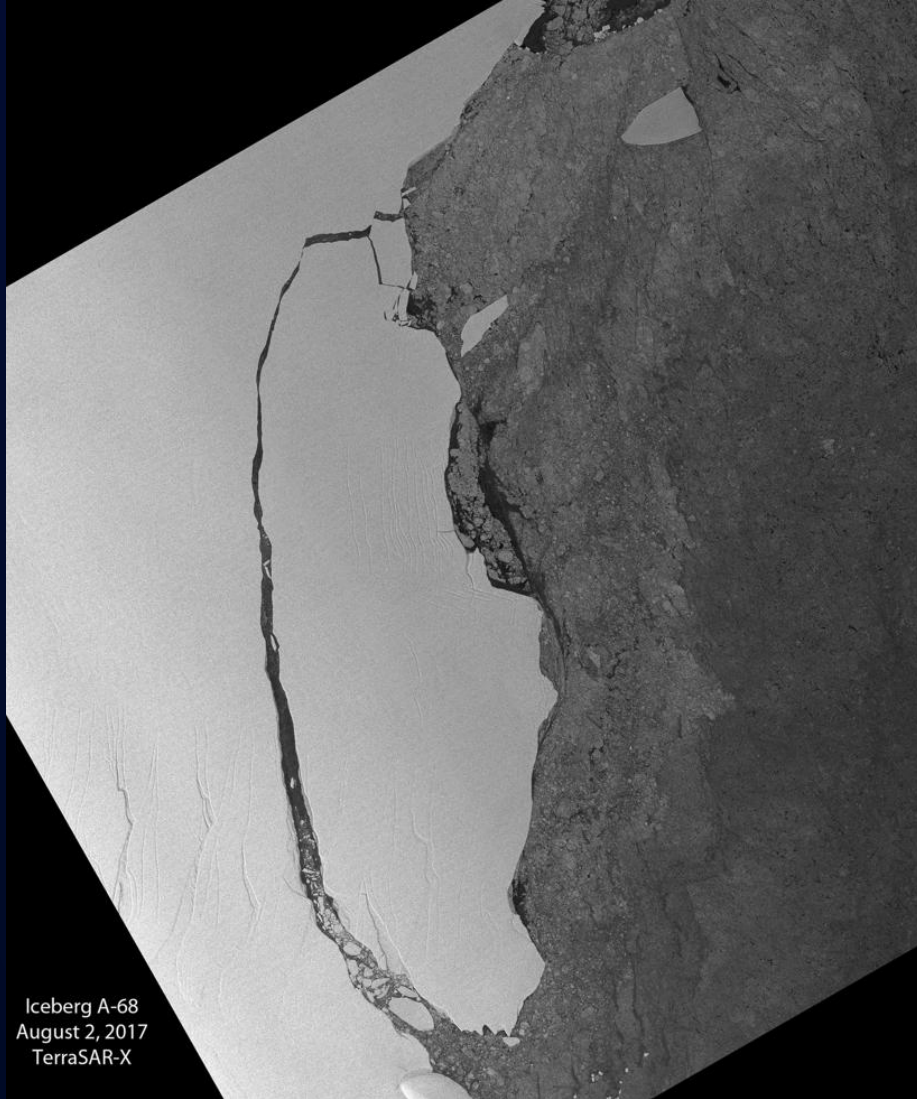
Climate Variability
& Change

TerraSAR-X imagery used
to track sea-ice thickness

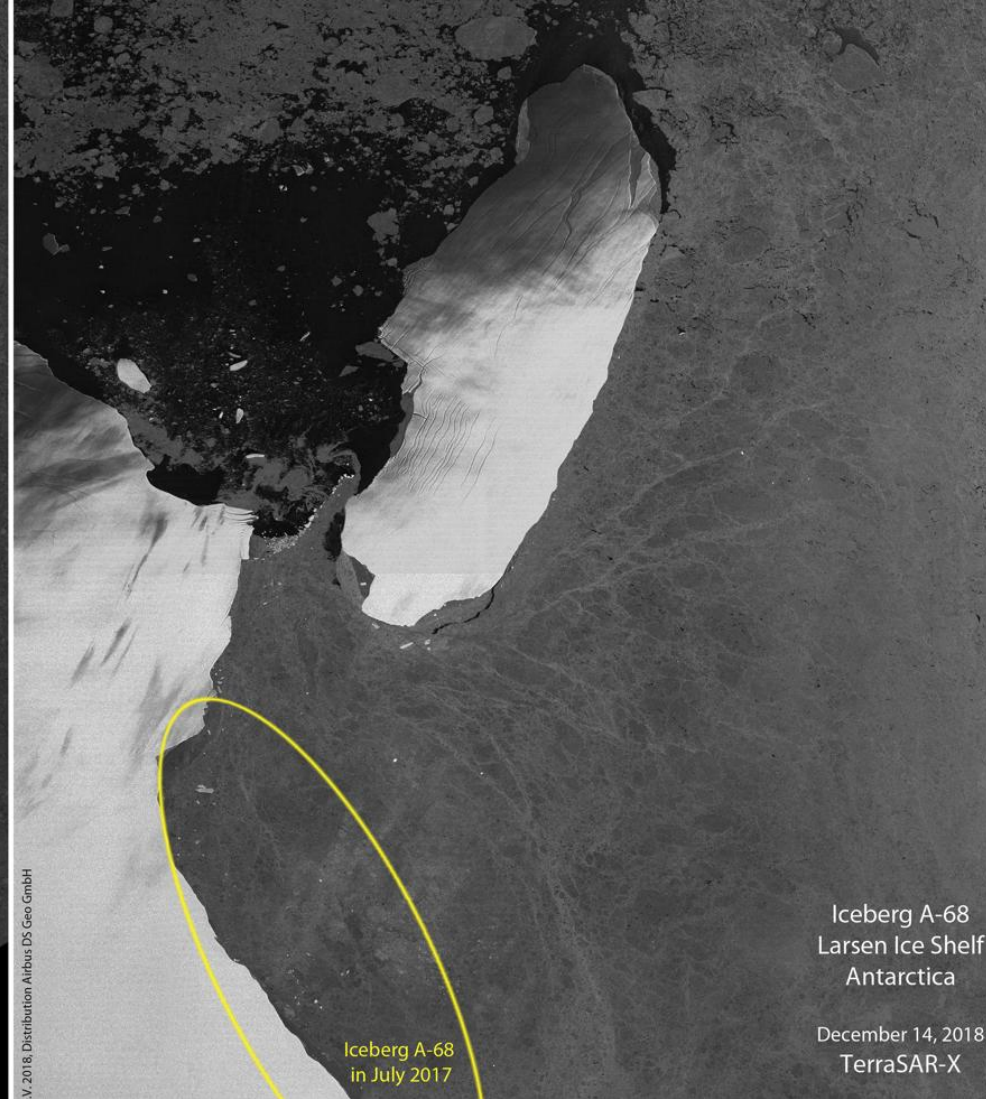


Climate Variability & Change

TerraSAR-X imagery used to track Antarctic sea-ice drift



Iceberg A-68
August 2, 2017
TerraSAR-X

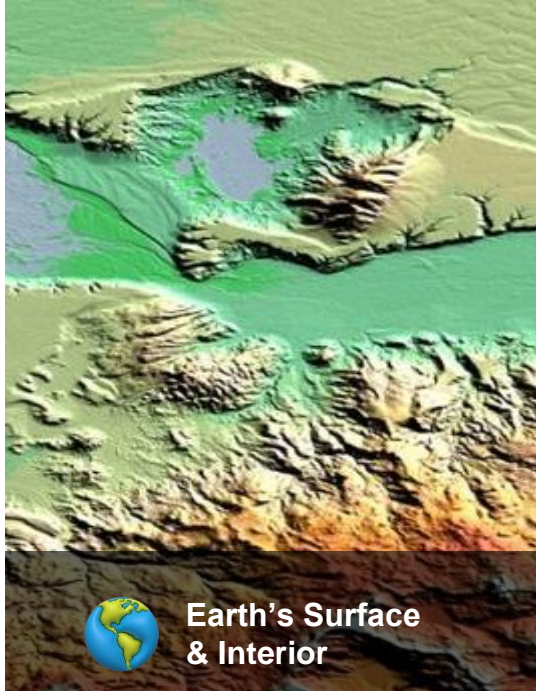


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Iceberg A-68
in July 2017

Iceberg A-68
Larsen Ice Shelf
Antarctica

December 14, 2018
TerraSAR-X



Earth's Surface
& Interior

User-Derived Digital Surface
Models using Pléiades
Imagery

SAR and Multispectral Imagery to Detect Structural Deformation

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ELSEVIER ScienceDirect Procedia Structural Integrity 64 (2024) 573–579

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SMAR 2024 – 7th International Conference on Smart Monitoring, Assessment and Rehabilitation of Civil Structures

Satellite-derived digital surface models to improve geolocation of InSAR deformation measurements on bridges

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^b National Research Council Canada, 1200 Montreal Rd., Ottawa, ON, K1A 0R6, Canada
^c MDA Geospatial Services Inc., 57 Auriga Drive, Ottawa, ON, K2E 8B2, Canada

Abstract

Canadian bridges need structural health monitoring (SHM) to ensure their safety and longevity. In-situ inspections are expensive and time-consuming, and climate change effects on river bridges may make previous legacy inspection schedules inadequate. Remote sensing can help supplement in-situ inspections or alert bridge operators to the need for a new inspection. Satellite-based Persistent Scatterer Interferometric Synthetic Aperture Radar (PS-InSAR) is an emerging approach for bridge deformation monitoring that requires accurate geolocation of the PS targets for best results. If the as-built elevations on bridges are insufficiently accurate, geolocation errors may limit the usefulness of the PS-InSAR data for bridge SHM. Satellite stereo imagery can be used to derive Digital Surface Models (DSMs), which give the elevation of the top surfaces of structures. It is unknown whether DSMs derived from satellite imagery are adequate as height sources for ensuring accurate positioning of PS-InSAR targets when bridge drawings or surveys are unavailable or unreliable. A study evaluating PS-InSAR elevation corrections using a DSM from satellite imagery was conducted on the Samuel de Champlain Bridge in Montreal (QC), Canada. A tri-stereo image triplet was used to create a 1 m resolution DSM, which was evaluated for height accuracy against a historical survey and used to correct PS-InSAR data points for elevation. The PS-InSAR dataset was georeferenced with DSM height corrections and evaluated for accuracy.

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 Peer-review under responsibility of SMAR 2024 Organizers

Keywords: Digital Surface Models; SAR Interferometry; Bridge Deformations; Structural Health Monitoring

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 Peer-review under responsibility of SMAR 2024 Organizers
 10.1016/j.prostr.2024.09.309

- Pléiades tri-stereo triplet used to create a 1-meter DSM
- The Pléiades tri-stereo DSM accurately captured the **asymmetrical elevation profile** of the subject bridge, and the vertical accuracy of this DSM was within expected tolerances
- Merging the Pléiades tri-stereo DSM with a 30m SRTM DEM, then using this merged DSM for height analysis, provided **significantly improved accuracy** relative to heights estimated from the DEM only

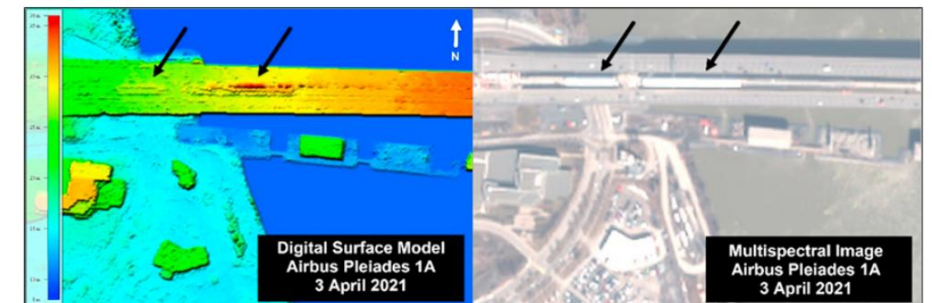
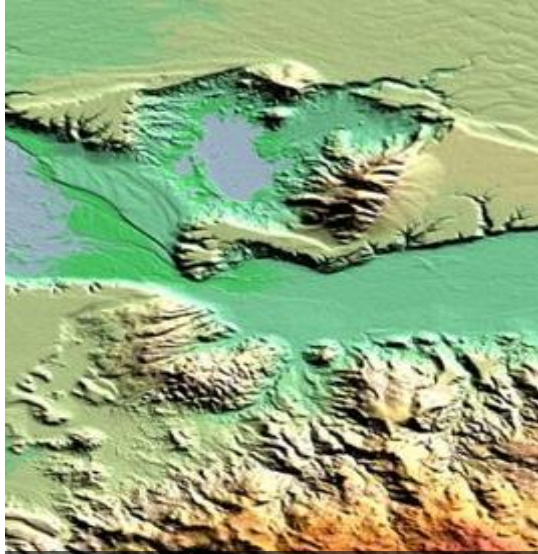


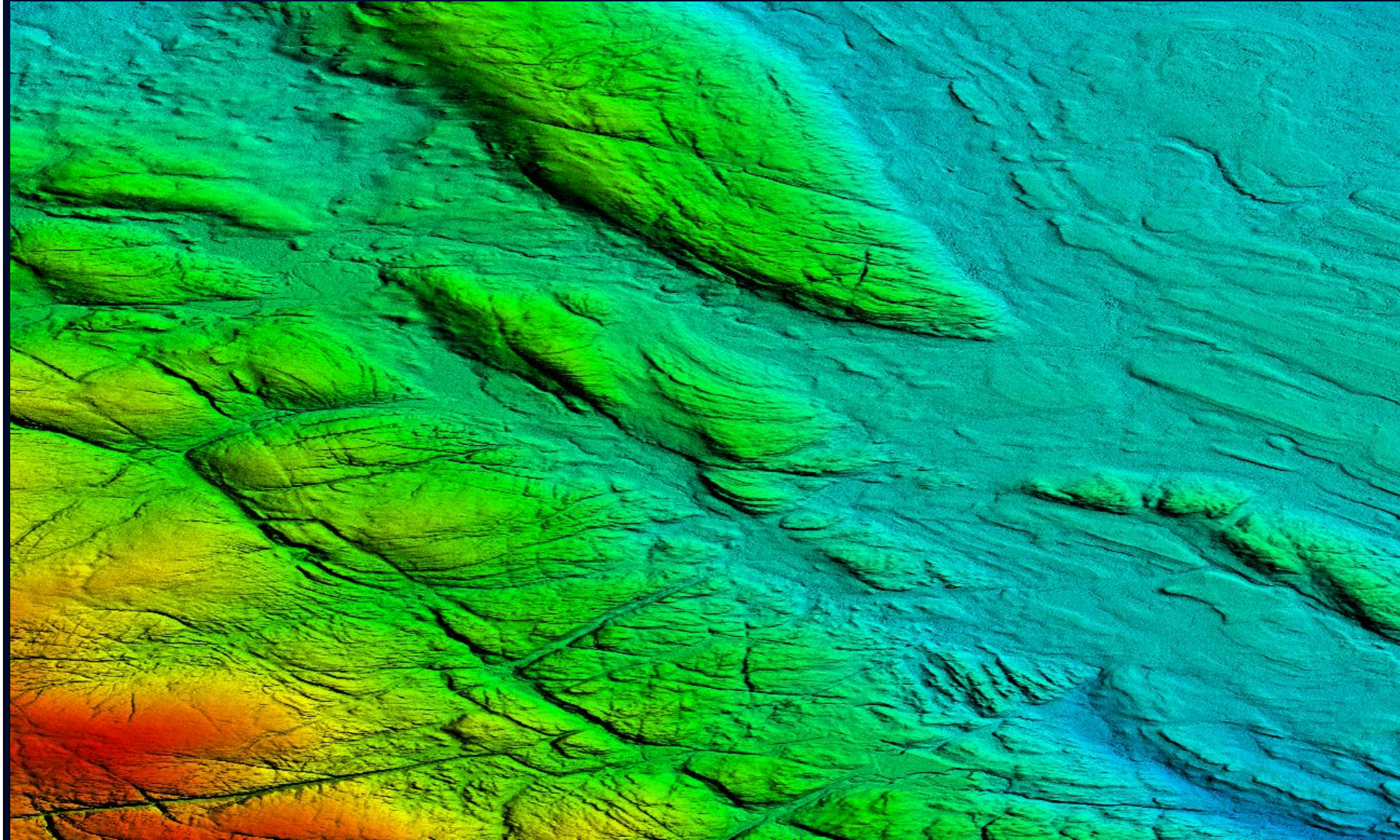
Fig. 3. Tri-stereo DSM (left) and multispectral image (right) illustrating the west abutment area of Samuel de Champlain Bridge. Black arrows indicate temporary structures on the central portion of the bridge deck.

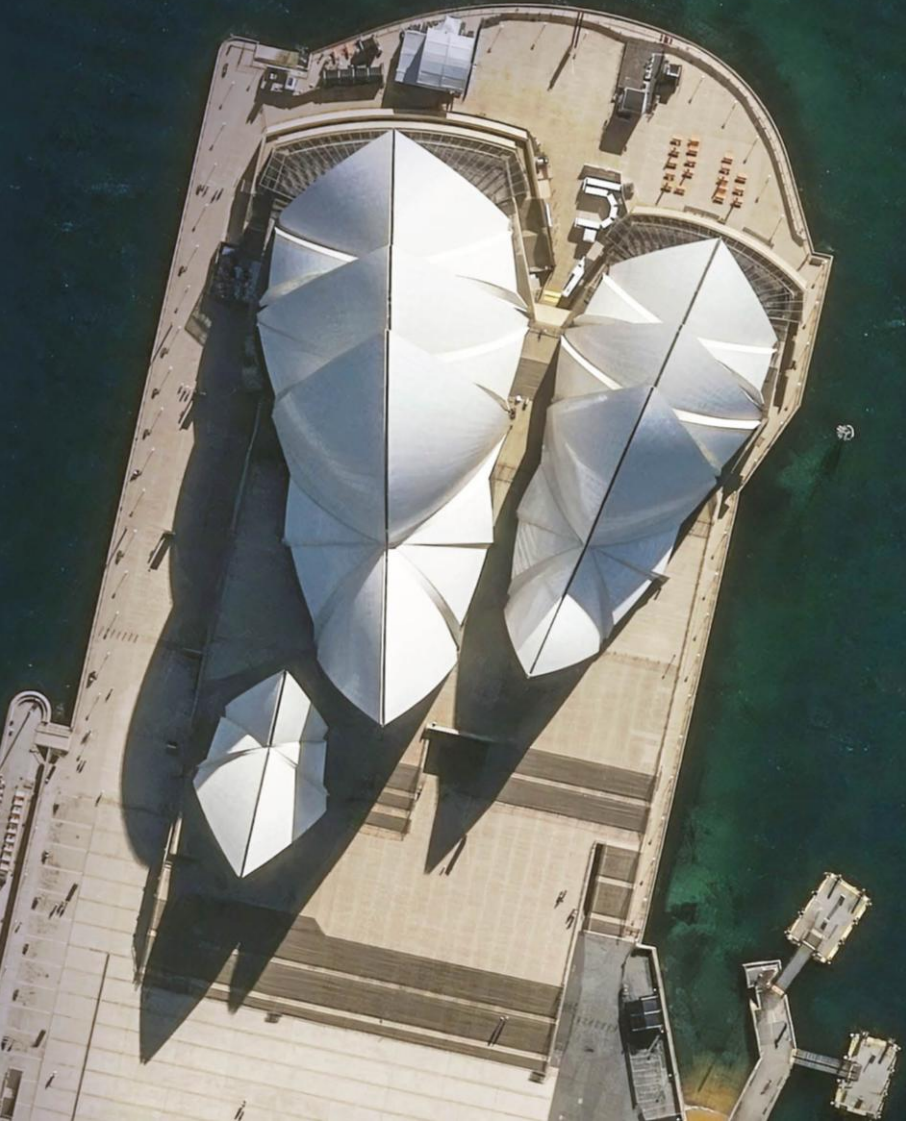
[Link to Full Paper](#)



Earth's Surface
& Interior

Airbus' Global DEM:
WorldDEM Neo over the
Canadian Arctic at 5m
posting





Thank You. Questions?

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AIRBUS

Airbus' CSDA Product Catalog

Optical

Radar

Sensors

- Pléiades Neo – 30cm & HD15 (High Definition 15cm)
- Pléiades – 50cm
- SPOT – 1.5m & 6m (Multispectral only)

Archive

- Mono / Stereo / Tri-Stereo

Tasking

- OnePlan
 - All satellites/modes
- OnePlan Monitoring
 - Pléiades & SPOT* / Mono only
- OneDay
 - All satellites/Mono only

Elevation Products

- Elevation 0.5 DSM
- Elevation 1 DSM & DTM
- Elevation 4 DSM & DTM

**SPOT1.5m Only*

Sensors

- TerraSAR-X
- TanDEM-X
- PAZ

Archive

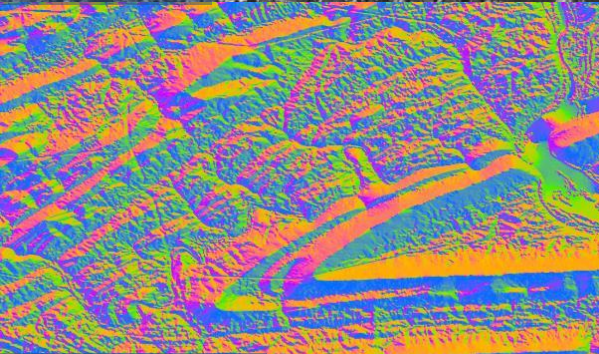
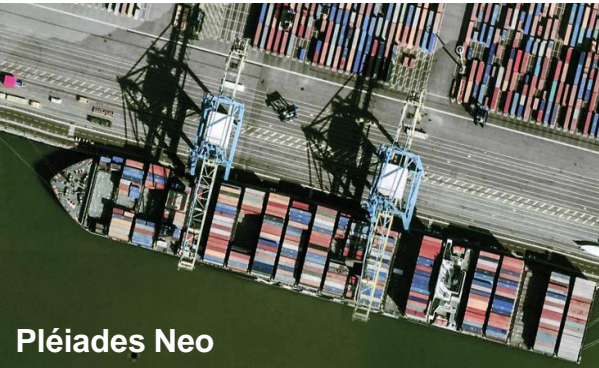
- Modes: ST, HS, SL, SM, SC, WSC

Tasking

- All Radar modes
- InSAR (Interferometric data stacks) ST, HS, SL, SM
- Maritime Monitoring Data Stacks: All Radar modes

Elevation Products

- WorldDEM Neo DSM & DTM
- WorldDEM DSM & DTM
- Ground Control Point (GCP) Packages



WorldDEM Neo