

Leveraging ICEYE US Commercial SAR

Alexandra Gloria
Program Manager
ICEYE US

Alvah Bickner
Product Manager
ICEYE US

Dr. Thomas Mitchell
SAR Scientist
ICEYE US

Agenda

1. ICEYE US Overview

- Company Legacy
- Constellation
- Missions

2. Capabilities

3. SAR Expanded

4. Accessing ICEYE US Data



Welcome to a completely new way
to understand life on Earth.
Delivering reliable, near real-time
Earth observation data to support
smarter decisions in disaster
response, security, and
environmental resilience.



A revolutionary SAR satellite

ICEYE US SAR satellites are designed to be smaller, more cost-effective, and offer greater flexibility compared to older, traditional systems.

By integrating a miniaturized SAR sensor payload onto a high-performance lightweight platform, ICEYE US satellites deliver a level of performance that has never been possible until now.

The design allows for extended imaging durations at exceptionally high resolution, along with the capability to flexibly adjust the antenna and scan the radar beam over wide areas.

This enables ICEYE US to offer a variety of imaging modes, catering to an extensive range of operational applications.

The world's largest SAR satellite constellation



First satellite launched
Q1 2018



5 satellites launched by
2019



48+ satellites launched by
2025

Proven satellite launches and more to come

- > 48 satellites successfully launched since 2018
- > 20+ to be launched annually in 2025, 2026, and beyond



Equipping Decision-Makers With Critical Insights

Leveraging the world's largest commercial SAR constellation, ICEYE US delivers persistent satellite monitoring for America's most pressing requirements.



Environmental & Scientific

Climate research, disaster response, environmental impact, Arctic monitoring



Economic

Supply chain monitoring, port security, resource management, illegal fishing detection



Defense & National

Maritime awareness, infrastructure monitoring, border security, counter-trafficking

US Team

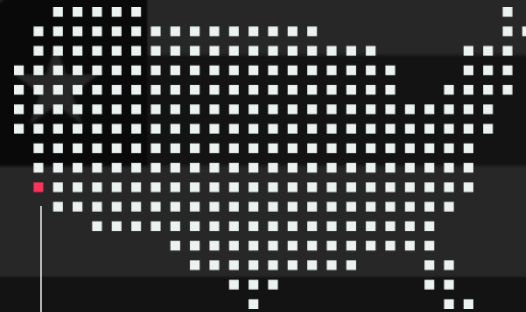
With scientific application expertise including NASA veterans

Seasoned USG Contractor

Execution-focused mission partner to various Federal sectors

US Sats

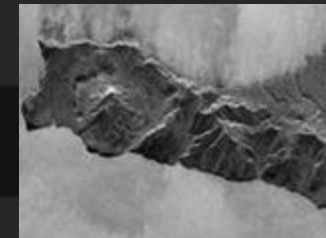
Built in Southern California



Irvine, CA (HQ)
Manufacturing
Mission ops

US Ops

Constellation operations center in Irvine, CA



Data



Satellite systems



Capabilities

Expanding Capabilities

Improved Coverage + Coherence

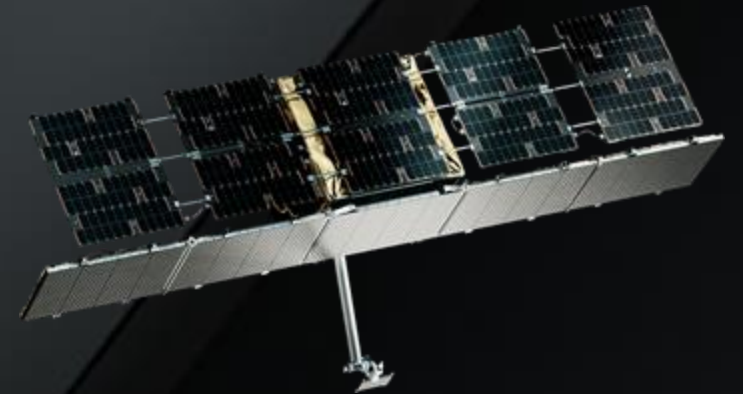
Due to Wider Range of Possible Imaging Angles

Rapid Access to the Data

API-Driven Interfaces for Ease of Use

World-Leading Resolution, Reduced Noise Level

Doubled Width of Antenna, Three Times the Bandwidth



Generation 3

- 17 Gen3 satellites launched to date
- 600 MHz bandwidth
- 500 Mbps downlink
- Phased Array 1.3 m²

Generation 3.5

- 10 Gen 3.5 satellites launched
- 1200 MHz bandwidth
- 500 Mbps downlink
- Phased Array 1.3 m²

Generation 4

- First satellite launched in Mar 2025
- 1,200 MHz bandwidth
- 500 Mbps downlink
- Double Wide Phased Array 2.6 m²
- Larger incidence angle access

Phased Array

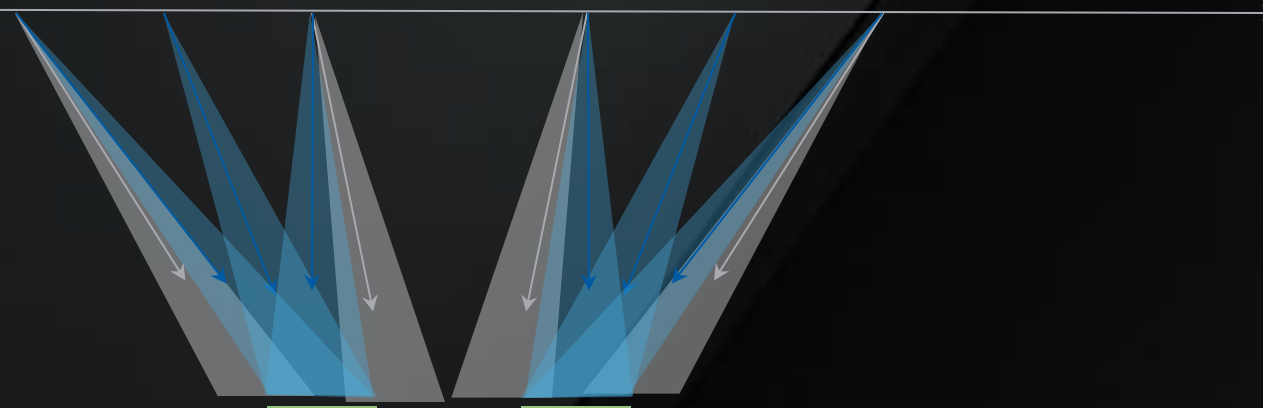
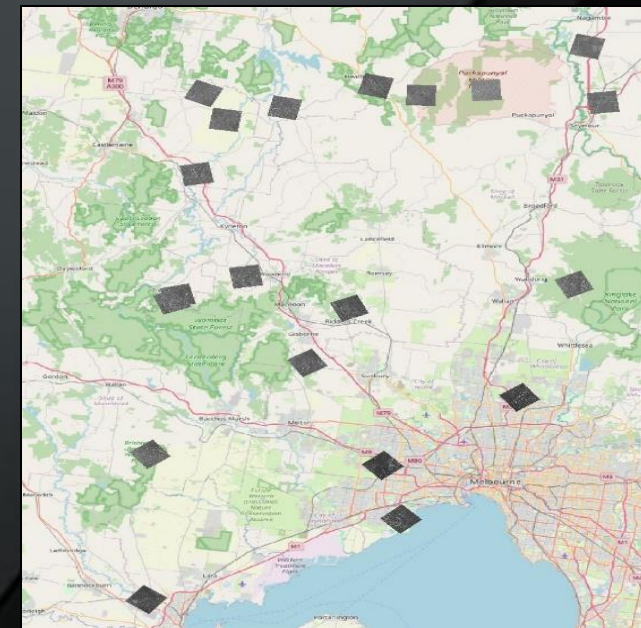
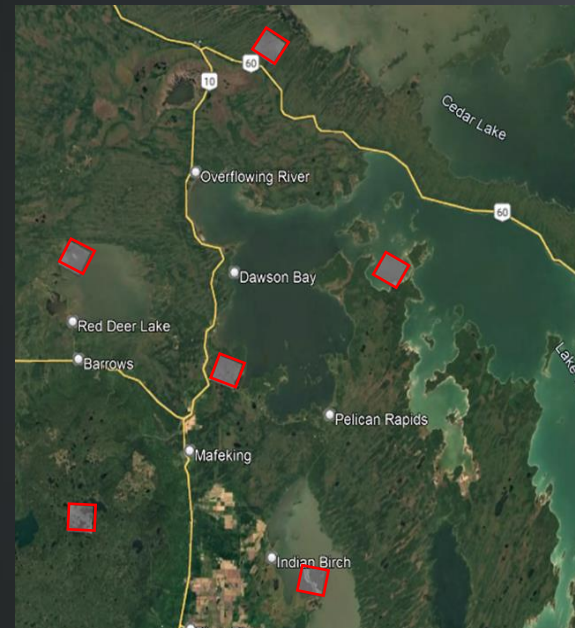
Our phased array is fully populated in elevation

- We have good precision on steering the beam in elevation “instantaneously”

Wide area collection: scan mode (100km x 100km)

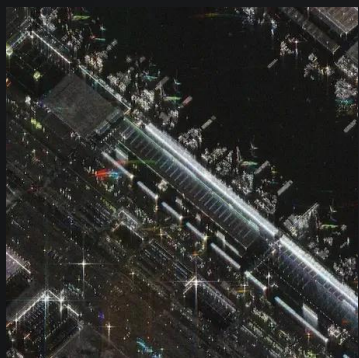
Multi-Image Acquisition (MIA)

- Beam steering enables the collection of multiple images in a pass



Gain Critical Clarity: See More with Modes

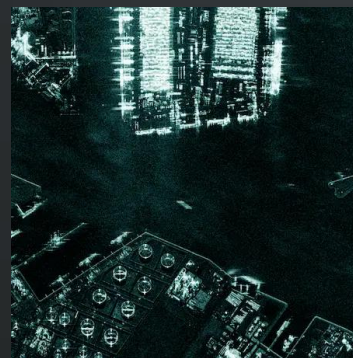
Get unprecedented visibility and flexibility with ICEYE US's Dwell, Spot, Strip, and Scan imaging modes. Monitor areas up to 84,000 km² and zoom in to areas of interest at very high resolution down to 25 cm – day, night, and in any weather.



Dwell Modes

Dwell modes help extract unmatched critical information from a single image. See every detail in incredible clarity with enhanced image quality and reduced noise.

Ground resolutions: up to 50 cm
Scene size: 5 km x 5 km



Spot Modes

Spot enables very high resolution (up to 50 cm) and the largest available scene size for detailed monitoring. Use Spot modes for object identification and highly detailed change detection.

Ground resolution: up to 50 cm
Scene size: up to 15 km x 15 km



Strip Mode

Strip is perfect for detecting changes to vast sea and land areas. Use Strip mode to see and respond to natural disasters and illegal activities, and to persistently monitor borders, coastal areas, or any location of interest.

Ground resolution: 3 m
Scene size: 30 x 50 km (extend up to 350km)



Scan Mode

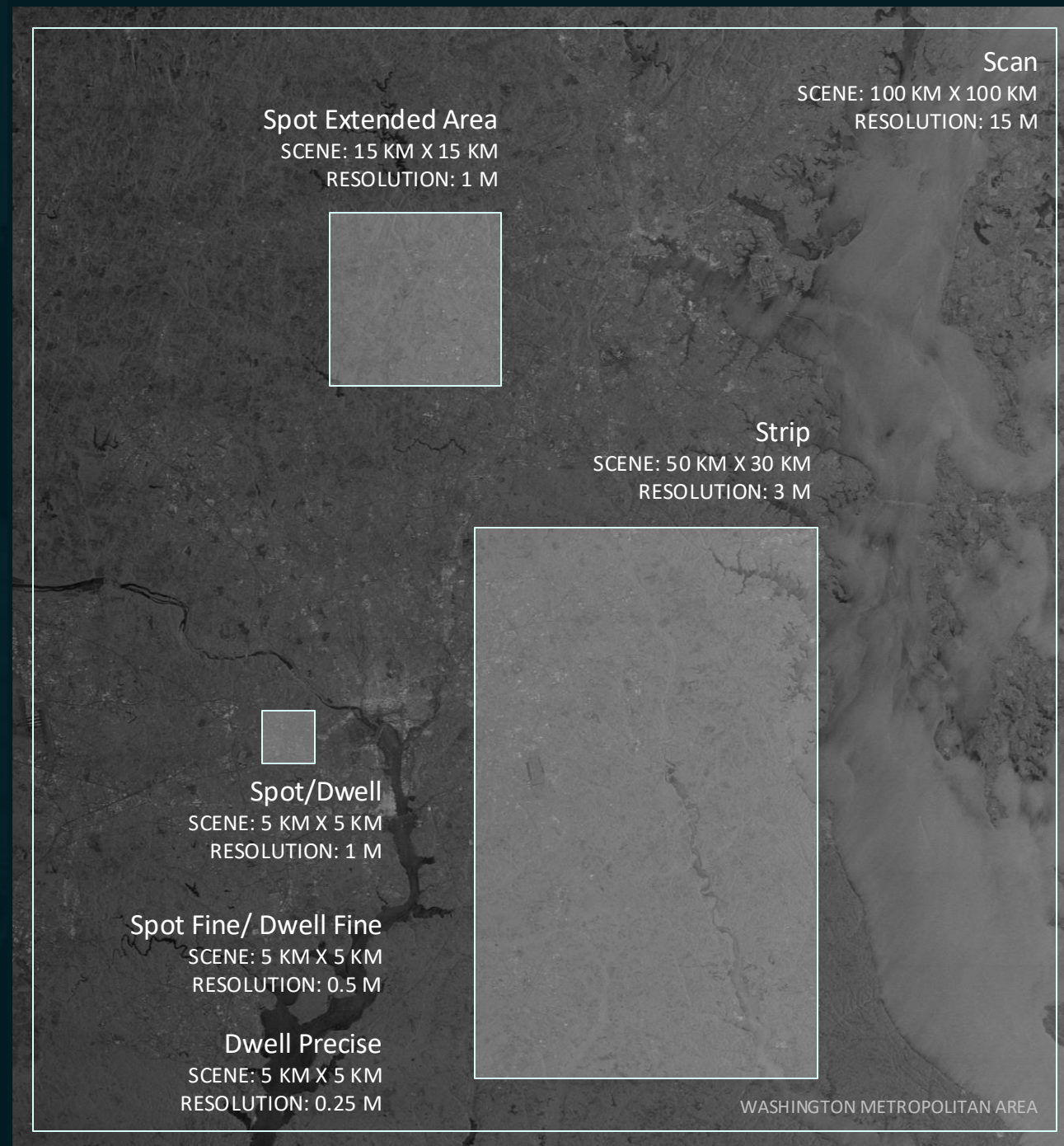
Scan can cover an area of up to 840 km by 100 km. Scan mode is particularly effective for acquiring wide coverage imagery for maritime use cases, where national security authorities and maritime safety officials need persistent visibility.

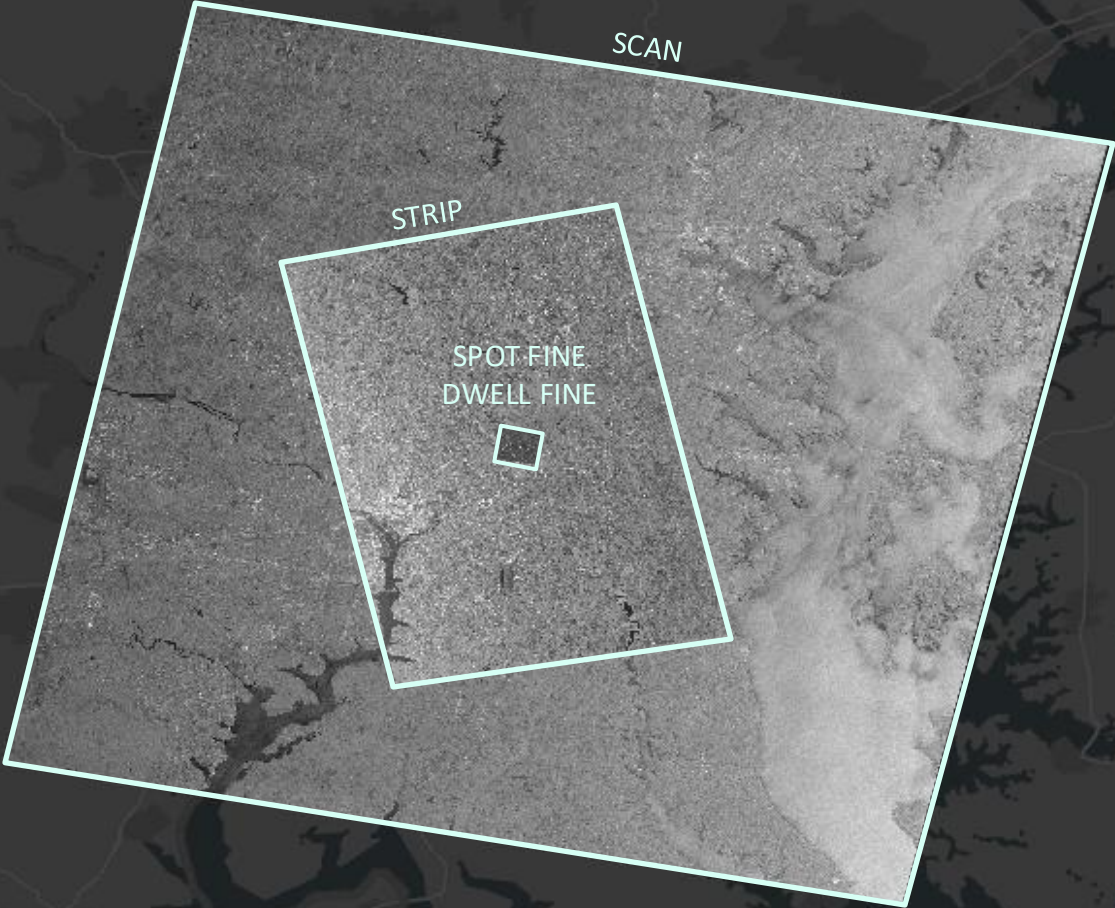
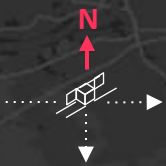
Ground resolutions: 12 m
Scene size: 100 km x 100 km (extended up to 840 km)

VARIABLE SCENE & RESOLUTION

TO MEET UNIQUE MISSION REQUIREMENTS

Strip and Scan products can be extended to cover up to 840km in the azimuth direction in a single pass.
E.g., 5 strip images for a total of 30km x 250km coverage





GSFC

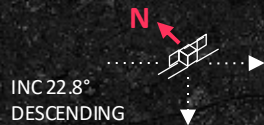
Goddard Space Flight Center, MD, USA

LAT 38.9915 LON -76.8423

2025-04-19 T 16:12:06Z

Imaging Mode: Scan

Ground Resolution: 12m



GSFC

Goddard Space Flight Center, MD, USA

LAT 38.9915 LON -76.8423
2025-04-20 T 06:50:54Z
Imaging Mode: Strip
Ground Resolution: 3m



Goddard Space Flight Center, MD, USA

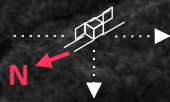
LAT 38.9915 LON -76.8423

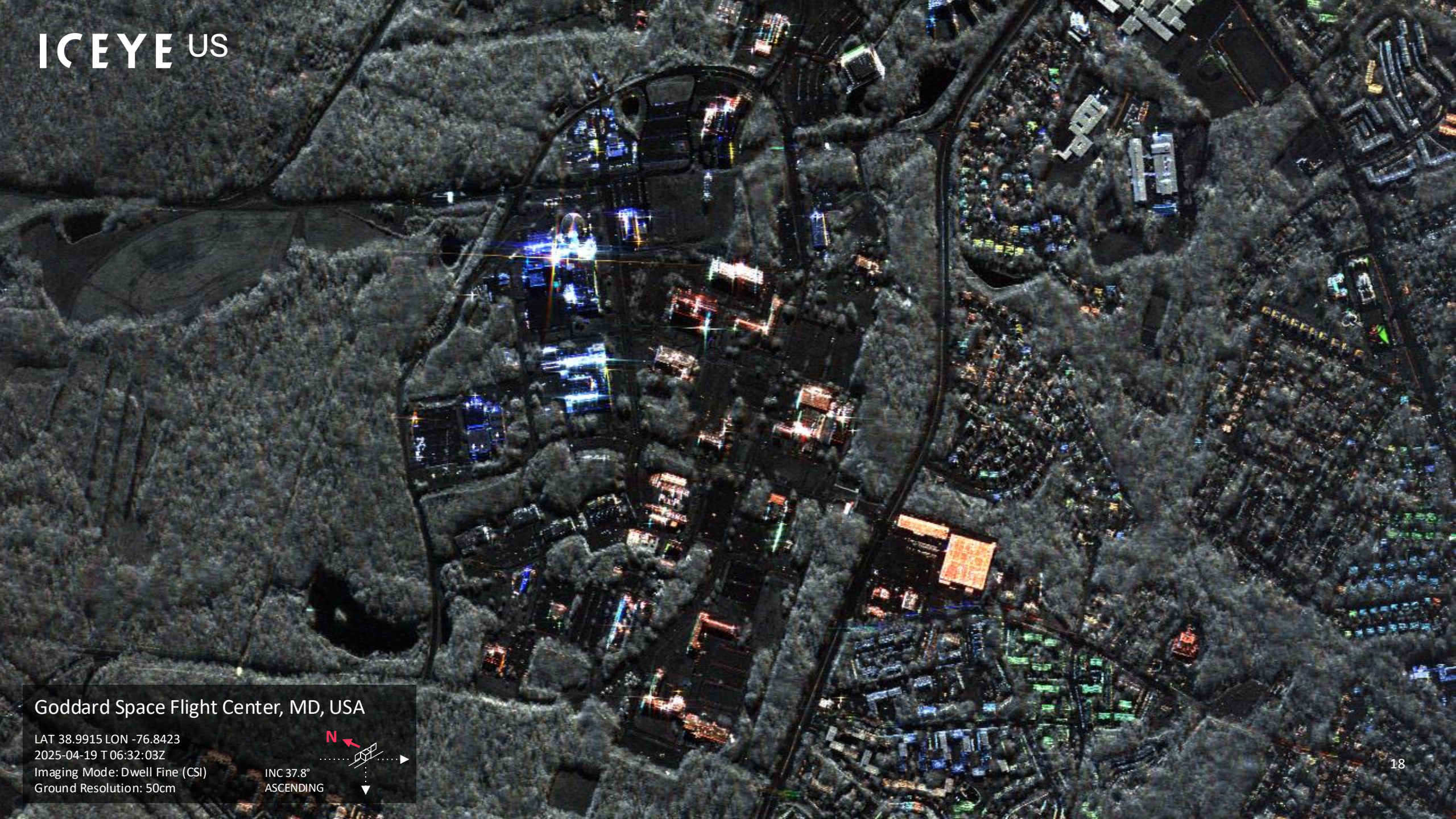
2025-04-18 T 16:04:38Z

Imaging Mode: Spot Fine

Ground Resolution: 50cm

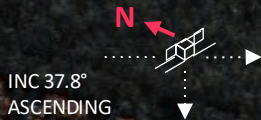
INC 36.5°
DESCENDING





Goddard Space Flight Center, MD, USA

LAT 38.9915 LON -76.8423
2025-04-19 T 06:32:03Z
Imaging Mode: Dwell Fine (CSI)
Ground Resolution: 50cm



SAR Expanded

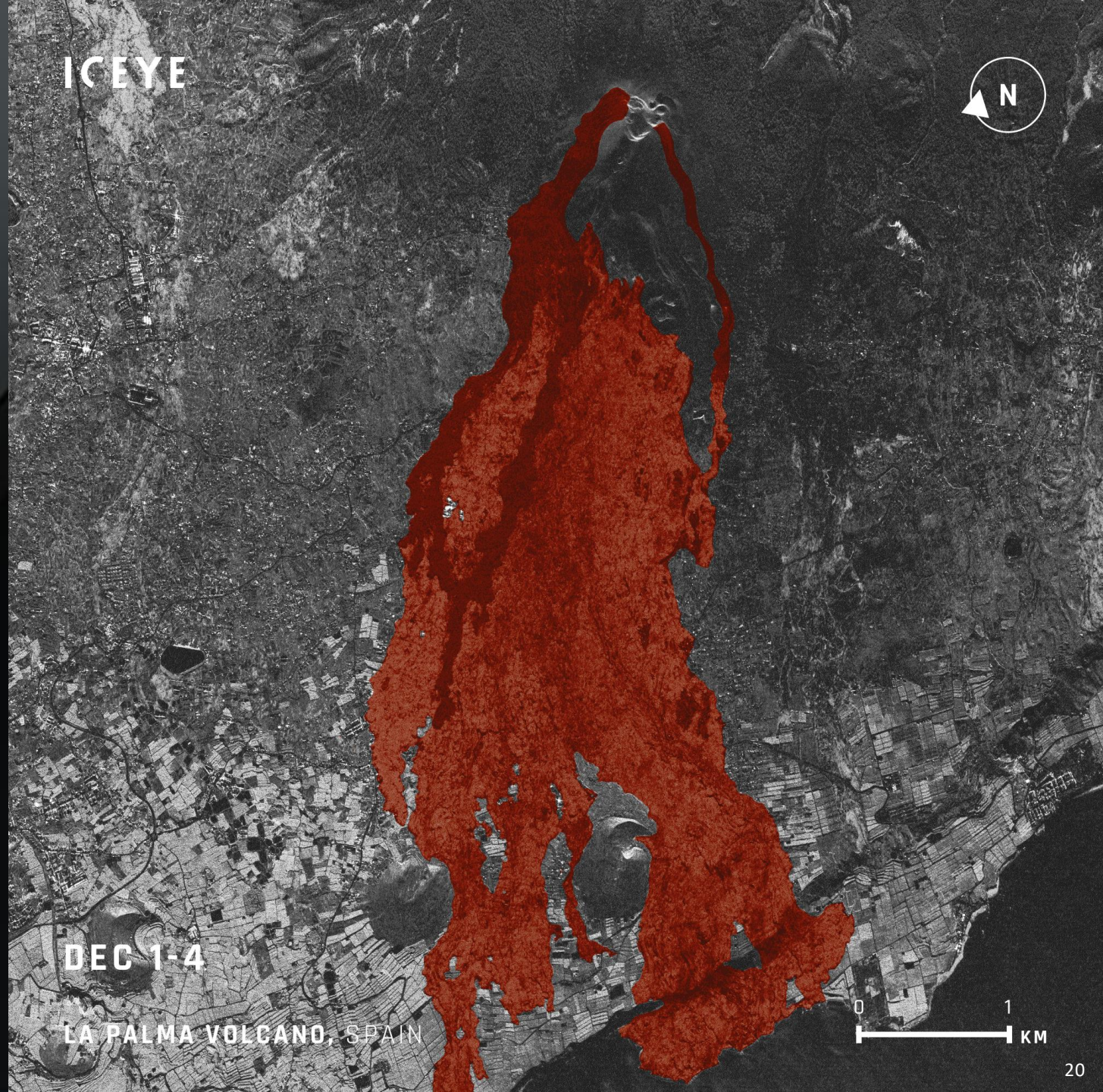
A Synthetic Aperture Radar (SAR) image of a city, showing a dense urban landscape with various buildings, streets, and a large body of water in the center. The image is in grayscale, highlighting the structural details of the city through radar returns.

Daily Coherent Ground Track Repeat (GTR)

In 2025, ICEYE US will have successfully positioned assets in specialized daily repeat orbits. These orbits are designed to allow the same asset a daily revisit with the same acquisition time, collection geometry, and location for an indefinite amount of time.

These orbits empower ICEYE US to create Amplitude Change Detection (ACD) and Coherent Change Detection (CCD) product stacks of images collected over desired locations.

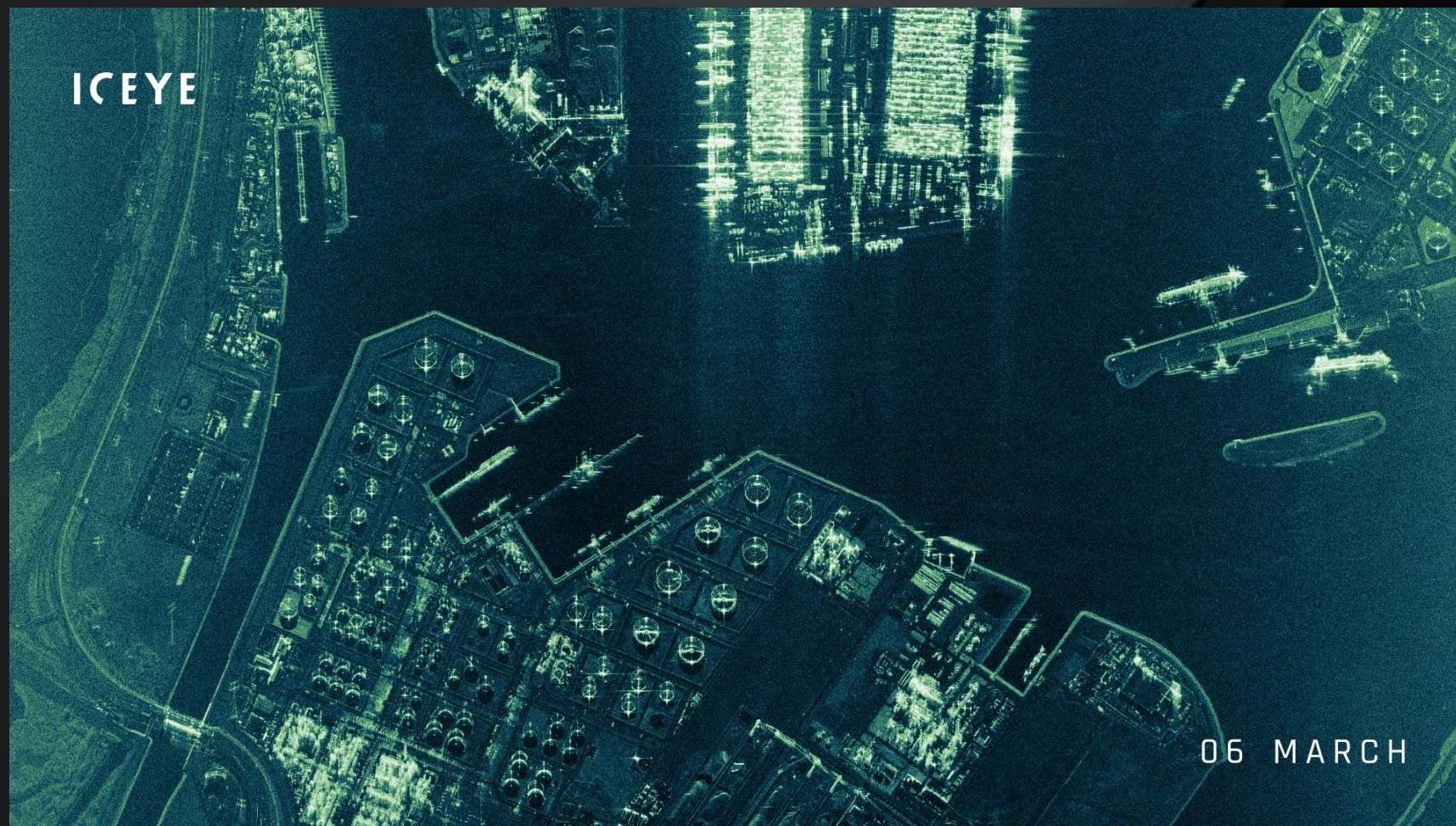
ICEYE US plans to begin offering GTR collections in 2025 over certain areas, building out the GTR capability as demand is received.



Ground Track Repeat (GTR)

Goal: daily revisit with $< 500\text{m}$ ground track shift

- By maintaining nearly identical satellite passes over a location, SAR satellites can acquire multiple images with uniform geometry.
- Comparing these exactly matching images enables the extraction of detailed information about the ground changes.



Example: GTR stack over The Port of Rotterdam, The Netherlands

Ground Track Repeat (GTR)

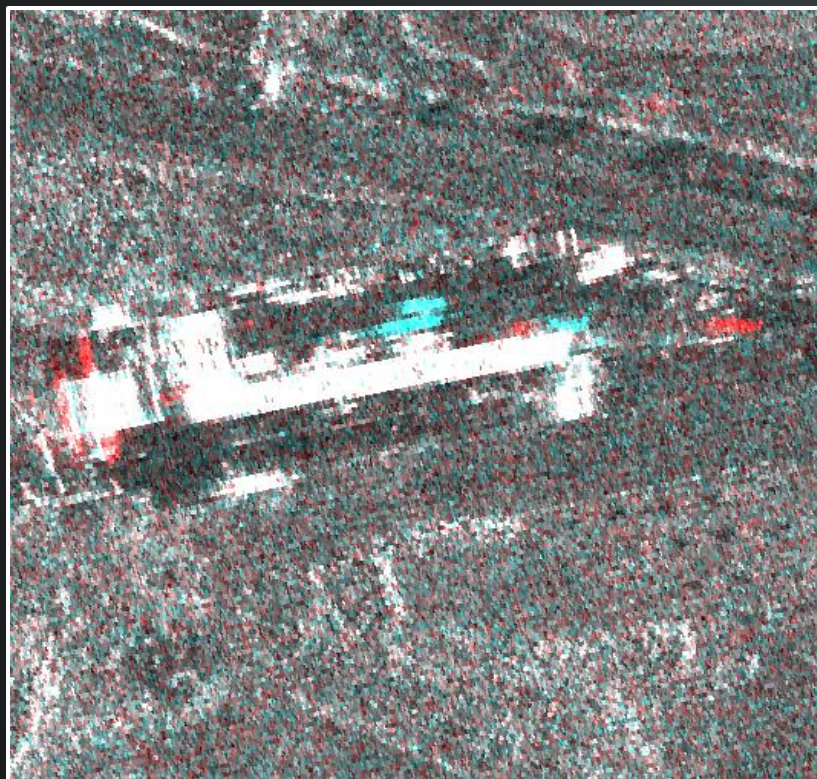
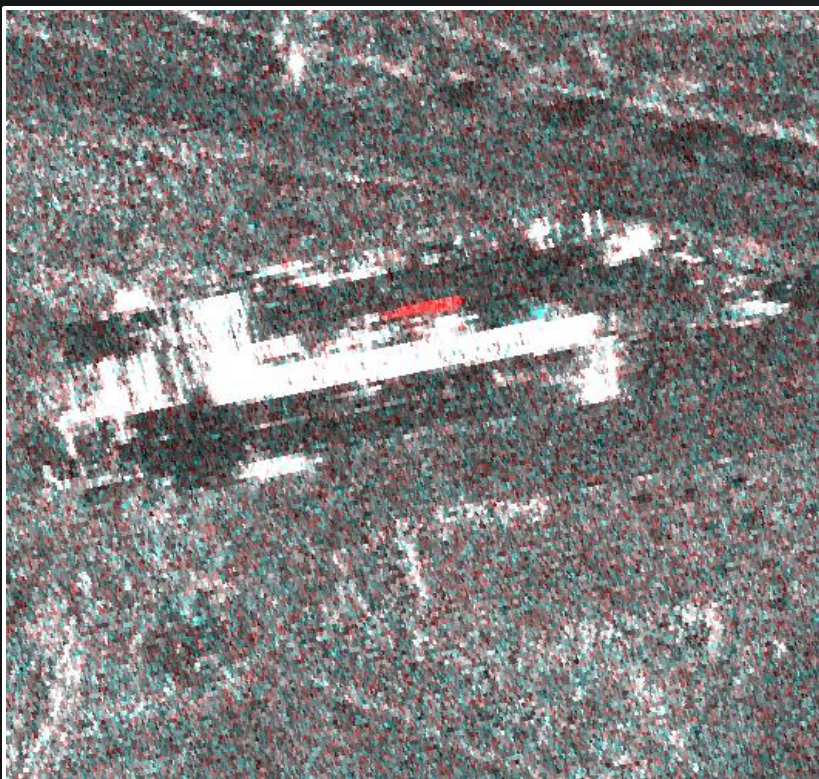
- Deforestation jeopardizes the livelihood of millions and accounts for approximately 10% of global carbon emissions.
- Illegal logging is a global problem: forests are cut down for unregulated timber sales, and farmers are clearing out land for agriculture and cattle ranching.
- Activities like this can be hard to detect with conventional methods



Example: Deforestation of Brazilian rainforest

Ground Track Repeat (GTR)

Example: Amplitude Change Detection (ACD)

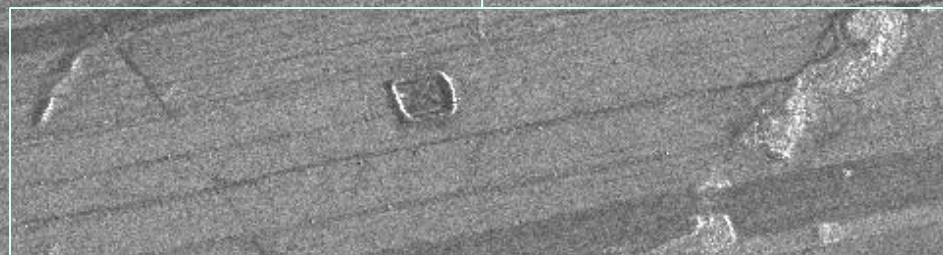


Ground Track Repeat (GTR)

Example: Coherent Change Detection (CCD)

- Requires near identical collection geometries
- Compares the complex information of the two SAR collects (amplitude and phase)
- Shows ground disturbances that may not be visible in the magnitude image
- Changes between images shown in dark

2024-11-27 | 2024-11-28



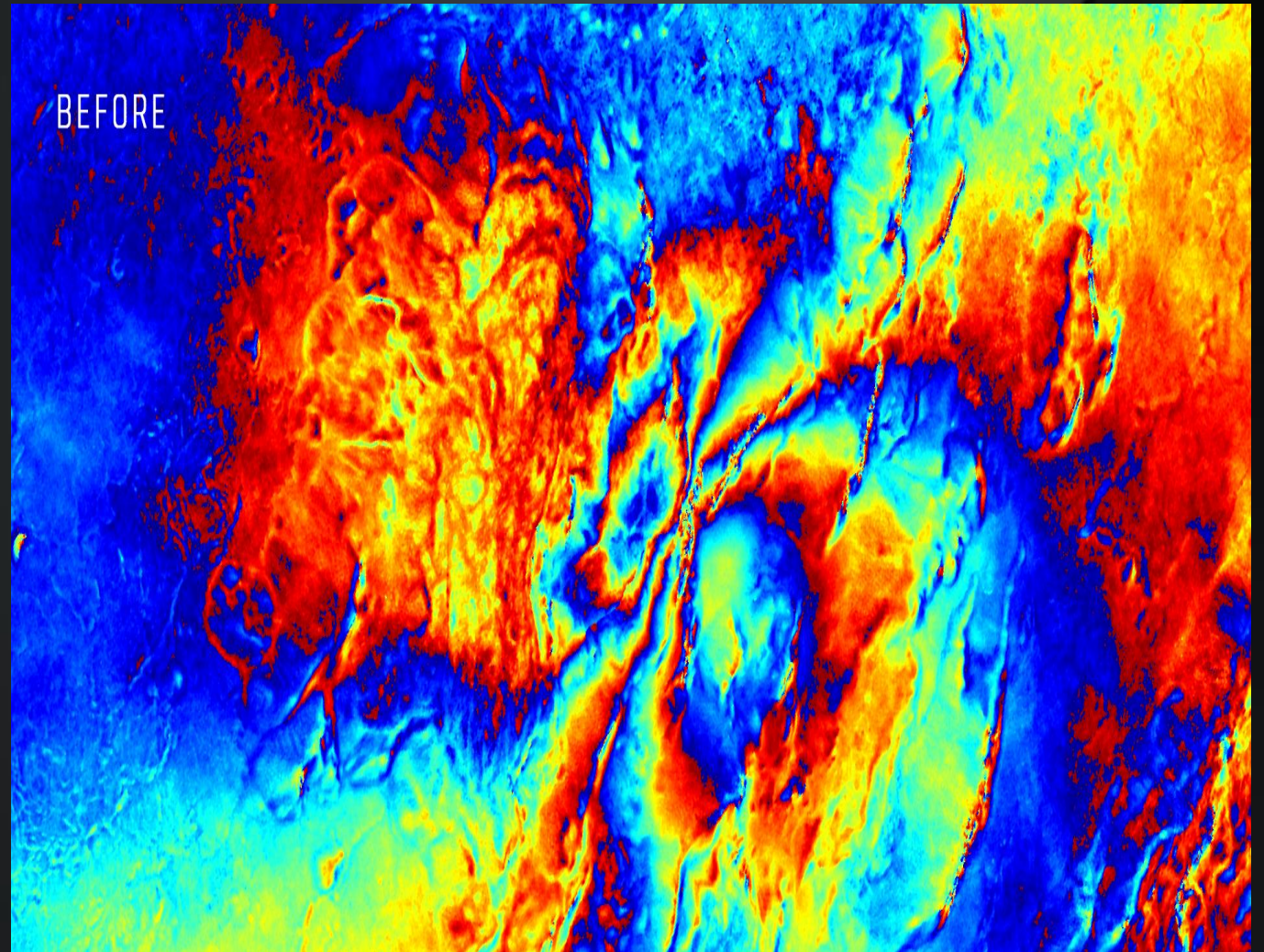
2024-11-28 | 2024-11-29



Ground Track Repeat (GTR)

- Interferometry can be used to detect vertical changes in the ground and structures by creating and comparing height information from pairs of data in a time series
- It enables creation of Digital Elevation Models (DEMs)
- It enables monitoring of areas and infrastructure for subsidence and uplift
- Provides the ability to analyze impact of underground activities, including construction

Example: Fagradalsfjall Volcano in Iceland



Accessing ICEYE US Data

An aerial, grayscale photograph of a coastal region. In the foreground, a large, dark body of water (likely a bay or harbor) is visible. Along the shoreline, there is a dense cluster of buildings, including industrial structures and residential areas. A prominent road or railway line runs along the coast. The background shows a hilly, forested landscape.

Tasking and discovery methods

ICEYE US's tasking solutions designed for customer – prioritizing customer functionality and cutting-edge imaging modalities for mission success.



Customer Operations & Satellite Planning (COSP)

→ Responsive Team

- 24/7/365 support available

→ Curated Feasibility and Archive Search

- COSP will provide detailed response based on your needs



Portal

Custom Tasking

→ Assess Feasibility

- Determine if satellite pass will be available for your parameters

→ Archive Search

- Utilize filters to determine if desired archive image is available



API

→ Automated Tasking

- Ideal for repeat and automated-process tasking

→ Quick Response time

Get a task confirmation and collection time

→ Archive Search



Questions?

ICEYE US