

Harnessing Multi-sensor Technologies for Disaster Monitoring & Detection

High Resolution



Multi Sensor



Near Real Time

Geo-Intelligence



SUHORA
space analytics simplified

Vision

Use Technology to Create a Sustainable Planet.

Mission

To become leader in 3M (Monitoring, Mapping & Managing) of Assets using Space Technology, AI, Big Data and Strategic Technologies.

What makes Suhora different?



Near Real Time Data Ordering & Space Analytics



Holistic Approach with SAR/OPTICAL/THERMAL Data



Capabilities to develop solutions and Analytics in different verticals

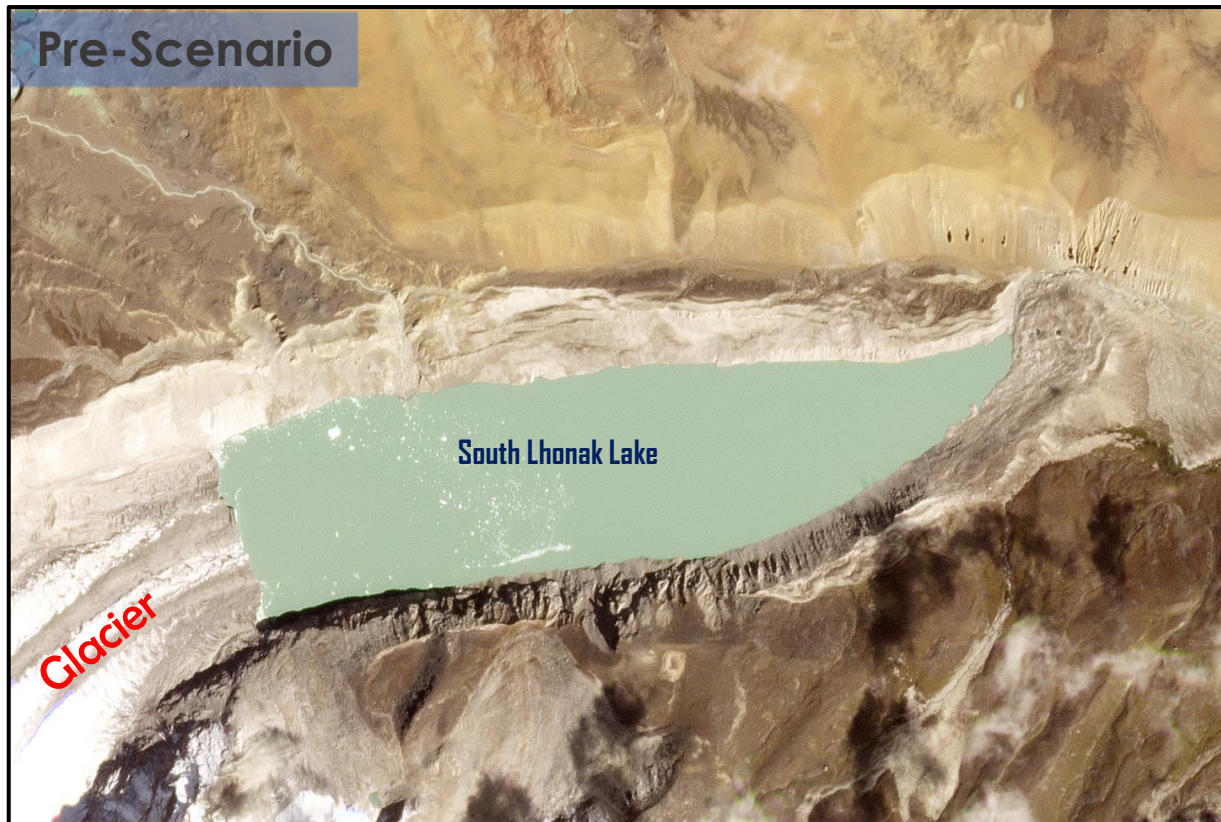


Speed and accuracy combined with Cost-Effectiveness

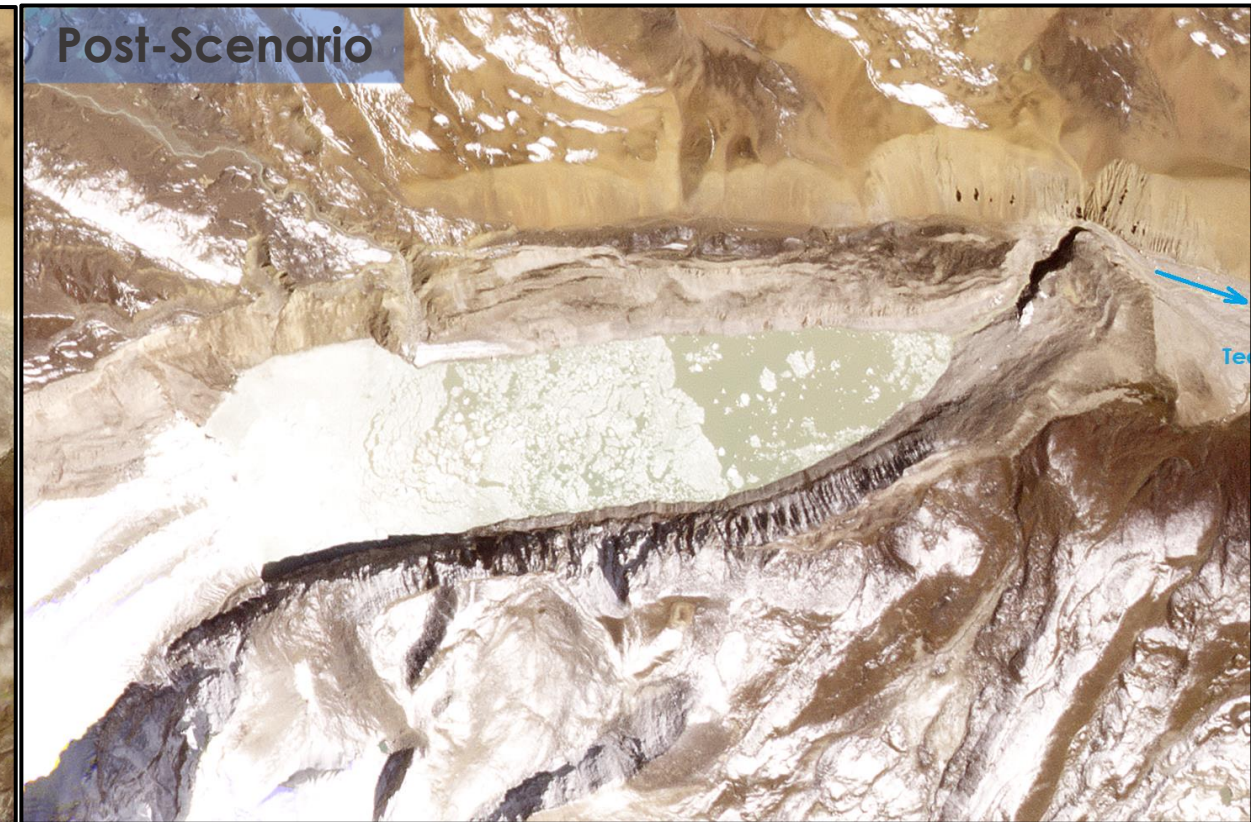


Disaster Management & Damage Assessment

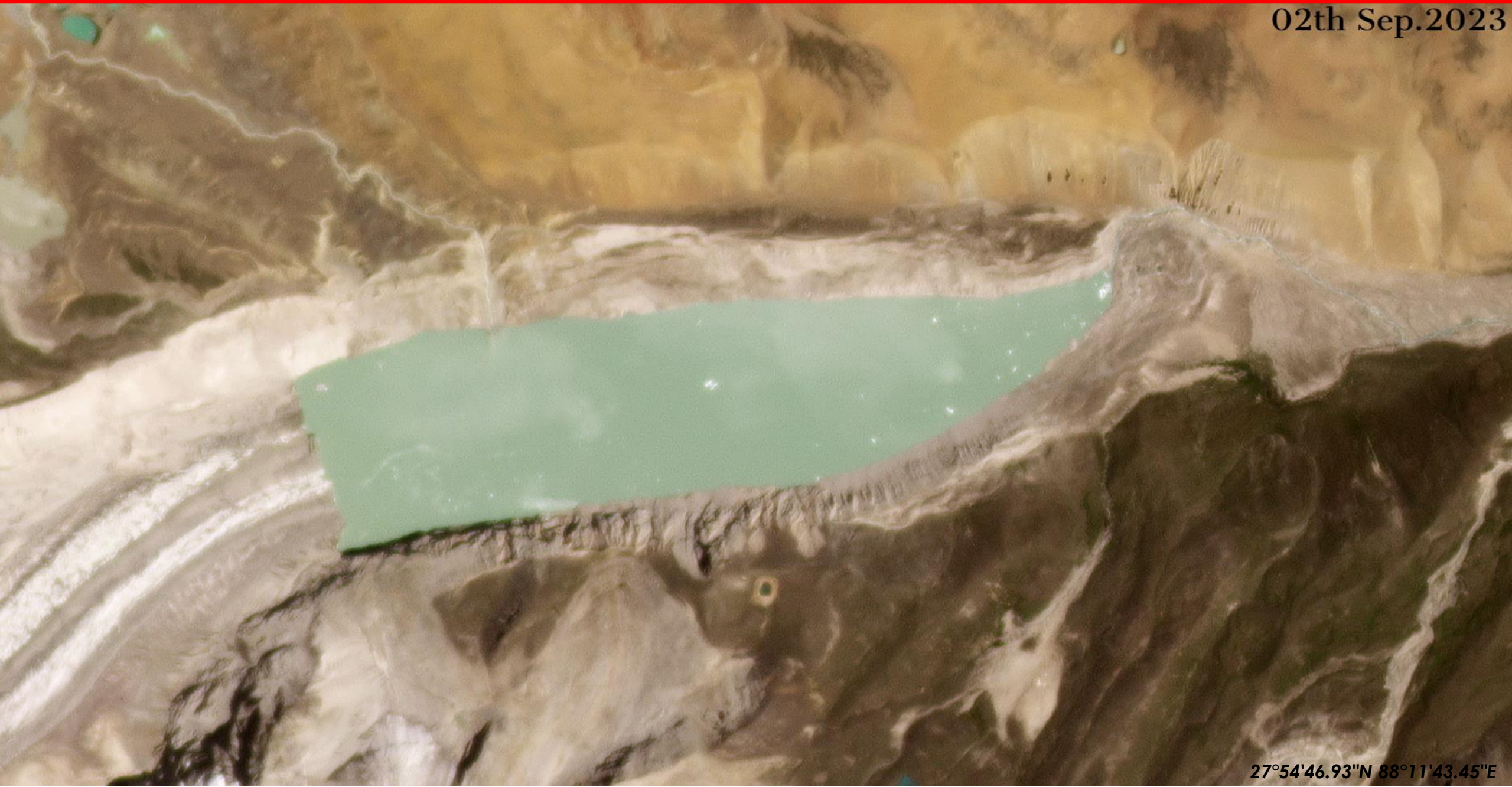
High Spatial Resolution (3 meters) | | Daily Data | | Global Coverage



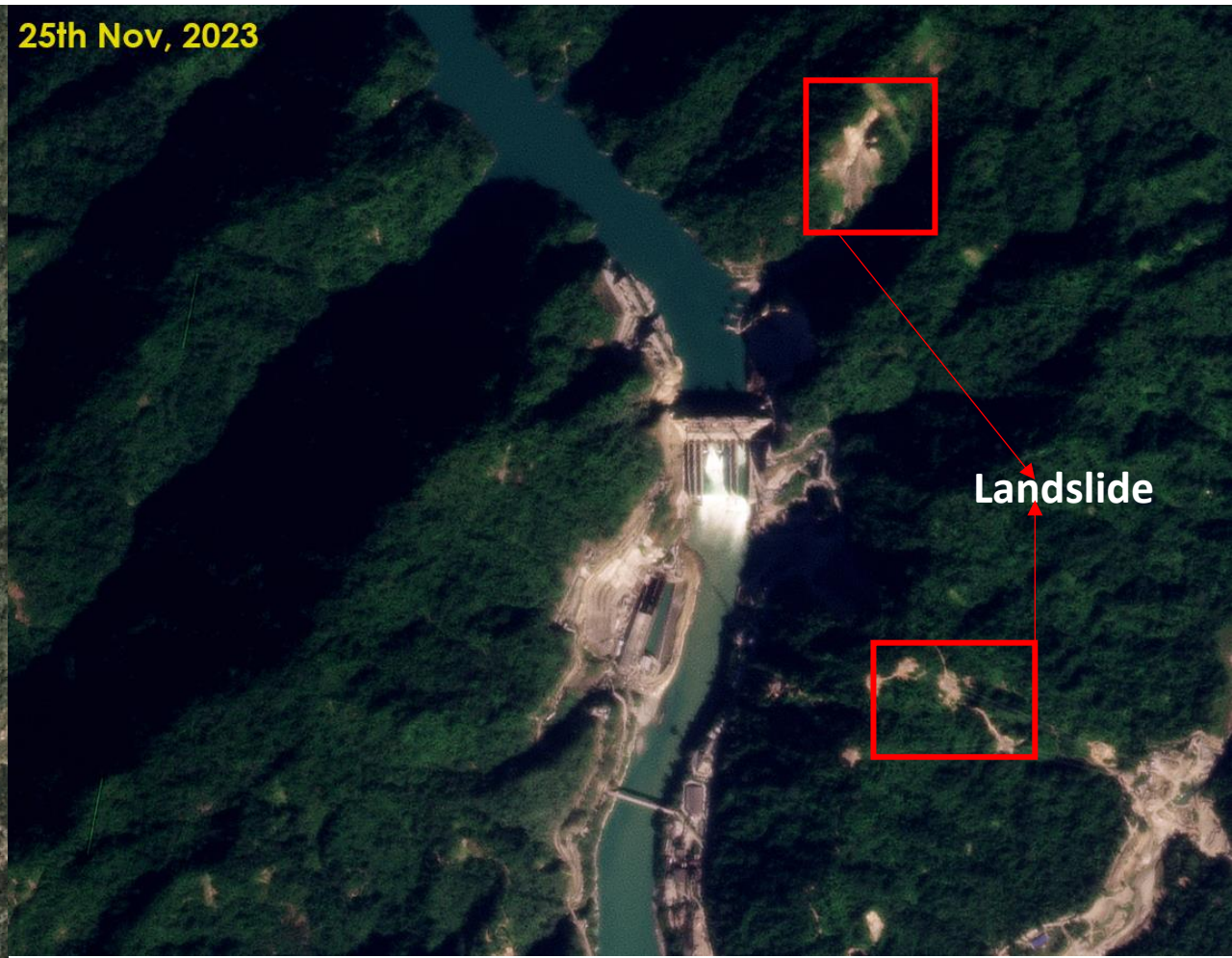
27th Sep. 2023



6th Oct. 2023



Subansiri Lower Dam

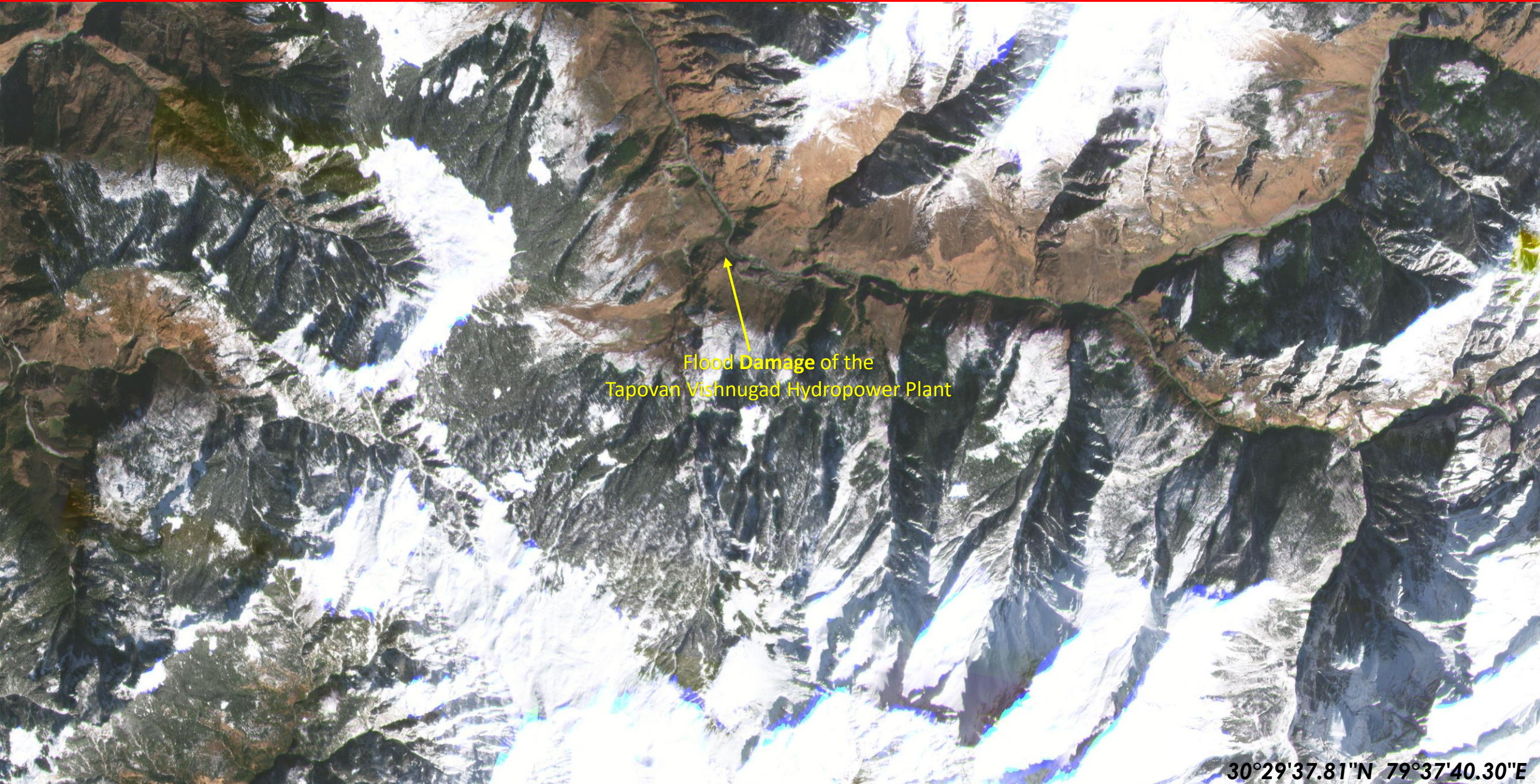


PlanetScope Image during the Dam Construction

PlanetScope Image of Recent Landslides

Rishiganga Rockslide and Flood Damage

February 07, 2021 | Uttarakhand, India

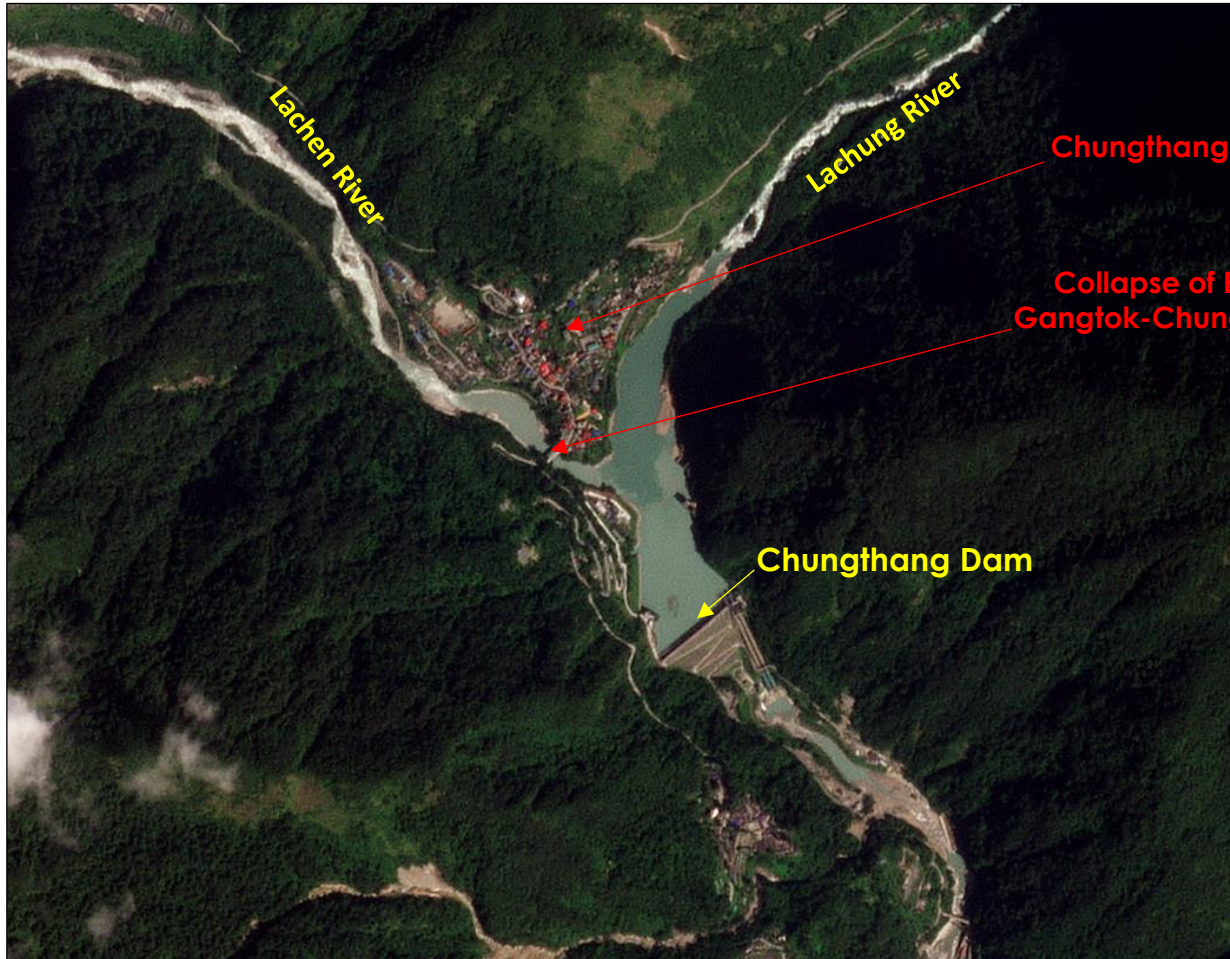


Flood Damage of the
Tapovan Vishnugad Hydropower Plant

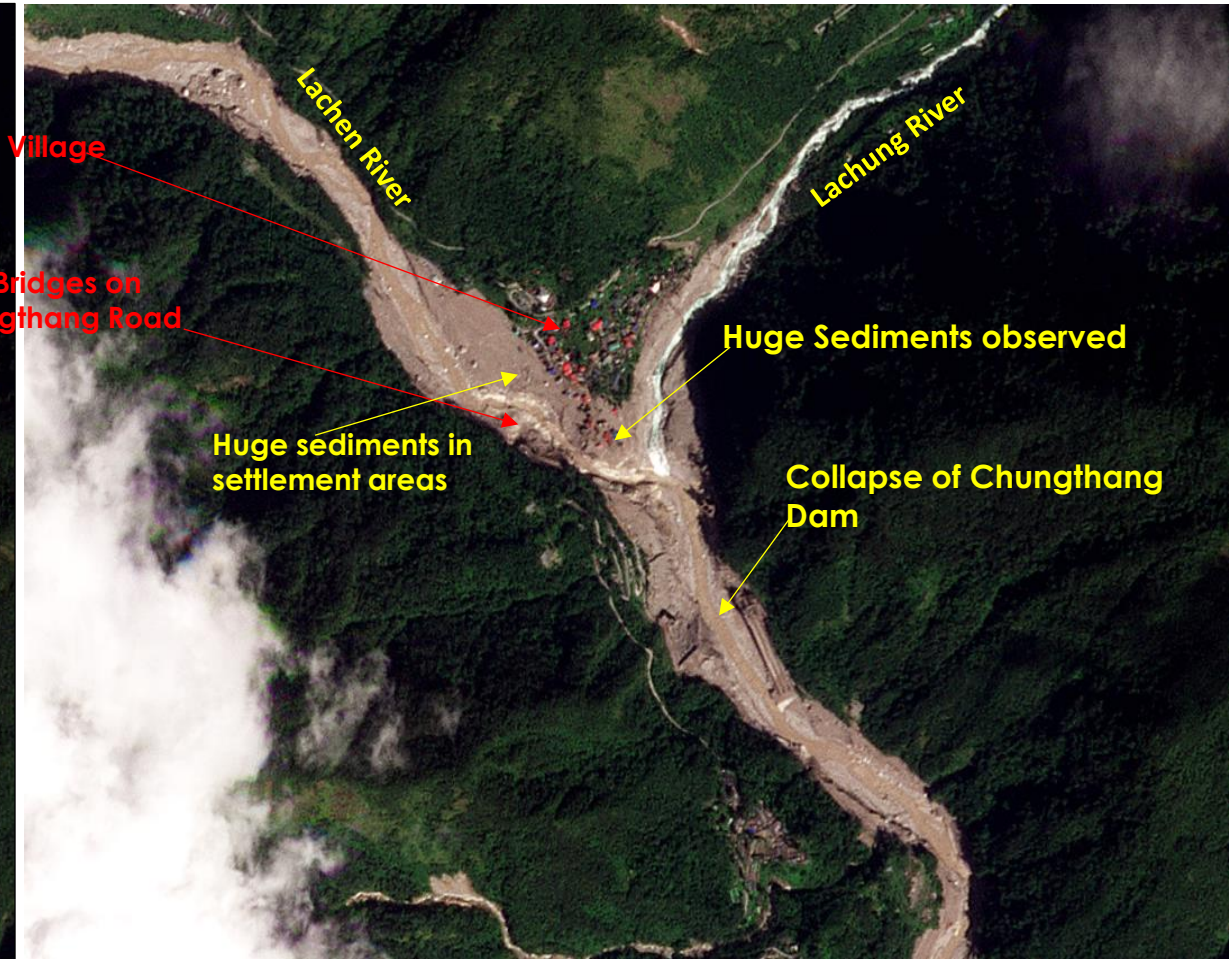
30°29'37.81"N 79°37'40.30"E

Flood Damage Assessment- Flood damage assessment is an integral part of the dam construction process, helping engineers and decision-makers make informed choices to ensure the safety, efficiency, and sustainability of dams.

Pre-Scenario (29th Sep. 2023)



Post-Scenario (9th Oct. 2023)

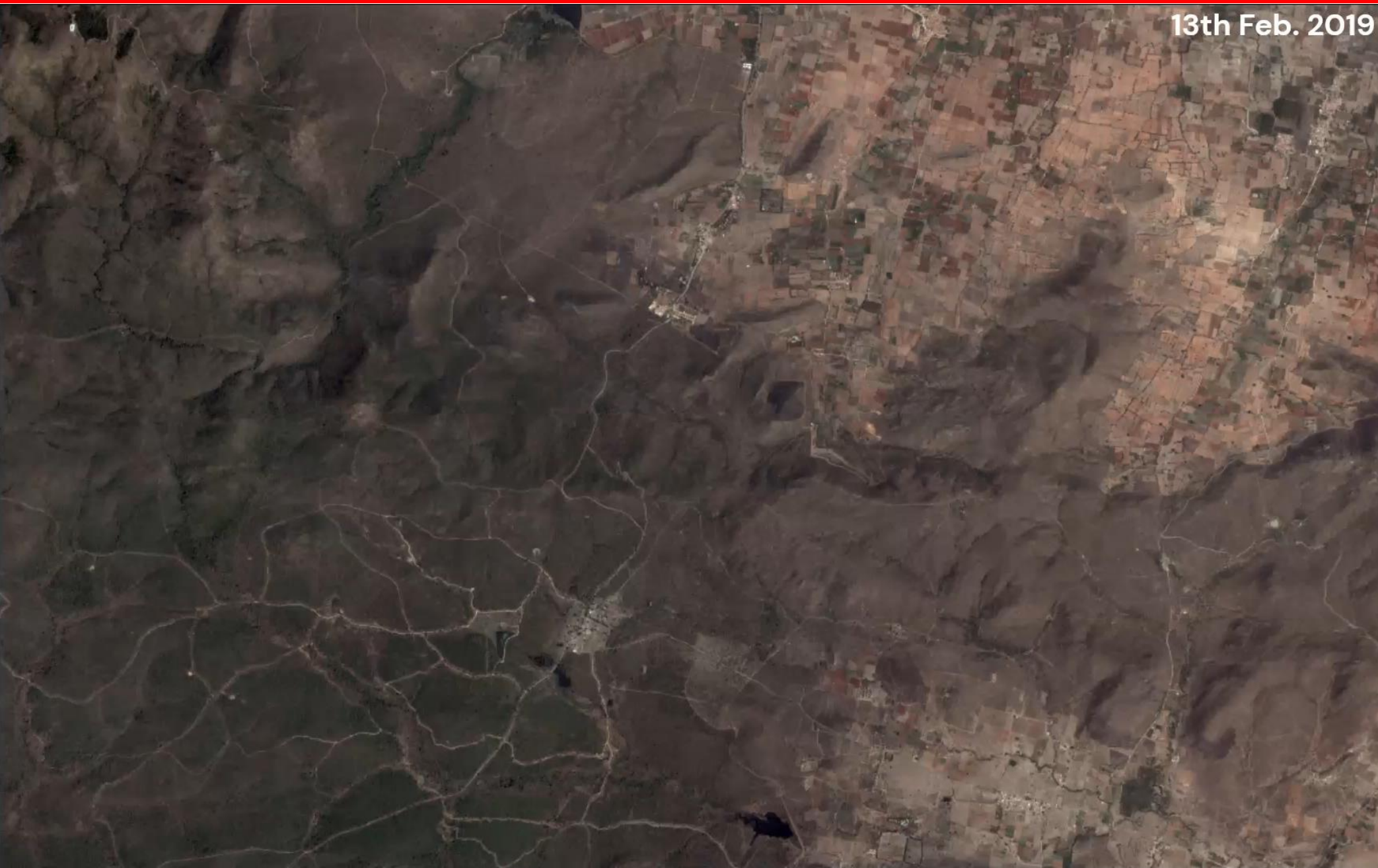


Showing Damages around Chungthang Dam due to Flood event on 3rd Oct,2023

27°35'52.57"N 88°38'59.99"E

Lachen Forest Block





13th Feb. 2019

Bandipur Forest Fire:

A massive forest fire broke out in the Bandipur National Park (Tiger Reserve) of Karnataka, India on February 22, 2019.

Suhora provides accurate forest fire maps by ML-based analytics with daily [PlanetScope Imagery](#)

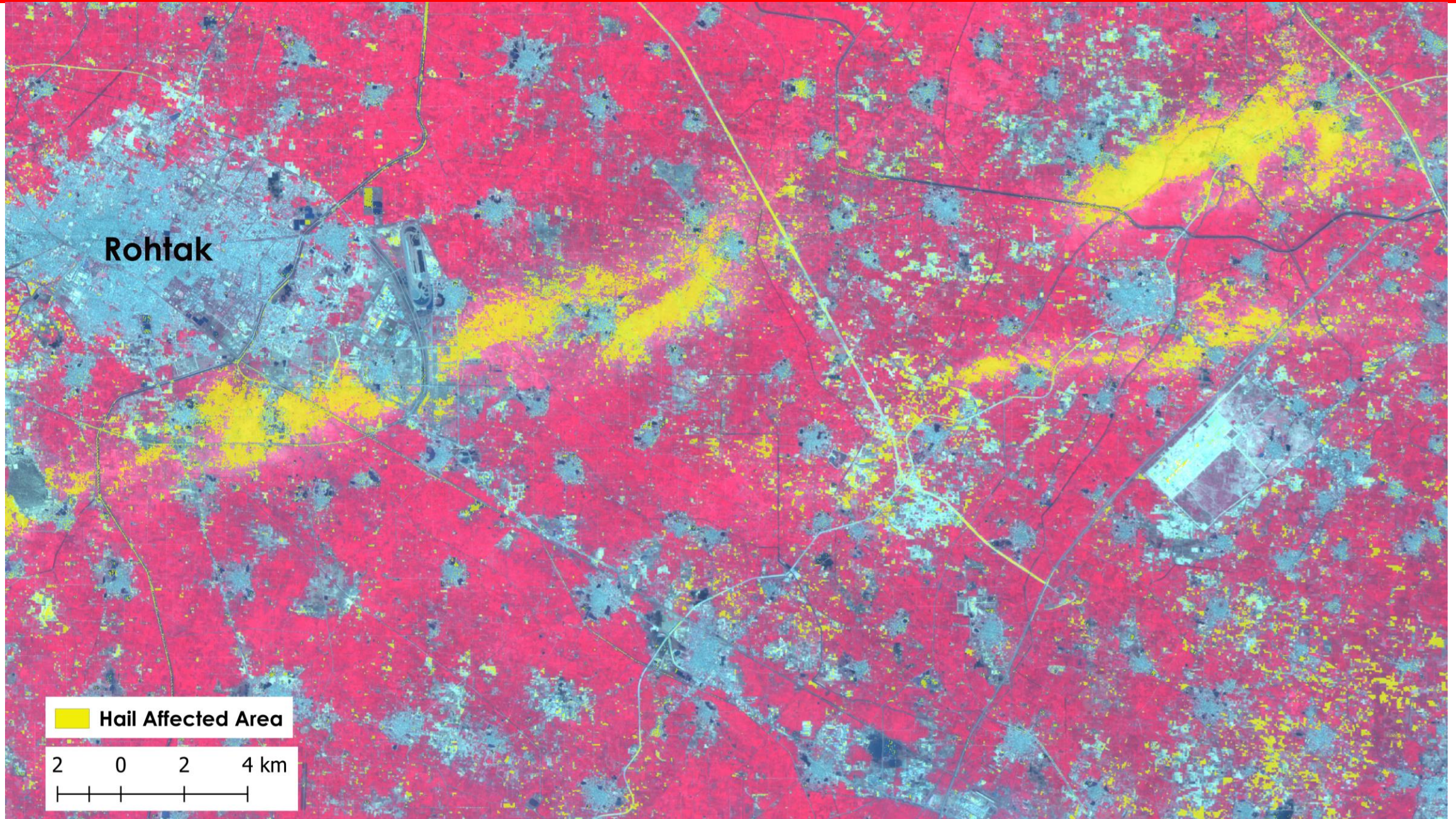
| Date | *Area(sqkm) |
|------------|-------------|
| 22-02-2019 | 4.24 |
| 23-02-2019 | 8.78 |
| 25-02-2019 | 40 |

 Forest Fire Affected Area

Hailstorm in North India



Hailstorm Mapping and Damage Assessment Using LISS-III Image (9th March-2024)



28.02.2024

Rohtak



SUHORA's Advances Approach

- Based on PlanetScope Imagery(3m).
- **Machine Learning model**-based approach.
- Detects all the burned fields.
- More than **75 burned** fields detected.
- A total of 1.12 sq km area is burned.
- We can **detect and monitor stubble burning day-wise.**
- Capability to study very small areas.
- **Cadastral-level** burning field can be detected.



Video: PlanetScope Image with Detected Burned Field near Patiala, Punjab (23/10/2022)

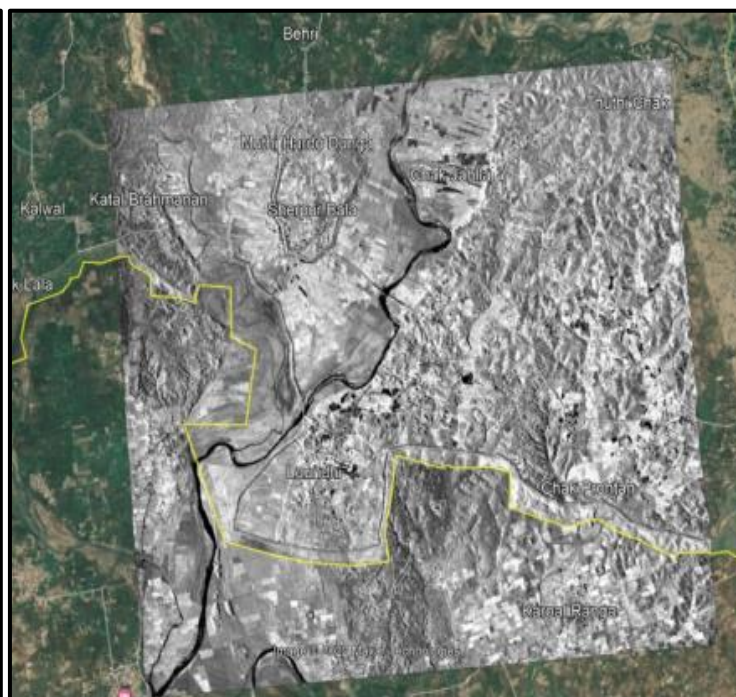
A 3D perspective view of a city model with a blue radar overlay. The radar shows a large blue area covering a significant portion of the city, indicating a radar scan or coverage area. The city buildings are rendered in various colors including grey, orange, yellow, and red. A river or canal winds through the city. The background is a light, hazy sky.

**All Weather,
Day- Night RADAR
Imagery for *Disaster
Monitoring, Damage
Assessment***

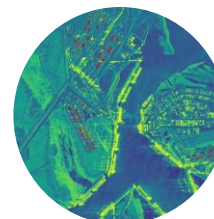
Very High Resolution(up to 25 cm) | | Daily Data | | Day & Night/All Weather Conditions | | Global Coverage



Cloudy Optical Data
3rd July 2022



SAR Data
3rd July 2022



Persistent Monitoring

ICEYE's large constellation of new space satellites unlocks new access to valuable data on any location on Earth – **day and night**, through the clouds, and multiple times per day



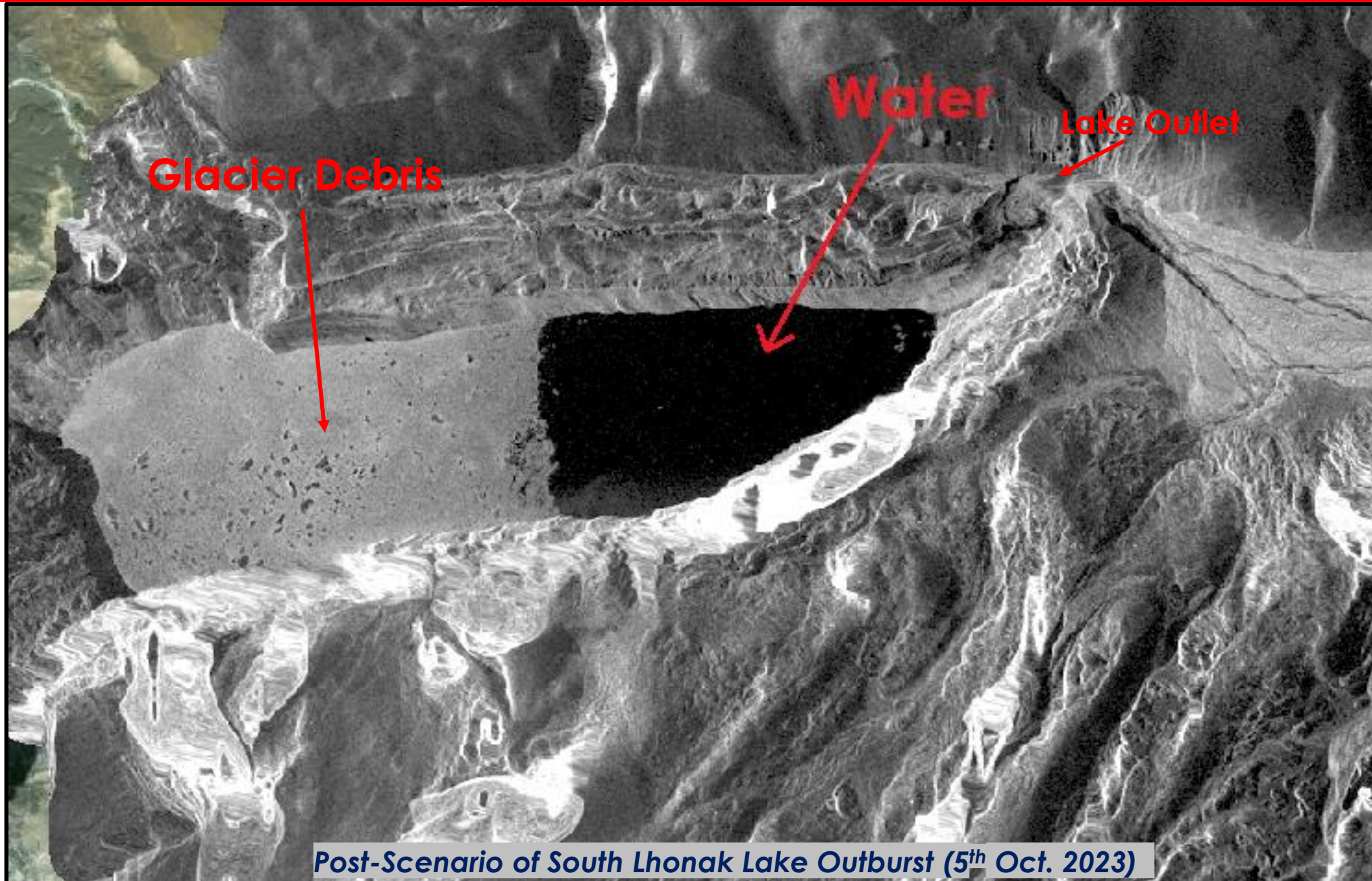
High Resolution and Swath

Very High resolution up to **25 cm** and continuous monitoring of up to **10,000** square kilometers in a single image



Mission Ready

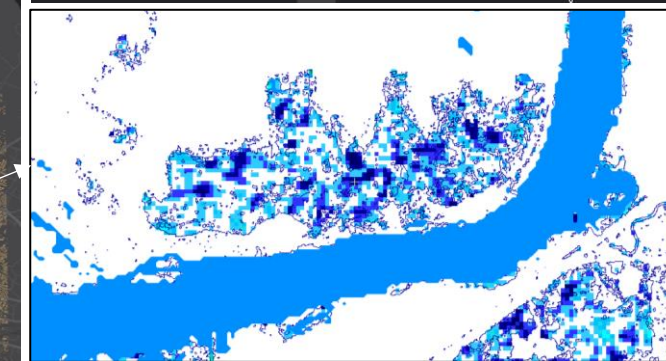
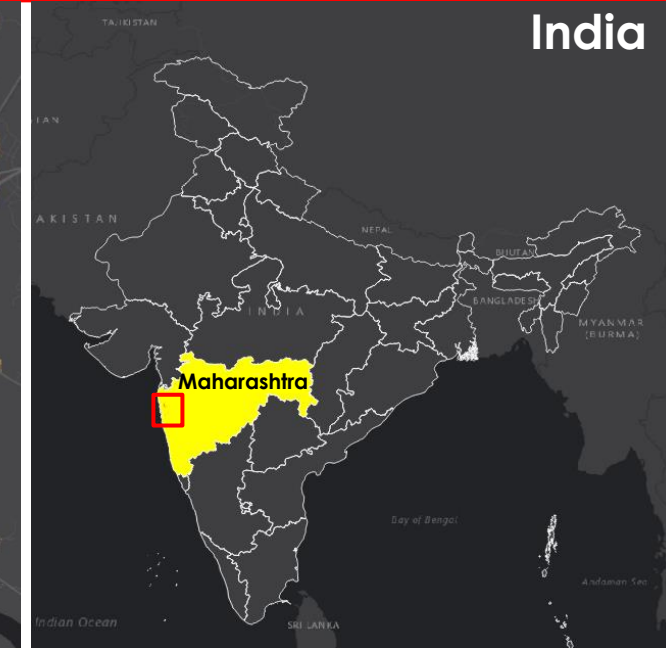
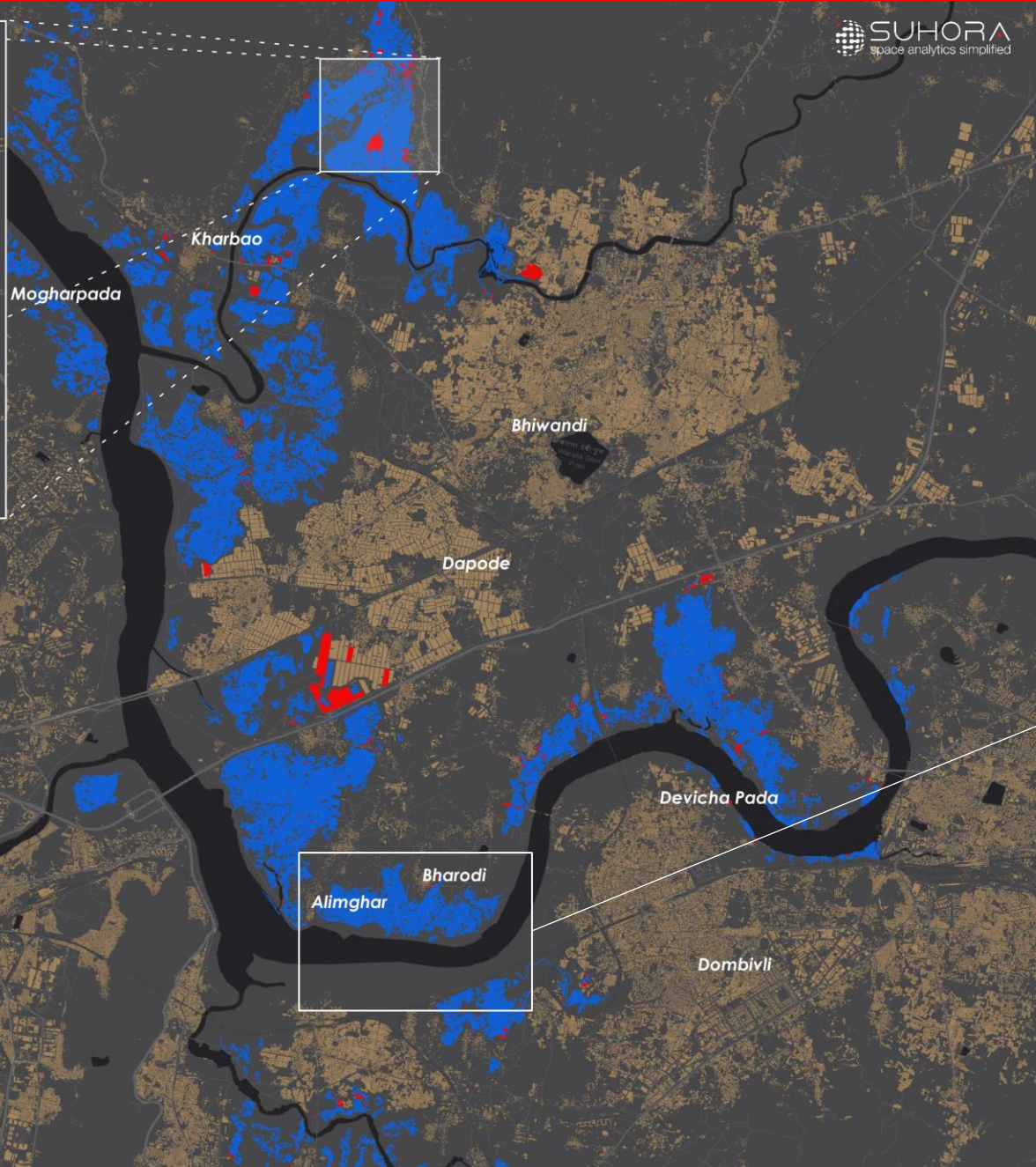
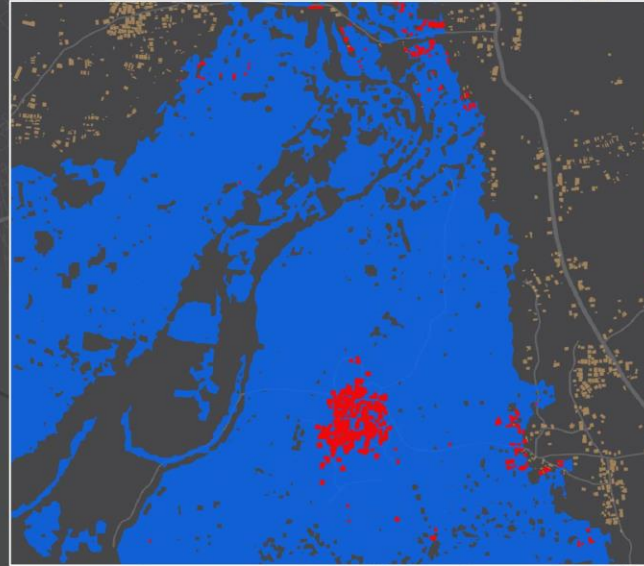
Task ICEYE SAR satellites to access critical data on any location on Earth – day or night and in any weather. The process is simple, and images are usually delivered within **1* hour** of initial request.



Post-Scenario of South Lhonak Lake Outburst (5th Oct. 2023)

27°54'46.93"N
88°11'43.45"E

Flood Inundation Area of Mumbai & Suburban Region-22 July,2021



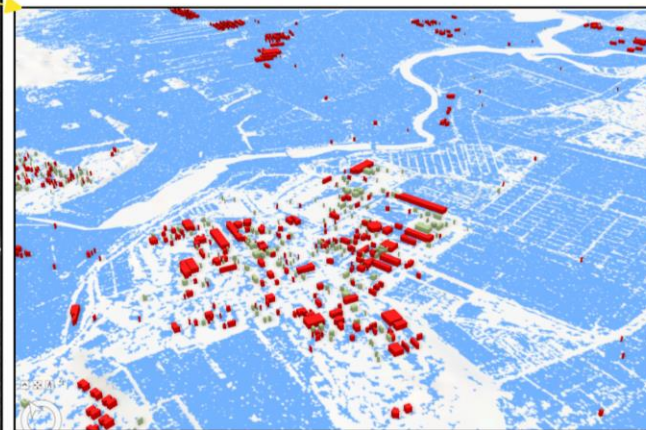
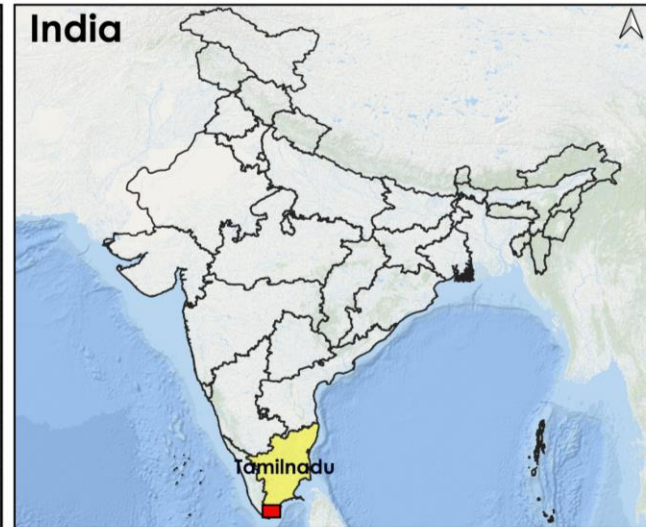
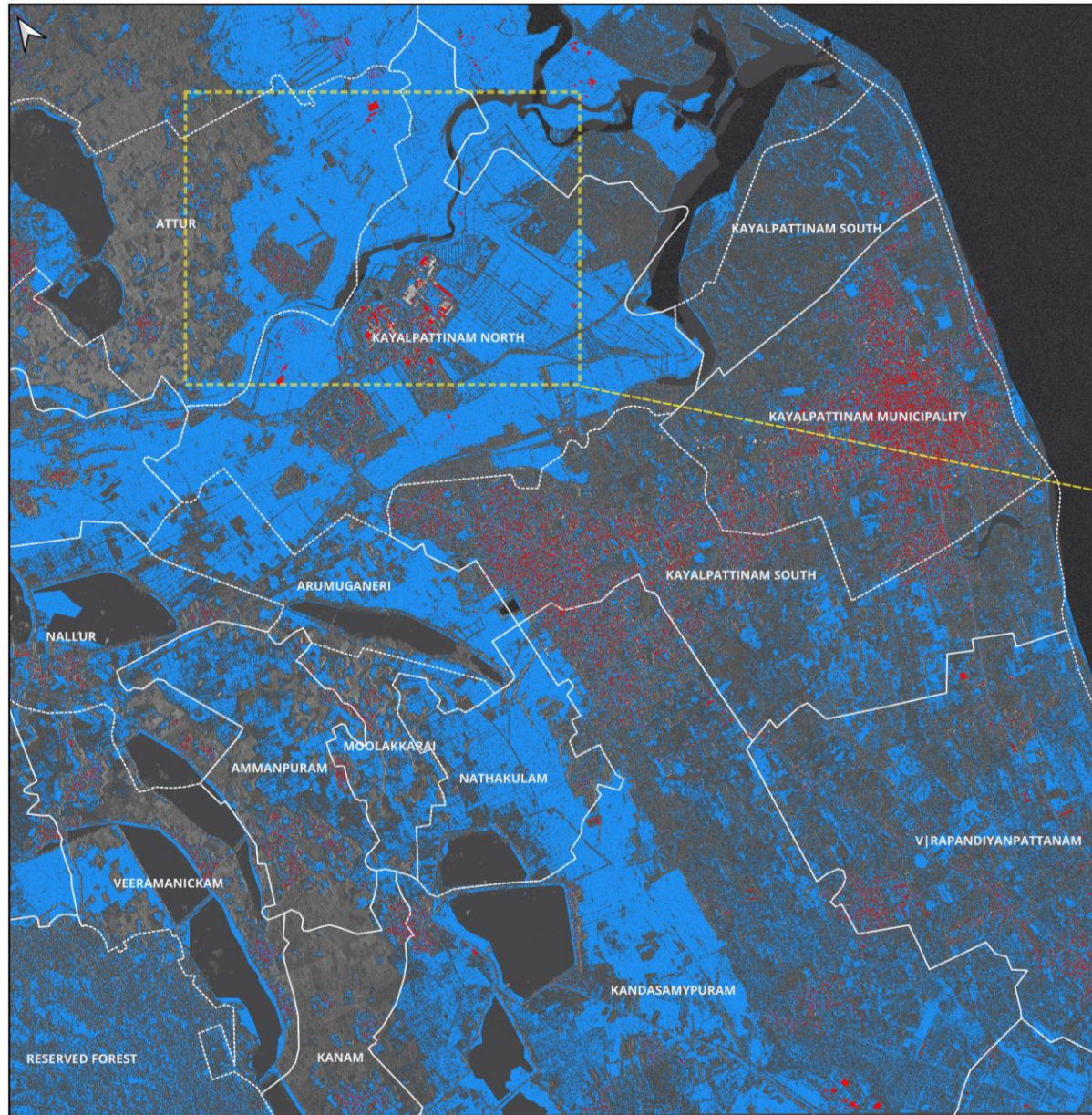
Affected Building ■
Safe Building ■
Flood Inundated Area ■



Depth of Inundated Water (m)

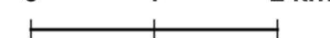
| | |
|--|-----------|
| ■ | 0 - 0.5 |
| ■ | 0.5 - 1.0 |
| ■ | 1.0 - 1.5 |
| ■ | 1.5 - 2.0 |
| ■ | > 2.0 |

Flood Inundation Map of Kayalpatnam, Thoothukkudi, Tamil Nadu



Flood Inundated Area ■
Affected Building ■
Safe Building ■

0 1 2 km



| Village | Inundated Area(sqkm) |
|----------------------------|----------------------|
| KAYALPATTINAM NORTH | 6.16 |
| SUGANTHALAI | 1.36 |
| NALUMAVADI | 0.42 |
| NALLUR | 0.91 |
| NATHAKULAM | 1.42 |
| MOOLAKKARAI | 0.53 |
| VEERAMANICKAM | 0.80 |
| KANAM | 0.19 |
| KANDASAMPURAM | 5.67 |
| KEELA TIRUCHENDUR | 0.40 |
| VIRAPANDIYANPATTANAM | 2.15 |
| KAYALPATTINAM SOUTH | 1.71 |
| KAYALPATTINAM SOUTH | 0.45 |
| PUNNAKAYAL | 2.19 |
| SENTHAMANGALAM | 1.21 |
| ATTUR | 2.68 |
| MELA AUTHOOR | 0.20 |
| KAYALPATTANAM MUNICIPALITY | 1.20 |
| ARUMUGANERI | 1.40 |
| AMMANPURAM | 0.89 |
| RESERVED FOREST | 1.28 |

Major Findings:

1. Approximately **13000 Buildings** are affected.
2. Kayalpattinam North village is the most affected (6.16 sqkm).

Image Date:20/12/2023

Avalanche Blockage Identification

Udaipur, India.

Imaging Time: 04-03-2024 1:43AM

Other Fresh Avalanches

North 

Dara Waterfall

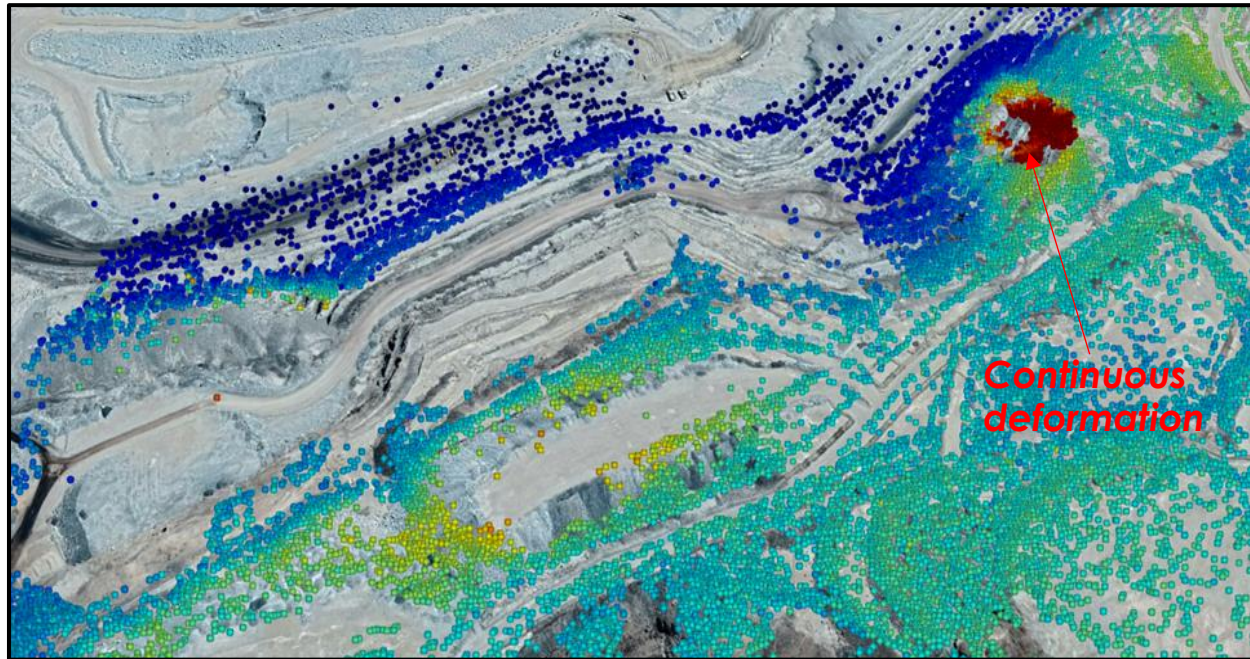
Chenab

Probable avalanche blockage

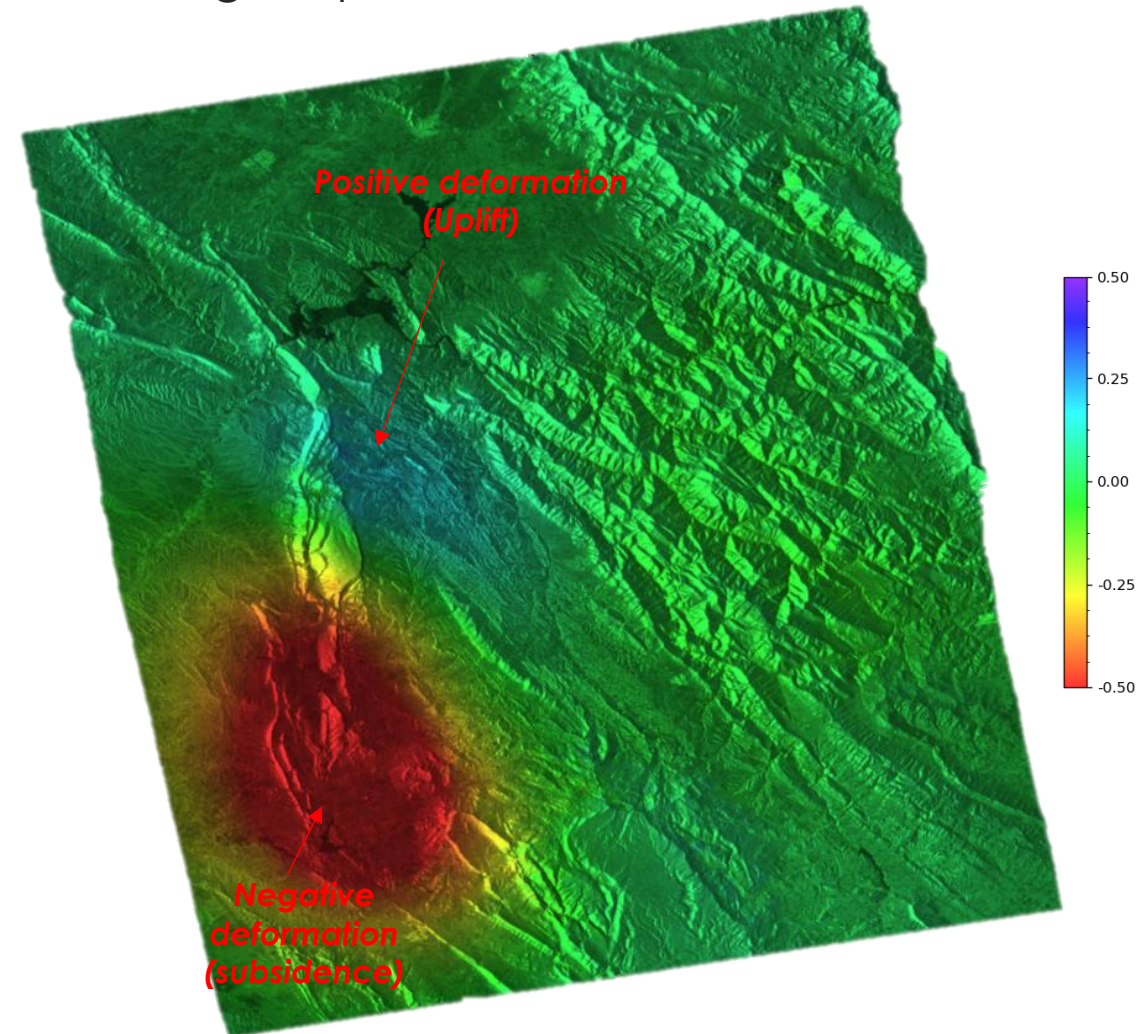
Goharman village

Ground Deformation and Land Subsidence Monitoring using InSAR Techniques. Mine caving/ DAM Stability Monitoring using PS-InSAR Techniques

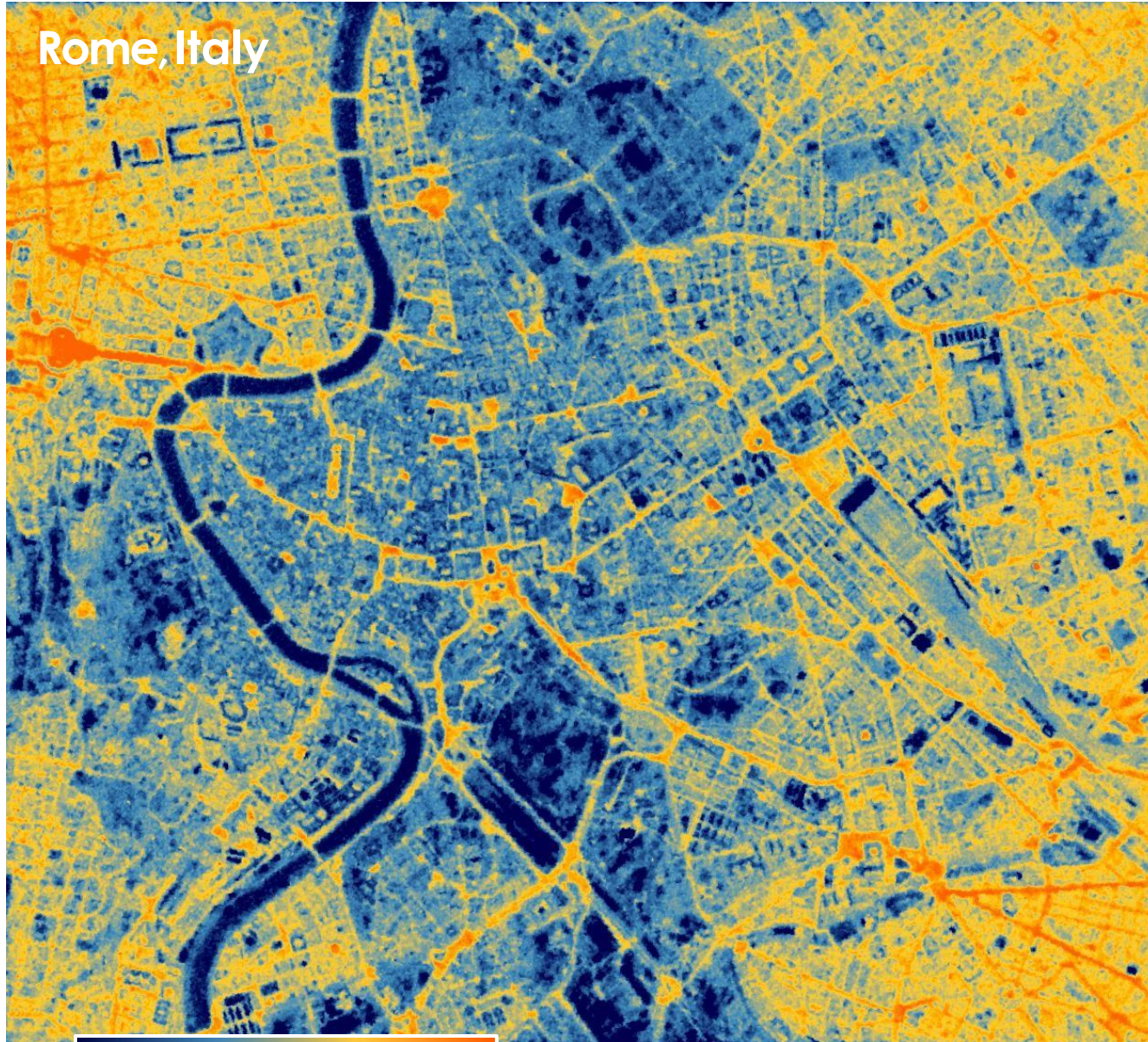
Get actionable reports and Measure Ground changes upto millimeter Level.



PSI deformation map showing points colorized by deformation rate at Rössing Uranium in Namibia. One location (red) shows significant and Mine continuous deformation on the steeply sloped edge of the mine.



Rome, Italy



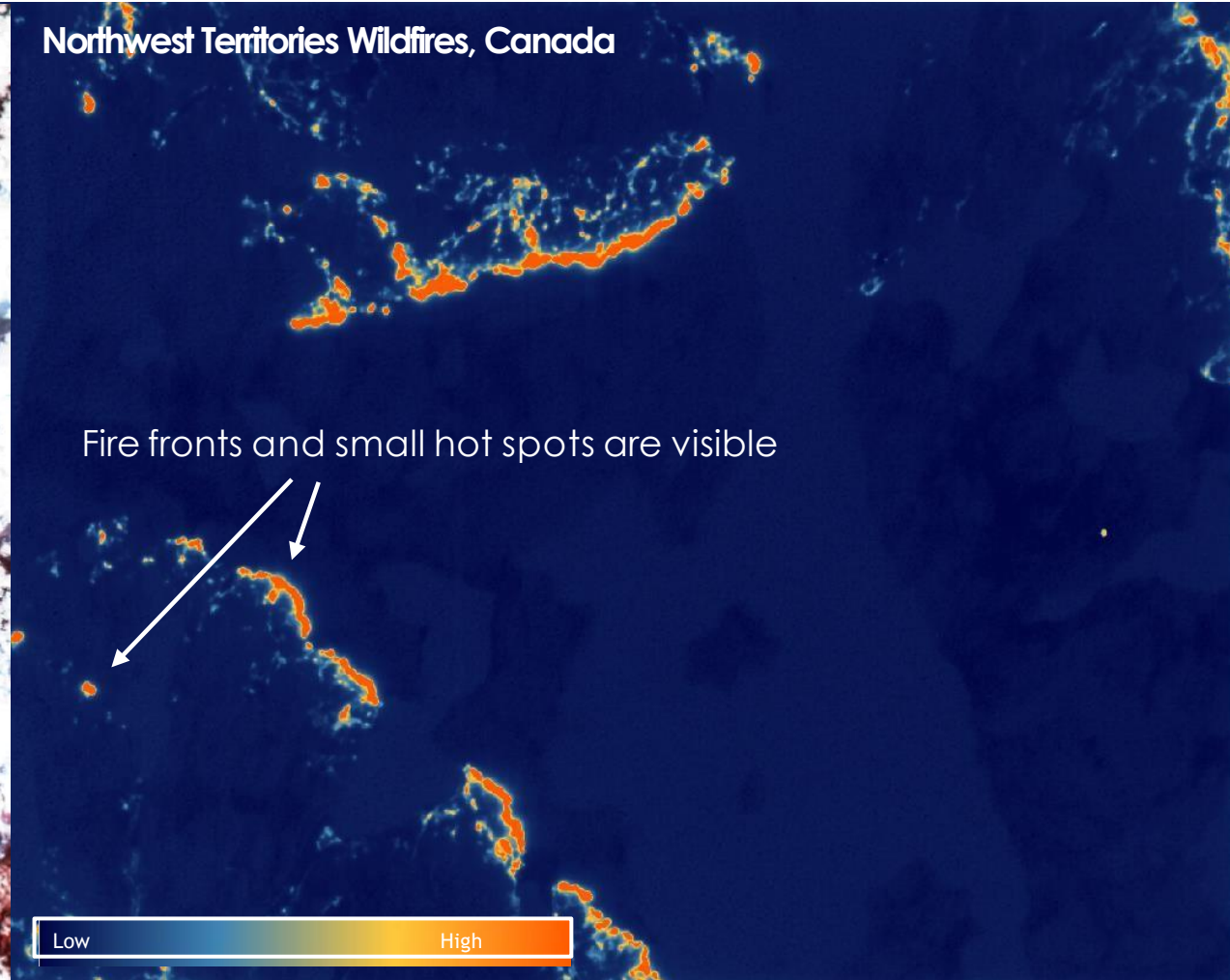
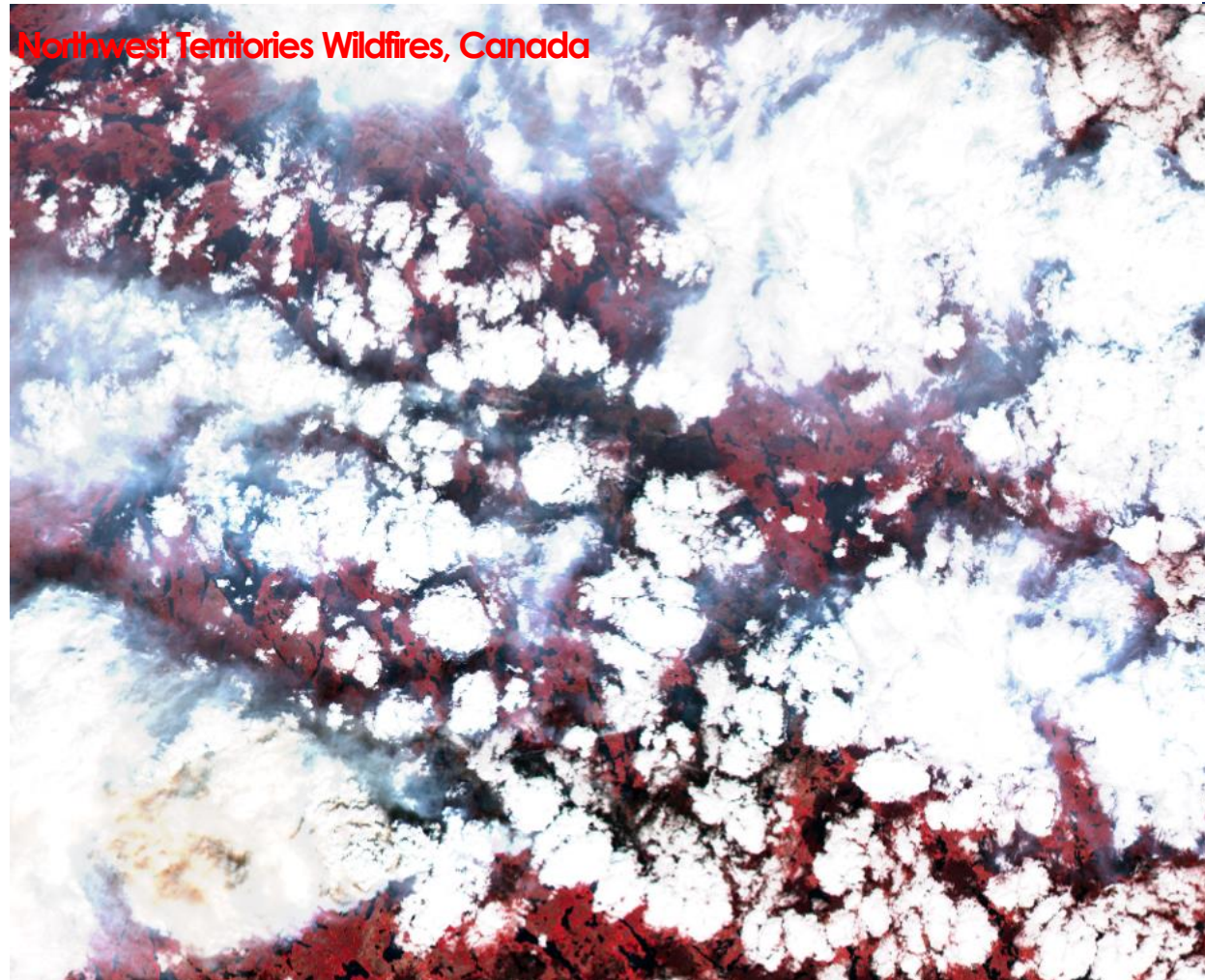
Low

High

World's 1st highest resolution (3.5m GSD) Spaceborne thermal image

- 22nd June 2023
- Night-time capture
- Single frame
- Limited sensor non-uniformity adjustment

Thermal Images can see through smoke; make possible to monitor forest fire extent



Sentinel-2 False Color IR Daytime collection on July 26, 2023

Night Collection Satvu's thermal imagery on July 26, 2023



Fresh Data Tasking & Management | | Archive Data Management & Ordering | | Data Analytics & Insights

 Efficient **Mission Planning and Tasking Platform**

 **Smart Tip-n-cue**


 An innovative platform for **Earth Observation data collection and processing**

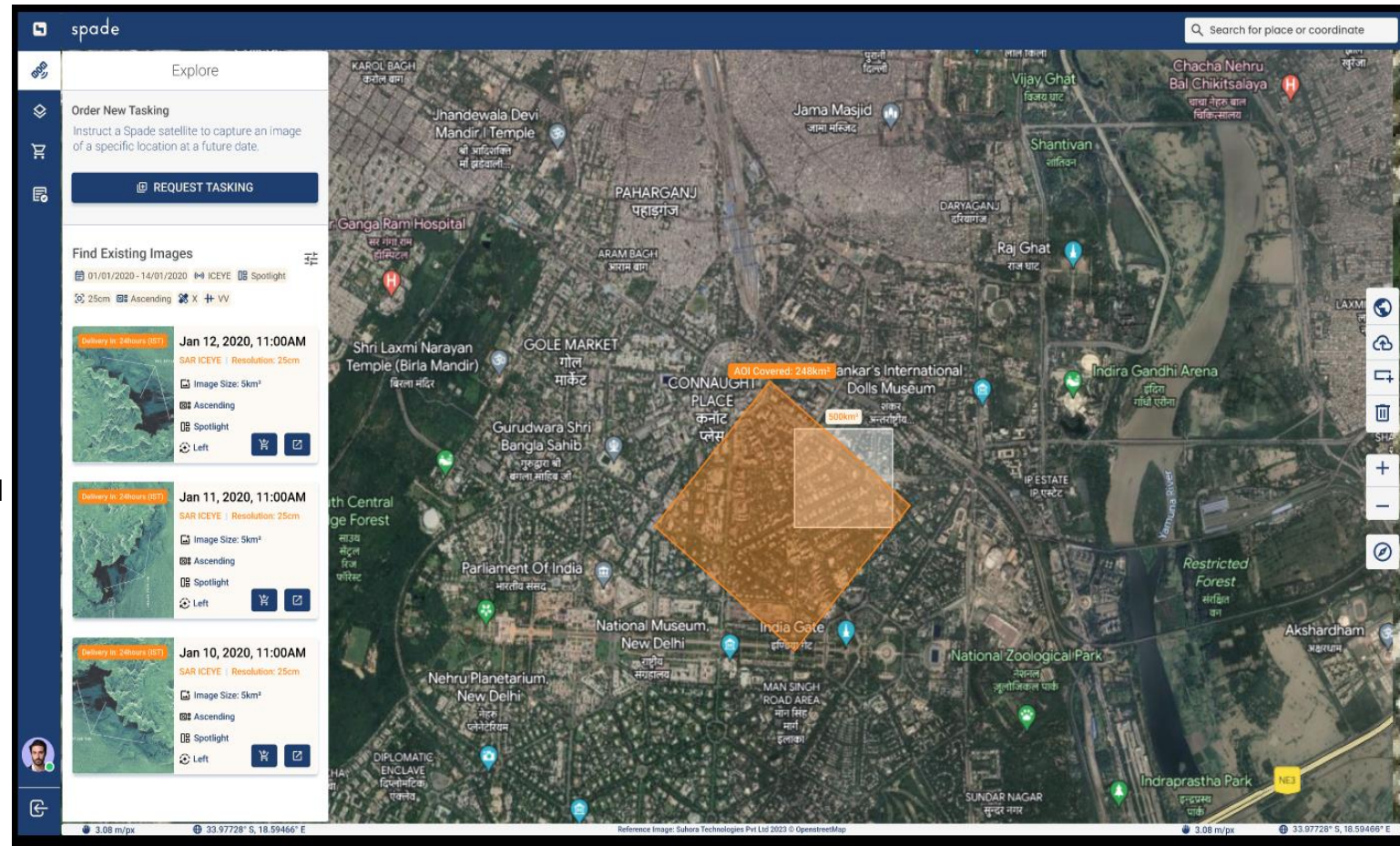
 **Multi-sensor Platform**

 **Integrated with intuitive tools.**

 **Interactive dashboard to manage data subscriptions.**

 **AI Based Surveillance and Monitoring**

 **Analytics Solutions: Target Detection/Thermal Anomaly Detection/Change Detection/Disaster Monitoring**



List of Different Sensors for Disaster Management

| Sl.No | Name of Product | Type | Resolution | Minimum Order Size | Application |
|-------|-----------------------|-----------------------|--------------------|--------------------|--|
| 1. | PlanetScope | OPTICAL | 3.5m | 100 Sq km | <ul style="list-style-type: none">• GLOF Monitoring• Forest Fire Mapping• Disaster Site Monitoring• Damage Assessment |
| 2. | SkySat | OPTICAL *On Demand | 50cm | 50 Sq km | <ul style="list-style-type: none">• Damage Assessment• Site Monitoring• Disaster Management• Rapid Response Planning |
| 3. | ICEYE (X Band) | SAR | 25cm/3m/15m | Scene basis | <ul style="list-style-type: none">• All Weather Monitoring• Land Subsidence Mapping• Flood Inundation and Depth Mapping |
| 4. | SatVu | Thermal/IR | 3.5m | Scene basis | <ul style="list-style-type: none">• Forest Fire Detection |

| Solution | | |
|---|--|--|
| Pre-Disaster (Mitigation, Preparedness) | During-Disaster (Response) | Post-Disaster (Recovery) |
| <ul style="list-style-type: none"> • Risk Assessment and Vulnerability analysis of Landslide, Flood, Earthquake, Cyclone • Cyclone Prone Area Mapping, Cyclone Tracking, Path Prediction • Continuous Forest Monitoring • Continuous Monitoring of Glacial Lake | <ul style="list-style-type: none"> • Landslide Detection and Mapping • Flood Mapping and monitoring. • Cyclone Affected Area Mapping • Identify the Safest Area • Forest Fire Identification • Monitoring & Mapping the Outburst | <ul style="list-style-type: none"> • Crop Damage Assessment • Infrastructural Damage Assessment • Environmental Damage Assessment • Soil Liquefaction Analysis • Deforestation Mapping • Burnt Area Mapping |

Thank You

