Nara Space Satellite Imagery Analytics Solution

Environment Management Solution

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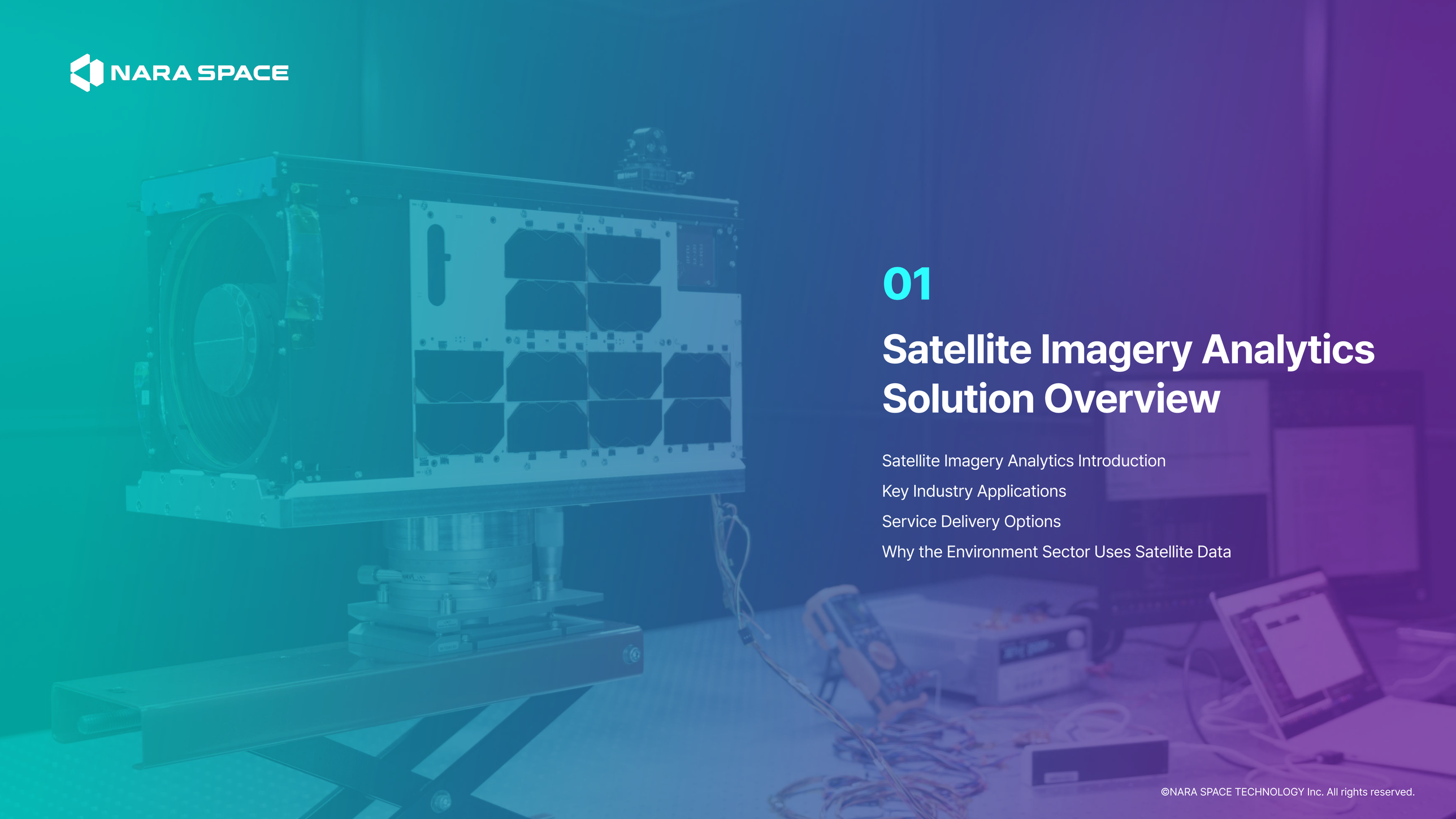


01

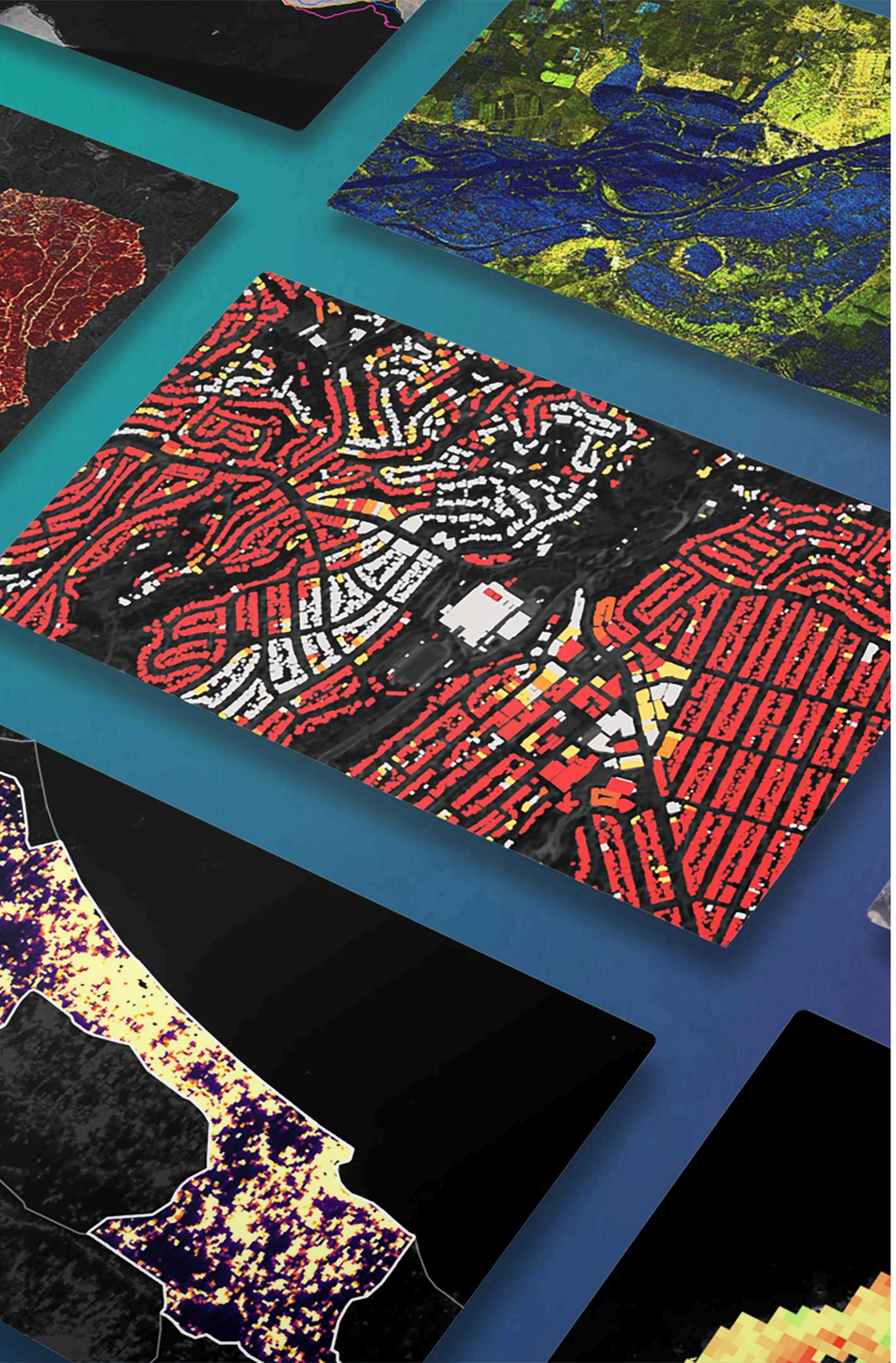
Satellite Imagery Analytics Solution Overview

Satellite Imagery Analytics Introduction

Key Industry Applications

Service Delivery Options

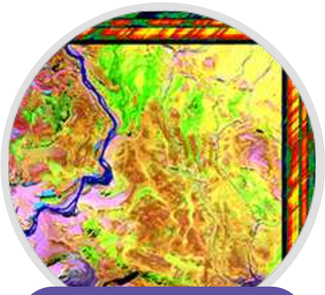
Why the Environment Sector Uses Satellite Data



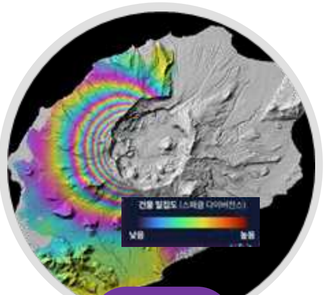
Nara Space Satellite Imagery Analytics Solution

Nara Space collaborates with global data partners and leverages multi-sensor data fusion technologies to deliver highly accurate analytics results

Multispectral



Hyperspectral



SAR

MULTI-SENSOR DATA FUSION

Key Industry Applications

Natural Disaster

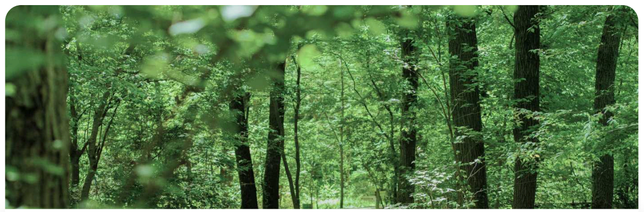
- Wild Fire Detection
- Flood Detection
- Landslide / Earthquake / Ground Subsidence

Finance

- Construction Monitoring
- Economic Intelligence

Agriculture

- Yield Prediction
- Corn
- Soybean
- Wheat

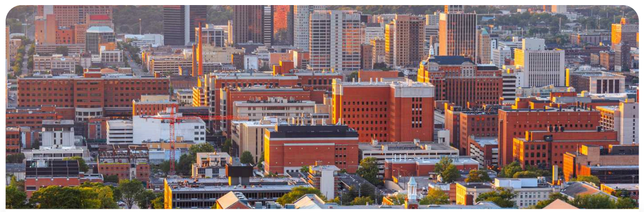


Environment

- Tree Detection
- Land Classification
- Water Quality Assessment

Defense

- Super-Resolution Imaging
- Object Detection
- Object Segmentation
- Change Detection



Urban

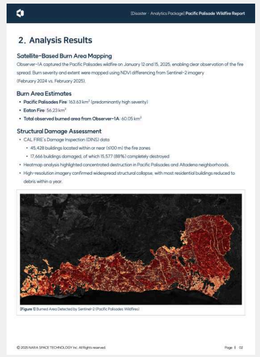
- Urban Management
- Smart City Strategy Development
- Land Use & Construction Monitoring

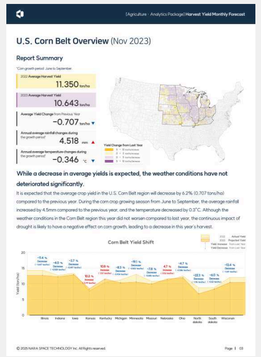
Service Delivery Options

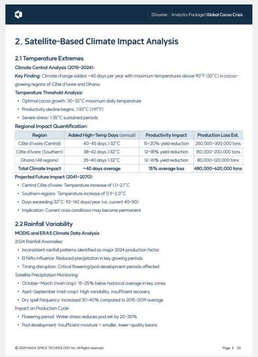
On-Demand Insight Reports

Get concise, decision-ready summaries without handling satellite data

Examples

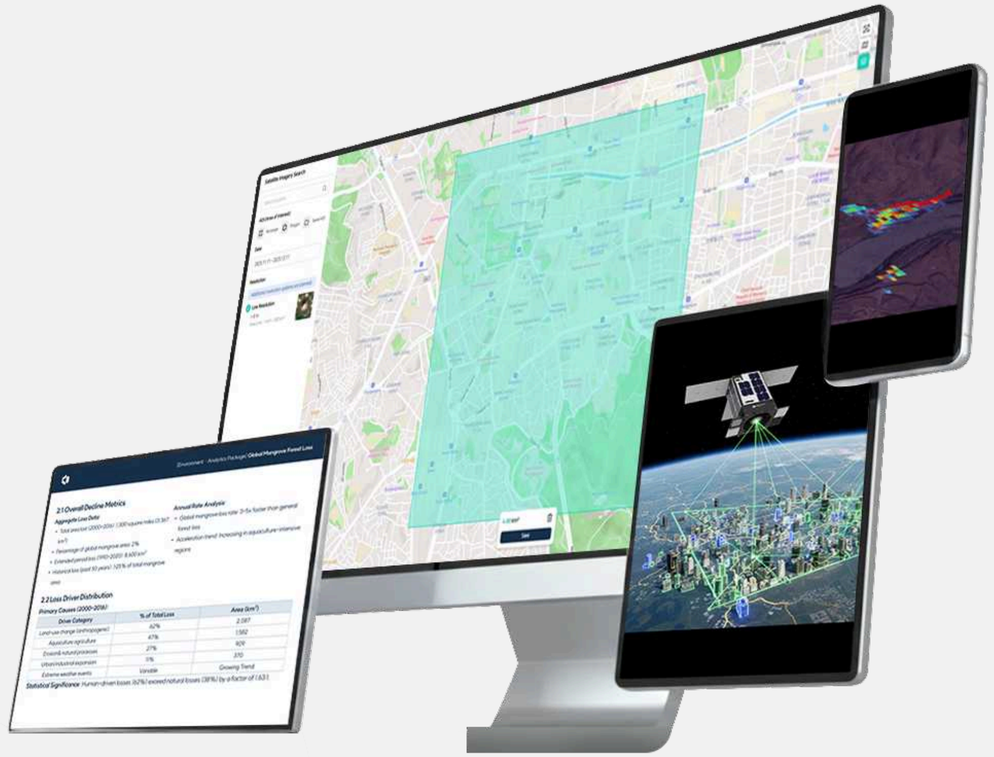






Custom Web Platform

A dedicated platform tailored for your organization



For APIs, additional analysis requests, or detailed customization, please contact us separately

Why the Environment Sector Uses Satellite Data

Challenges in Environmental Management	What Satellite Data Provides
Ground-based monitoring is decentralized, resource-intensive, and costly	**Global Coverage** — Consistent, repeatable observation of forests, oceans, rivers and urban environments
Large-scale deforestation, pollution, and ecosystem change are difficult to measure consistently	**Multi-parameter Monitoring** — Simultaneous observation of multiple environmental variables across the same area
Climate change requires continuous and reliable data	**Hard-to-Access Regions Monitoring** — Reliable observations in disaster zones, remote areas, polar regions or restricted locations
Policymakers and organizations need verifiable, objective evidence for sustainability reporting and compliance	**Cost Efficiency** — Significant reduction of expensive and time-consuming field surveys.

Why the Environment Sector Uses Satellite Data

Key Applications

Deforestation Tracking
Measure illegal logging and land use change

Water Quality Assessment
Detect algae blooms, sediment, pollution

Carbon Monitoring
Validate carbon sequestration projects

Biodiversity & Land Use Mapping
Support sustainable development planning

Value for Environment Stakeholders

Governments
Stronger climate policies backed by data

Enterprises
Credible ESG reporting and risk management

NGOs & Global Institutions
Independent monitoring of conservation efforts

Energy Sector
Methane and emission tracking for compliance

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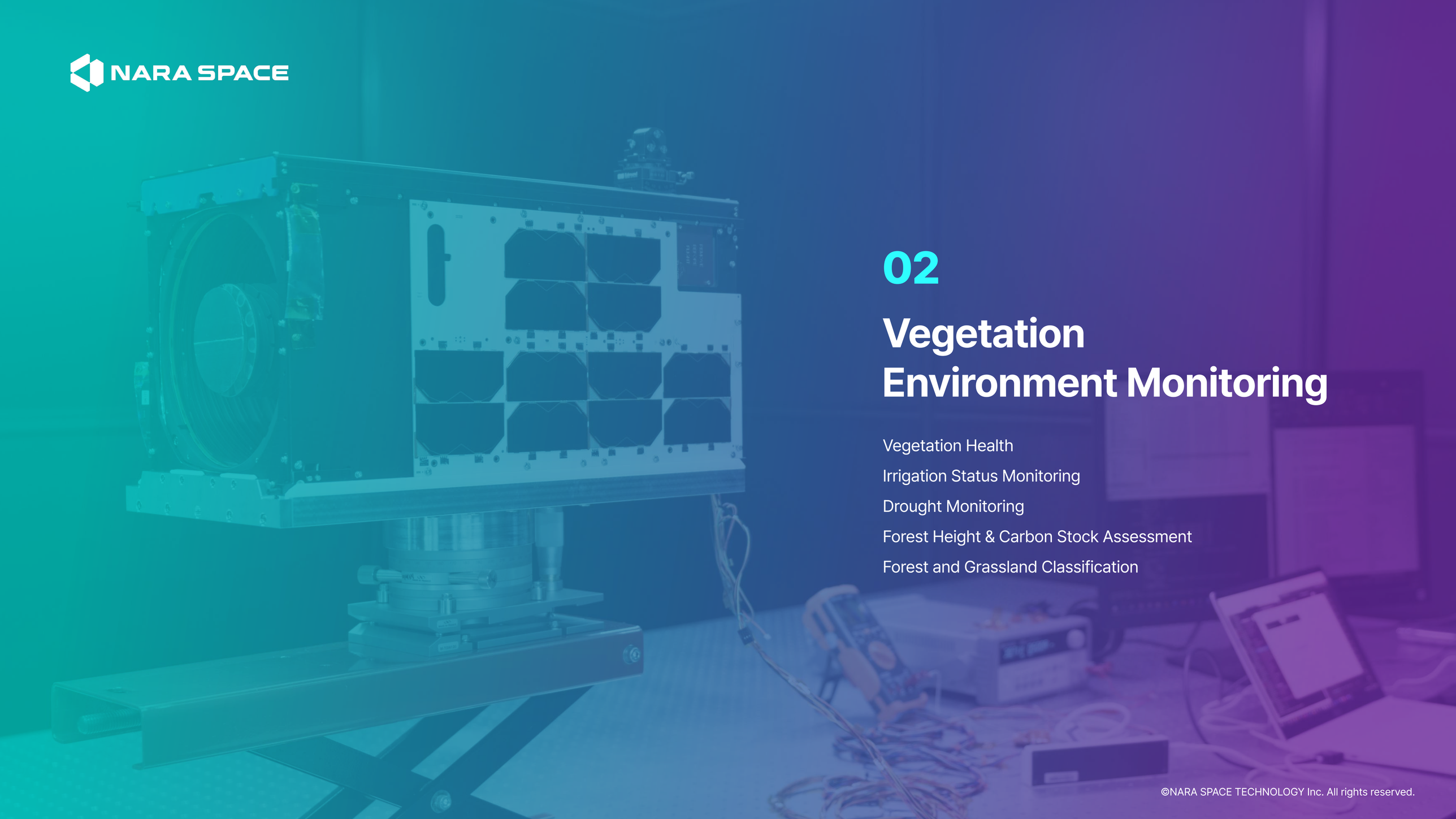


02

Vegetation Environment Monitoring

Vegetation Health

Irrigation Status Monitoring

Drought Monitoring

Forest Height & Carbon Stock Assessment

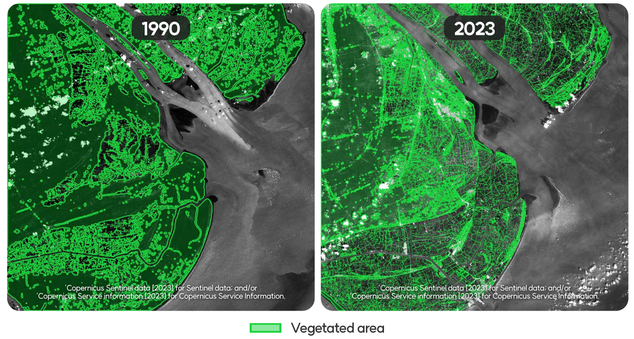
Forest and Grassland Classification

Vegetation Health

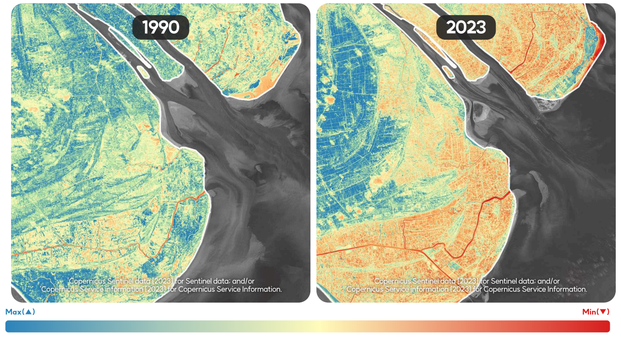
RGB Image

Pre- and post-Vietnam vegetation index (NDVI) image classification

[Co Chien River in Vietnam]

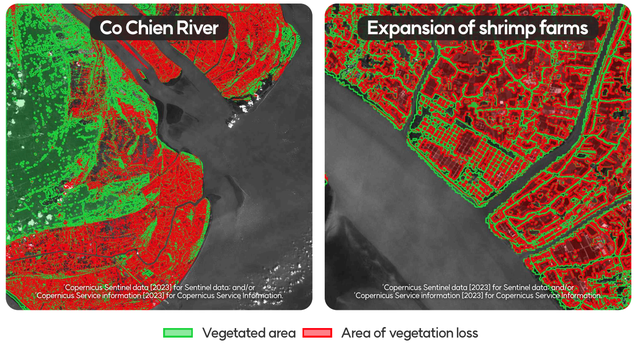


Comparison Imagery of Vegetation Vitality Changes



Vegetated area and area of vegetation loss

[Co Chien River in Vietnam]



Technical Specifications

Input Data

Red, Green, Blue, NIR, SWIR, etc.

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Large-scale Time-series Monitoring

Time-series analysis across extensive or hard-to-access areas enables consistent monitoring at scale, supporting efficient resource management and evidence-based policy decisions.

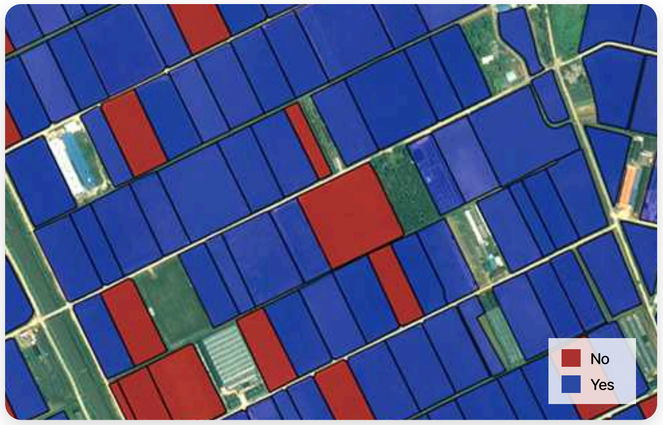
2 Integrated Analysis of Multiple Vegetation Indicators

Beyond basic vegetation condition assessment, we analyze a comprehensive set of indicators—including water- and growth-related indices—to deliver optimized, application-specific management insights.

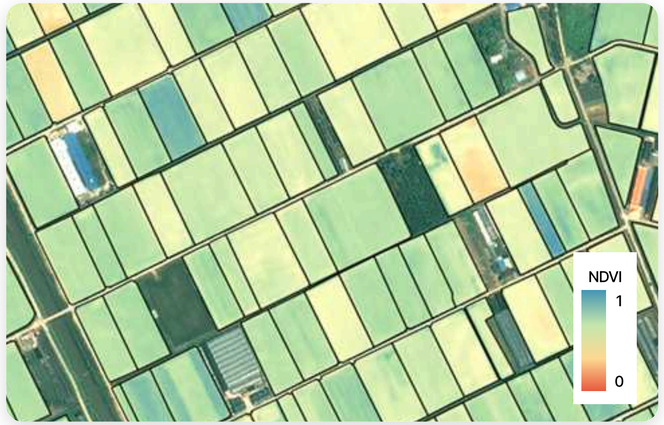
Irrigation Status Monitoring

RGB Imagery (2025-06-18, Pleiades)

Irrigation Presence Mask



NDVI-based Analysis Results



NDWI-based Analysis Results

Technical Specifications

Available Resolution	Less 10 m (Sentinel-2, Pleiades, PNEO, etc.)
Input Data	Red, Green, NIR, and SWIR bands, pre- and post-irrigation
Output Format	Raster (GeoTIFF, PNG), Vector (GeoJson)

Key Advantages

1 Parcel-level Irrigation Status and Rate Detection

Satellite-based monitoring enables precise assessment of irrigation status and irrigation rates at both individual parcel level and across large rice paddy field clusters.

2 Detection of Subvisual Irrigation Anomalies

By analyzing vegetation- and moisture-related indices derived from remote sensing data, the system detects subtle irrigation deficiencies invisible to the naked eye.

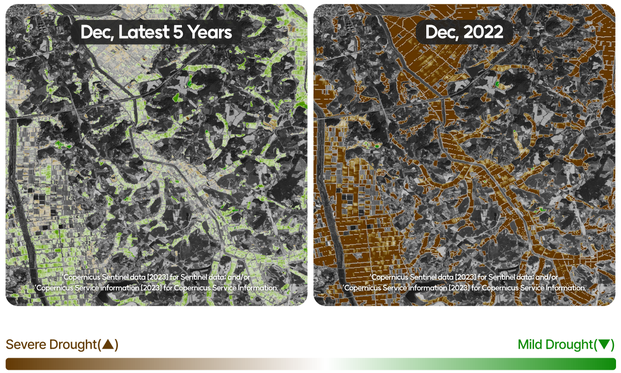
3 Proactive Water Resource Management for Paddy Agriculture

Near real-time monitoring of irrigation conditions during periods of anticipated water scarcity supports the development of proactive response strategies and effective water management practices.

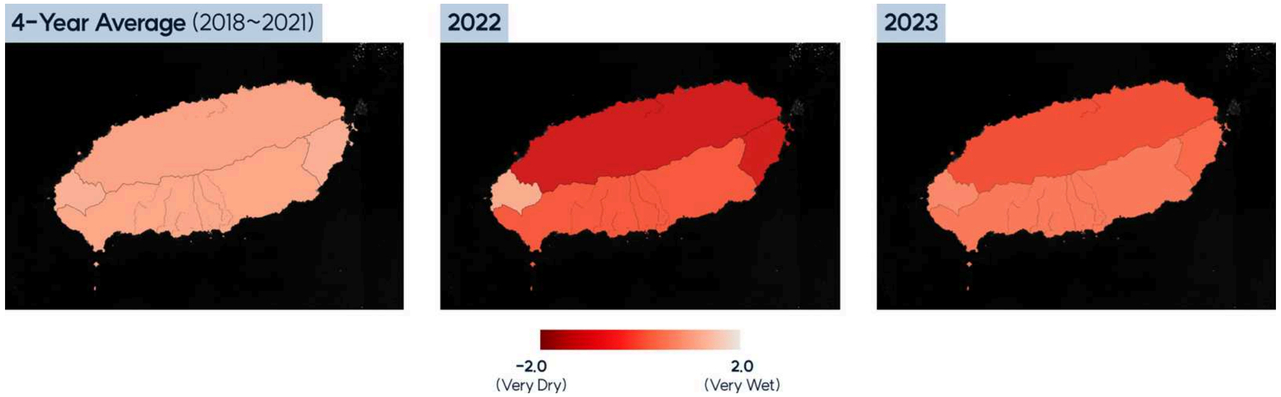
Drought Monitoring

Some Areas of Naju Plain, Jeollanam-do

Comparison of Drought Indices in Naju, Jeollanam-do



Average September Standardized Precipitation Index Across Jeju Island



Technical Specifications

Input Data

Red, Green, Blue, NIR, Microwave bands and Meteorological data

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Multi-scale Drought Information Delivery

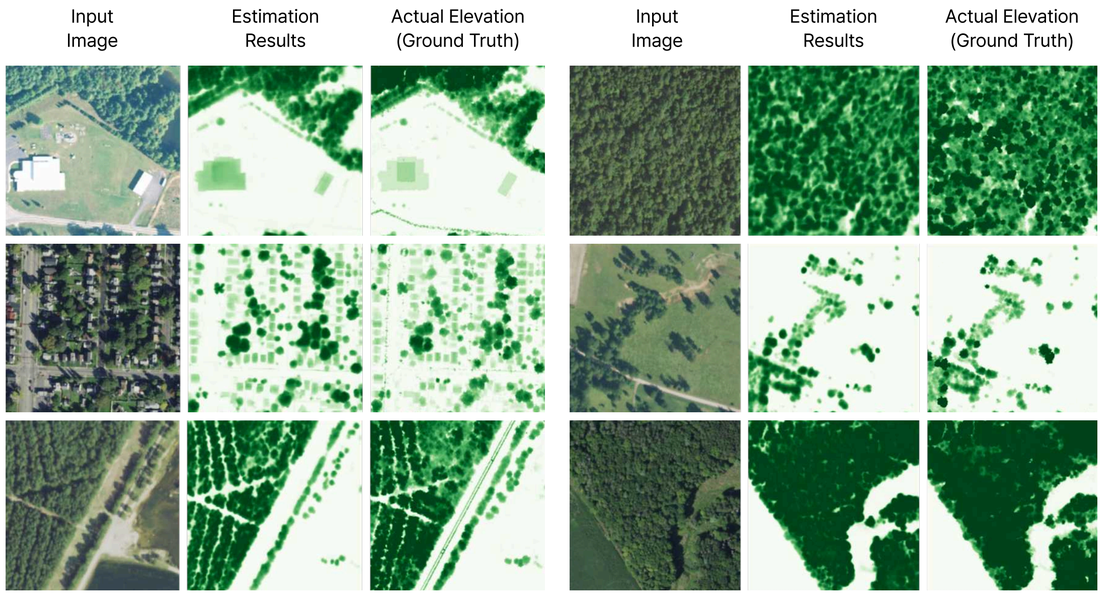
Provides drought analysis tailored to multiple spatial scales, ranging from individual agricultural parcels to broader administrative and regional boundaries.

2 Integrated Drought Assessment Using Diverse Data Sources

By integrating satellite-based drought indicators with ancillary datasets—such as river conditions and reservoir surface area dynamics—our approach supports the development of practical and effective drought response strategies

Forest Height & Carbon Stock Assessment

Forest Height Estimation (U.S. Aerial Imagery)



Technical Specifications

Input Data	50 cm or Higher Resolution Aerial / Satellite Imagery (Red, Green, Blue)
Output Format	Raster (GeoTIFF, PNG)
Accuracy (MAE)	2.1 m (*MAE : Mean Absolute Error)

Key Advantages

1 Providing key indicators for the assessment of carbon stocks and forest resources

Forest height data serves as a critical indicator for estimating biomass and carbon stocks, contributing to the formulation of climate action and forest management policies

2 Precision Forest Height Estimation Based on Aerial Imagery

Utilizing deep learning models to continuously estimate forest height across vast areas without the need for on-site surveys or aerial LiDAR

3 Delivering high-resolution results that incorporate spatial continuity

Delivering pixel-level predictions that capture subtle height variations in forest structures, creating high-resolution spatial distribution maps without discontinuities

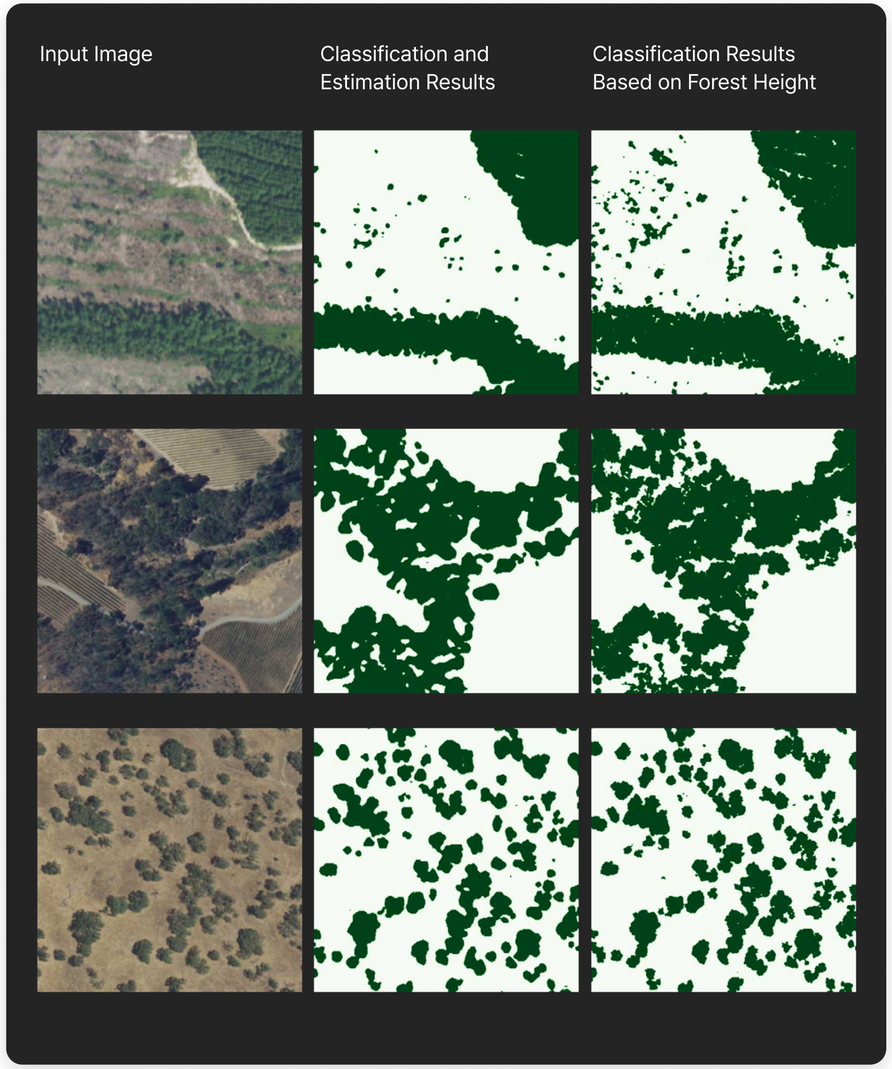
4 Monitoring of Forest Dynamics and Growth Status

Performing time-series analysis of forest height variations to quantitatively assess growth, degradation, and logging activities

Forest Height Estimation (High-Resolution Satellite Imagery)

Input Image | Estimation Results | Input Image | Estimation Results

Forest and Grassland Classification



Technical Specifications

Input Data	Land Cover Classification Results, Canopy Height Estimation Results
Output Format	Raster (GeoTIFF, PNG), Vector (GeoJson)

Key Advantages

1 Reduced Carbon and Regulatory Risk

High-precision differentiation of forest and grassland minimizes classification errors that can lead to incorrect carbon accounting, regulatory non-compliance, or invalid environmental claims—protecting the financial value of carbon and ESG-related projects.

2 Lower Monitoring and Field Survey Costs

Stable analytics performance across heterogeneous and mixed-vegetation areas significantly reduces reliance on repeated field surveys and manual validation, lowering operational costs and accelerating project timelines.

3 Evidence-based Validation of Environmental Outcomes

Time-series monitoring of ecological change provides quantitative evidence to demonstrate restoration progress, land-use compliance, and ecosystem performance—supporting continued funding, approvals, and stakeholder confidence.

4 Scalable Foundation for Biodiversity and Carbon Services

Vegetation structural data serves as a core input for high-value applications such as biodiversity assessment, carbon stock estimation, and natural resource management, enabling scalable deployment across ESG, conservation, and climate finance use cases.

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03

Urban Ecosystems Monitoring

Nighttime Light Analytics for Economic and Infrastructure Insights

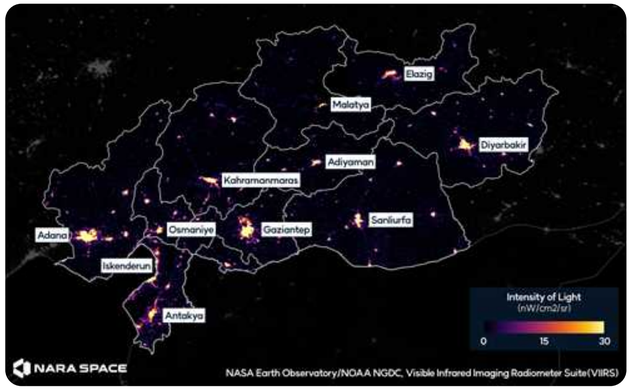
Urban Area Detection

Solar Panel Detection

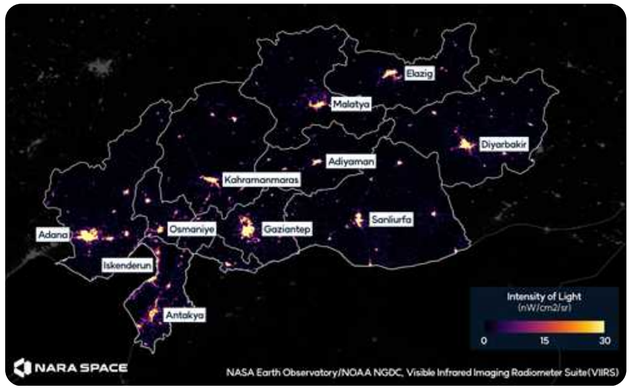
Land Cover Classification

Nighttime Light Analytics for Economic and Infrastructure Insights

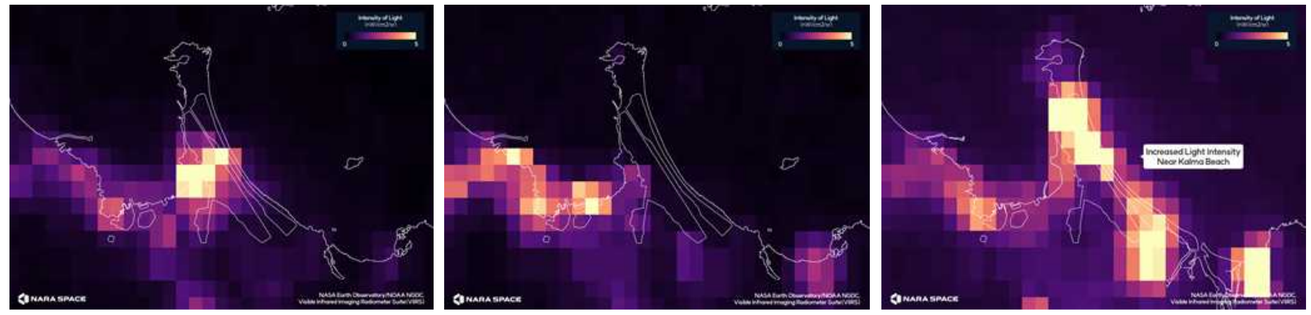
Nighttime Light Intensity before the Türkiye Earthquake (2023)



Nighttime Light Intensity after the Türkiye Earthquake (2023)



Nighttime Light Intensity Comparison in the Kalma Tourist Zone, North Korea (2014–2018)



Technical Specifications

Input Data

Red, Green, and Blue Bands Captured at Night

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Economic Activity Insights in Remote or Restricted Areas

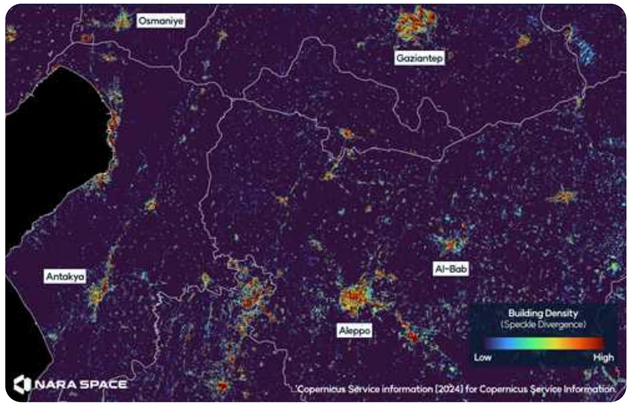
Satellite-based analysis enables assessment of residential and economic activity levels even in regions or countries with limited accessibility, reducing reliance on delayed or unavailable local statistics.

2 Industrial Activity Assessment in Nighttime Zones

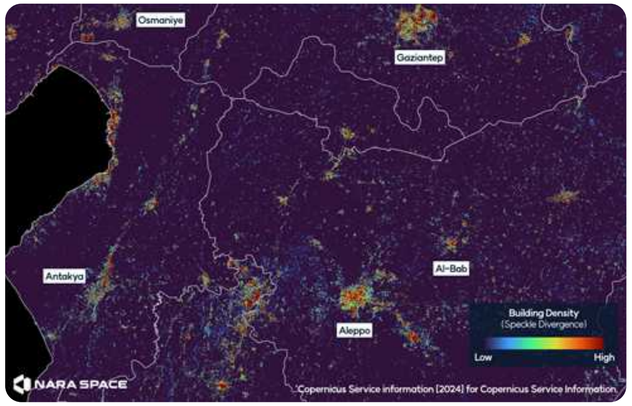
Nighttime light analysis of industrial complexes and large-scale manufacturing zones provides indirect insights into operational intensity and production status, supporting monitoring of industrial performance and disruption risks.

Urban Sprawl Detection

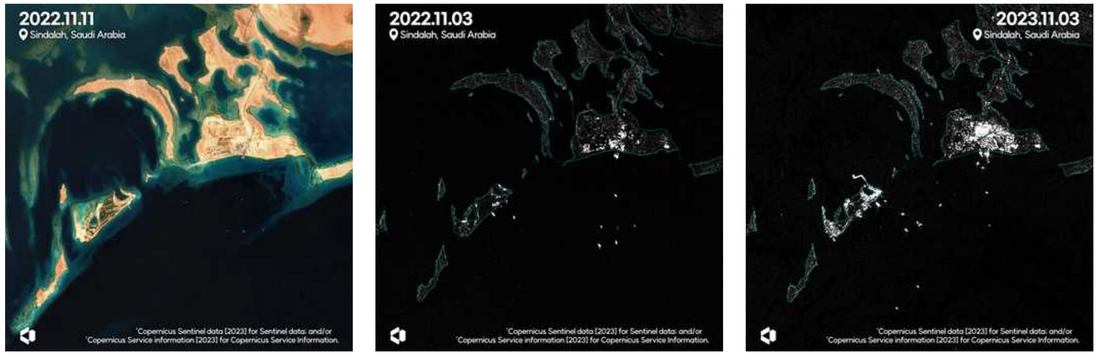
Building Density before the Türkiye Earthquake (2023)



Building Density after the Türkiye Earthquake (2023)



SAR-based Comparative Analysis of Urban Development in Sindalah, Saudi Arabia



Technical Specifications

Input Data

Dual-polarization SAR Imagery

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Scalable Urban Growth Intelligence across Space and Time

Enables comparative analysis of urbanization trends across municipal, regional, and national scales, providing a consistent and objective basis for tracking urban expansion, densification, and post-disaster change.

2 Concise Evaluation of Urban Development Progress

Assesses actual urban development levels against planned targets, supporting data-driven decisions for infrastructure investment, urban planning validation, and policy implementation monitoring.

Solar Panel Detection

Solar Panel Detection Results

Technical Specifications

Input Data	High Resolution Satellite Imagery (50 cm or above) (Red, Green, Blue)
Output Format	Raster (GeoTIFF, PNG), Vector (GeoJson)
Accuracy (mIoU)	0.95 (*mIoU : Mean Intersection over Union)

Key Advantages

1 Reduced Survey and Asset Inventory Costs

Automated detection of large-scale solar installations using high-resolution satellite imagery significantly reduces the time and cost associated with manual field surveys and asset inventory collection.

2 Reliable Performance across Diverse Installation Environments

Consistent detection accuracy across rooftops, agricultural land, and idle or undeveloped areas ensures dependable results, lowering verification risk for energy planners, utilities, and investors.

3 Continuous Monitoring of Asset Growth and Operational Change

Time-series analysis enables tracking of new installations, capacity expansion, and decommissioning, supporting up-to-date asset management and performance assessment.

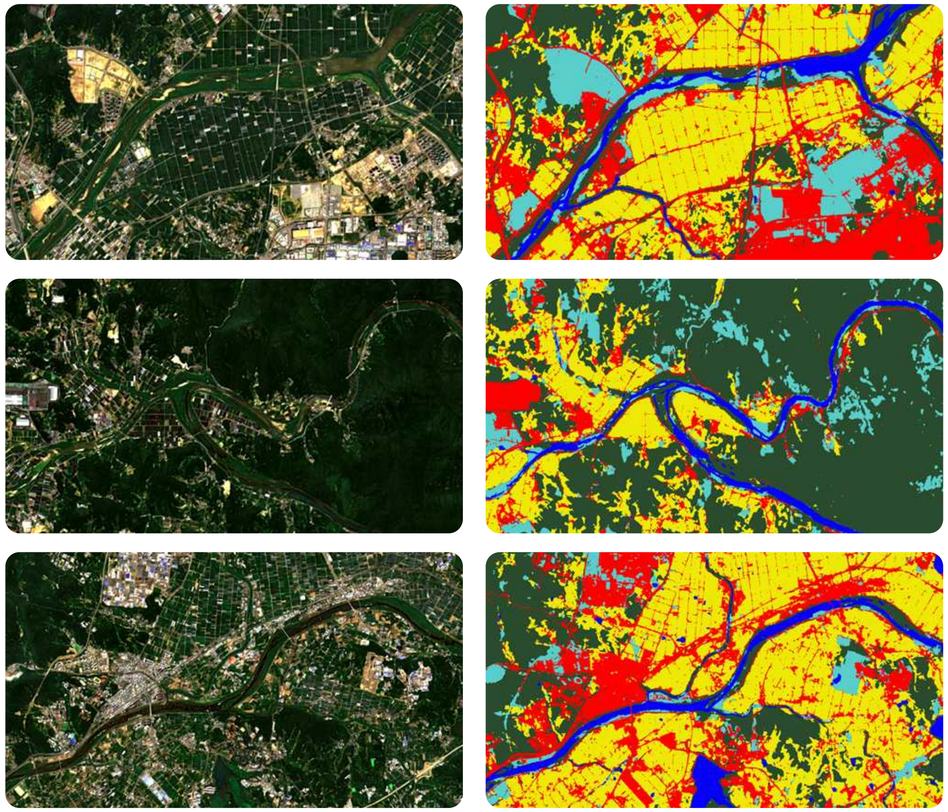
4 Decision-ready Data for Energy Planning and Investment

Detection outputs provide a validated data foundation for estimating installed capacity, assessing market penetration, informing renewable energy policy, and supporting investment and financing decisions.

Land Cover Classification

Sentinel-2
Super-Resolution Imagery

Land Cover
Classification Results



Technical Specifications

Input Data	Satellite Imagery over 10 m (Red, Green, Blue, NIR)
Output Format	Raster (GeoTIFF, PNG), Vector (GeoJson)
Accuracy (mIoU)	0.61 (*mIoU : Mean Intersection over Union)

Key Advantages

1 Automated, High-precision Land Cover Intelligence at Scale

Deep learning–based land cover classification enables high-resolution analysis of large geographic areas, automatically identifying diverse land cover types—including farmland, forest, urban areas, and water bodies—while significantly reducing the time and cost associated with manual mapping and field surveys.

2 Reliable Classification in Complex and Mixed-use Environments

By learning spatial patterns rather than relying solely on spectral thresholds, the system delivers stable classification performance in ambiguous boundary areas, improving reliability for land-use planning, development assessment, and regulatory review.

3 Continuous Monitoring of Land-use Change and Expansion

Multi-temporal satellite imagery supports systematic detection of urban expansion, deforestation, and agricultural shifts over time, enabling early identification of change and more proactive land and resource management.

4 Standardized Data Foundation for Policy, ESG, and Environmental Decision-making

A consistent and repeatable classification framework produces standardized land cover datasets that can be directly applied to land management, environmental policy analysis, ESG reporting, and spatial statistics—supporting comparability across regions and time periods.

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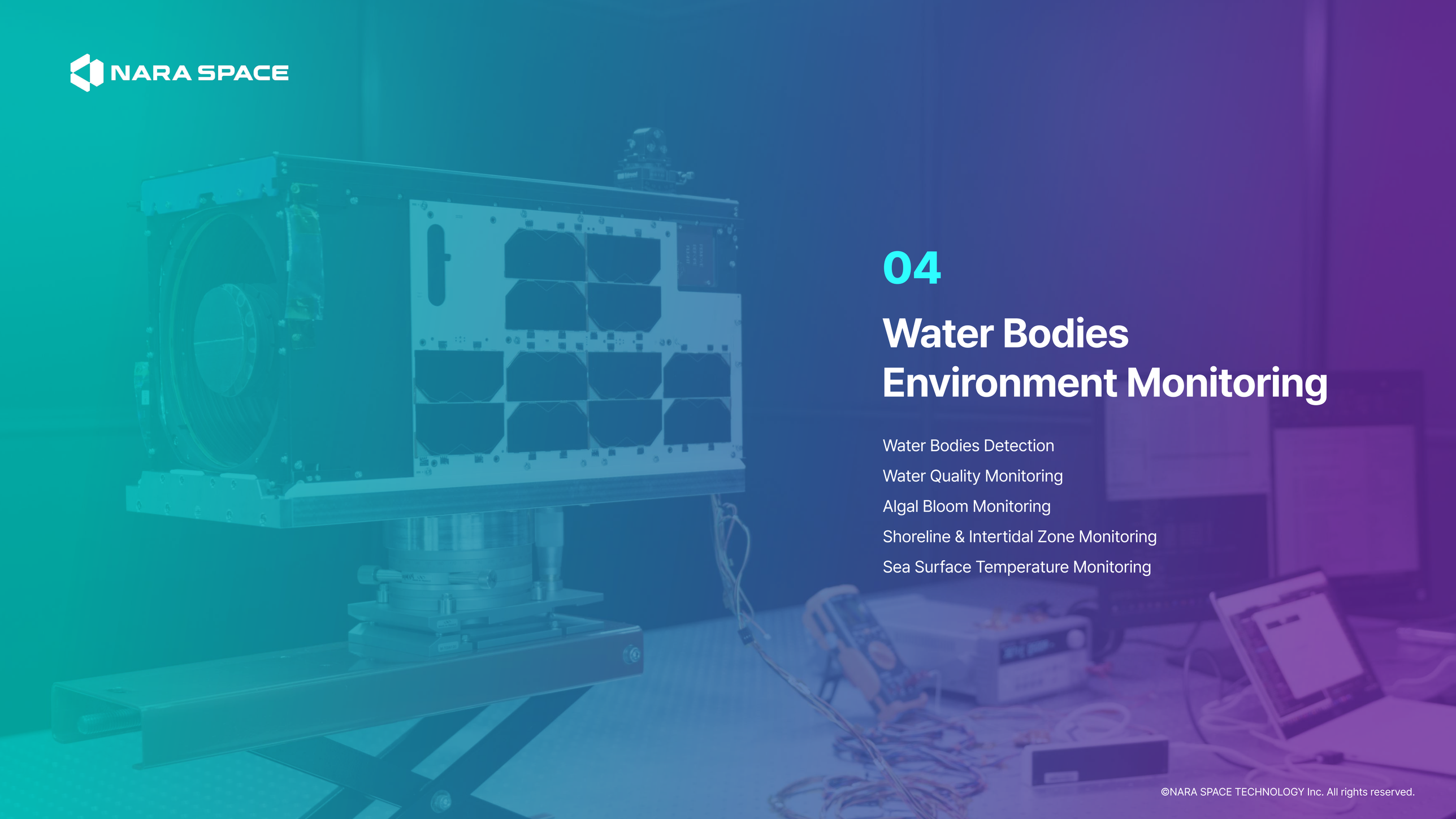


04

Water Bodies Environment Monitoring

Water Bodies Detection

Water Quality Monitoring

Algal Bloom Monitoring

Shoreline & Intertidal Zone Monitoring

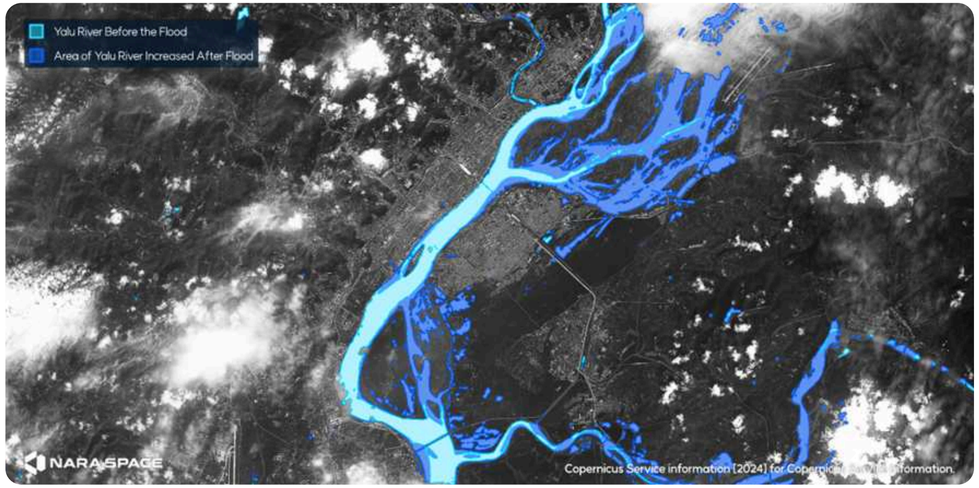
Sea Surface Temperature Monitoring

Water Bodies Detection

Satellite imagery of Sinuiju, North Korea, before the flood

Satellite imagery of Sinuiju, North Korea, after the flood

Average September Standardized Precipitation Index Across Jeju Island



Technical Specifications

Input Data	Output Format
Red, Green, Blue, NIR, etc. bands	Raster (GeoTIFF, PNG)

Key Advantages

1 High-frequency Monitoring for Water Resource Management

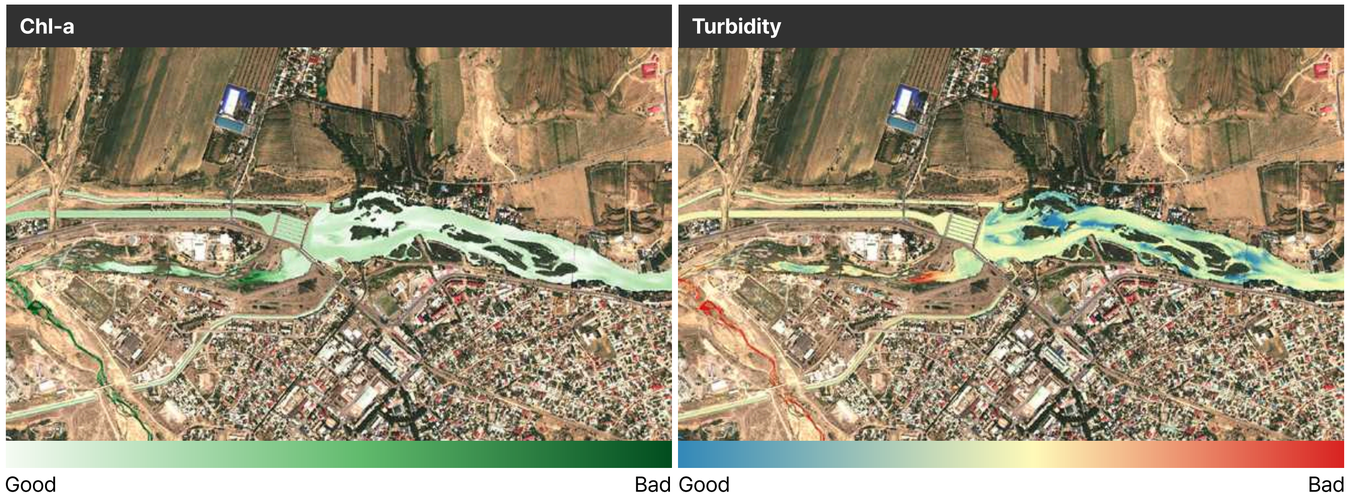
Satellite-based analysis of surface water extent enables frequent, repeatable monitoring of reservoirs and river systems, supporting more efficient water resource planning and short-interval operational decision-making without reliance on ground surveys.

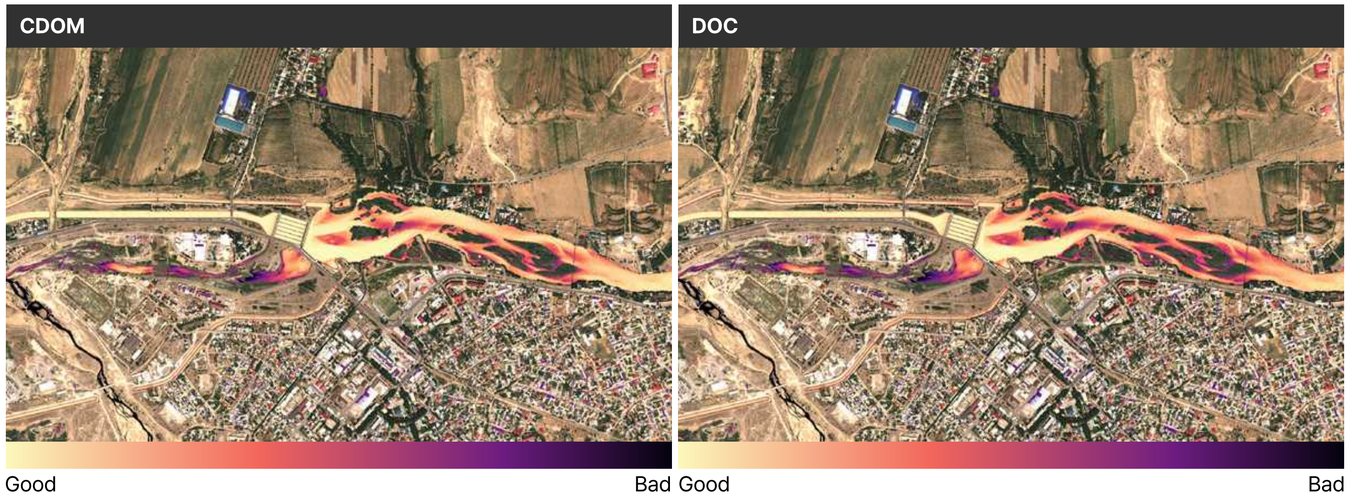
2 Rapid Detection of Disaster-driven Water Changes

Automated identification of river and reservoir area changes enables fast assessment of flood and drought impacts, providing decision-makers with timely, objective information for emergency response, recovery planning, and risk mitigation.

Water Quality Monitoring

Water quality imagery of Chirchiq River, Uzbekistan





Technical Specifications

Input Data

Red, Green, Blue, NIR, Red-edge, etc. bands

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Integrated Analysis of Multiple Water Quality Indicators

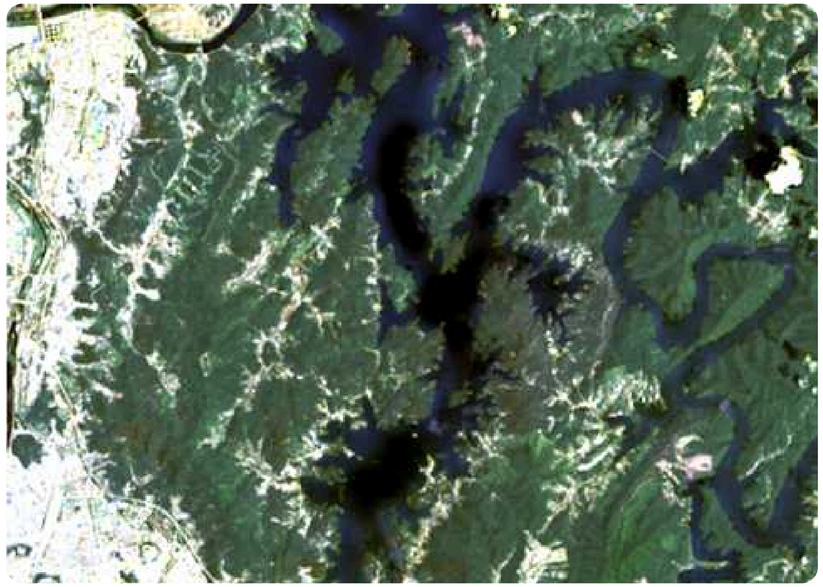
Provides comprehensive assessment of water quality by analyzing multiple indicators—including turbidity, chlorophyll concentration, dissolved organic carbon, and dissolved organic matter—enabling a more accurate understanding of water conditions beyond single-parameter monitoring.

2 High-resolution Mapping of Water Quality Distribution

High-resolution satellite monitoring reveals detailed spatial patterns of water quality, helping identify priority management areas and potential pollution sources to support targeted intervention and resource allocation.

Algal Bloom Monitoring

RGB Imagery of Daecheong Dam (2024)



Algal Bloom Enhancement Imagery of Daecheong Dam (2024)

Technical Specifications

Input Data

Red, Green, Blue, NIR, SWIR, etc. bands

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Early Detection of Algal Bloom Development

Continuous monitoring of reservoirs and river systems enables early identification of algal bloom formation, supporting timely intervention and reducing the risk of large-scale water quality degradation.

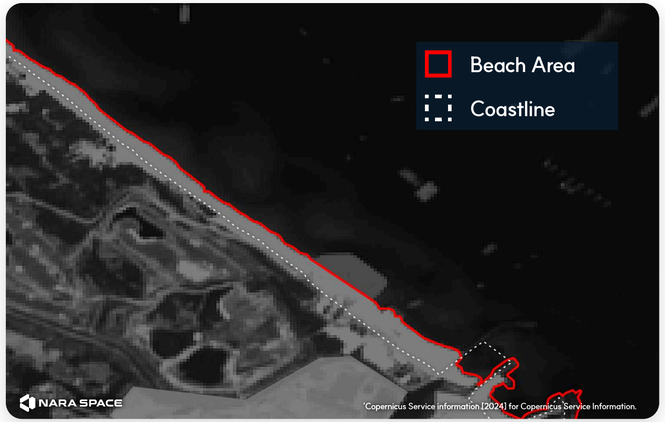
Key Advantages

2 Location-specific Decision Support for Bloom Response

High-resolution analysis of the spatial extent and severity of algal blooms provides actionable intelligence to support response measures such as targeted removal, operational adjustments of dams and weirs, and optimized water management strategies.

Shoreline & Intertidal Zone Monitoring

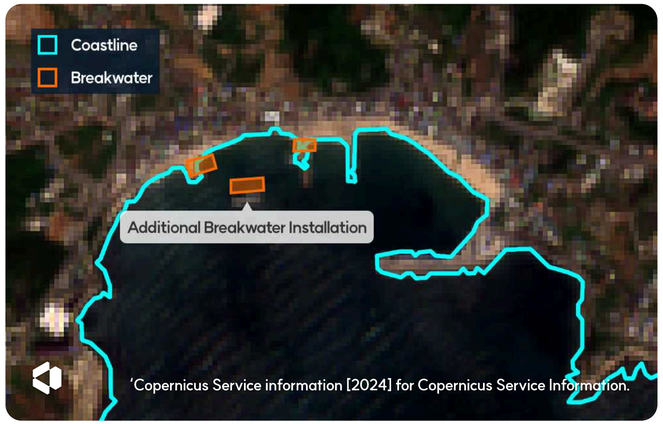
Shoreline Change in Hashidong, Gangneung (2020)



Shoreline Change in Hashidong, Gangneung (2023)

Shoreline Change at Nasa Beach, Ulsan (2017)

Shoreline Change at Nasa Beach, Ulsan (2017)



Technical Specifications

Input Data

Red, Green, Blue, TIR, SWIR, etc. bands

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Reliable Separation of Vegetation and Water Surfaces

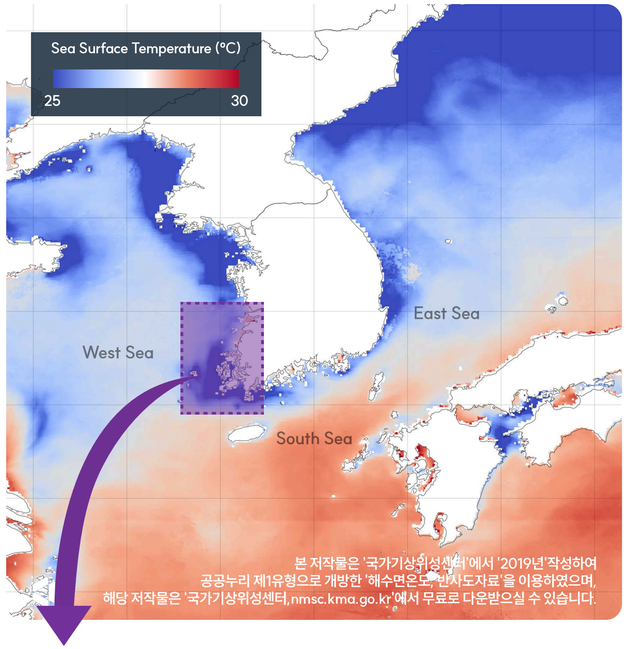
By combining spectral indices such as NDVI and NDWI with RGB imagery, our solution delivers consistent discrimination between vegetation and water bodies, reducing classification ambiguity and improving reliability for environmental monitoring and coastal management.

2 Accurate Shoreline and Intertidal Zone Monitoring under Variable Conditions

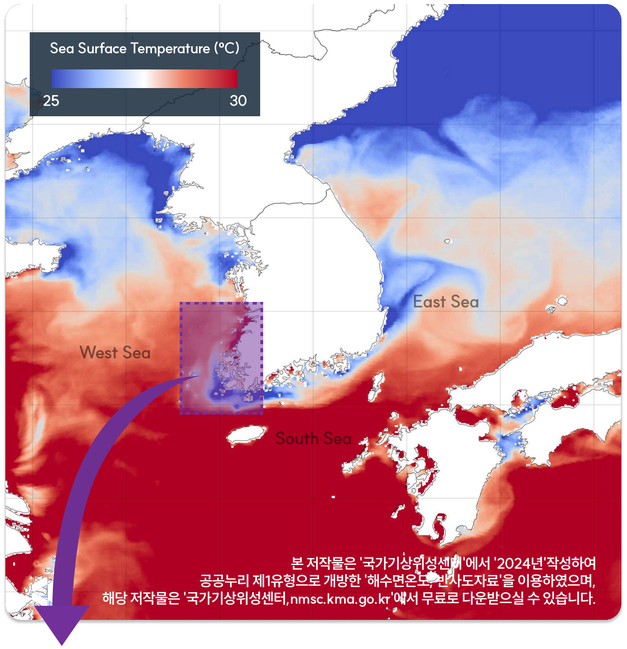
Otsu's thresholding technique mitigates spectral distortions caused by clouds, shadows, and atmospheric effects, enabling more accurate detection and monitoring of shorelines and intertidal zones to support change analysis, regulatory assessment, and coastal planning.

Sea Surface Temperature Monitoring

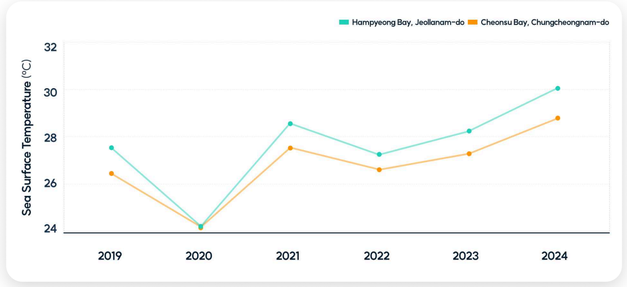
Average Sea Surface Temperature around the Korean Peninsula (2019–2023)



Sea Surface Temperature around the Korean Peninsula (2024)



Sea Surface Temperature Change in the West Sea (2019–2024)



Sea Surface Temperature Change in the South Sea and Jeju Island (2019–2024)

Technical Specifications

Input Data	Output Format
SeaSurface Temperature (SST)	Raster (GeoTIFF, PNG), CSV

Key Advantages

1 Hourly, Satellite-based Sea Surface Temperature Monitoring at Scale

Satellite data enables hourly monitoring of sea surface temperature and marine heatwaves across vast ocean areas, supporting rapid identification of high-temperature anomalies and large-scale thermal dispersion patterns, enabling real-time marine heat risk monitoring for fisheries protection and offshore operations.

2 Long-term Sea Surface Temperature Trend Analysis for Climate Risk Assessment

Analysis of accumulated long-term sea surface temperature data enables identification of climate-driven warming trends, supporting climate risk evaluation, environmental policy planning, and marine resource management.

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05

Air Quality Monitoring

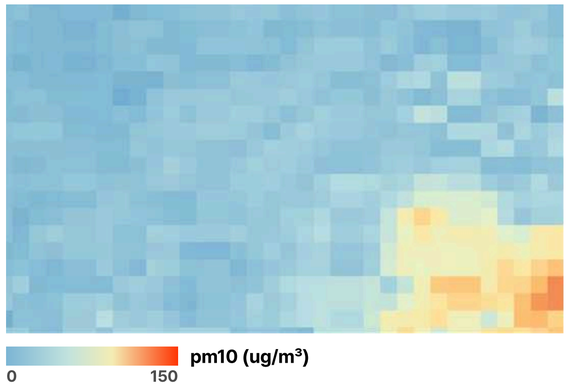
Particulate Matter Concentration Monitoring

Methane Concentration & Emission Monitoring

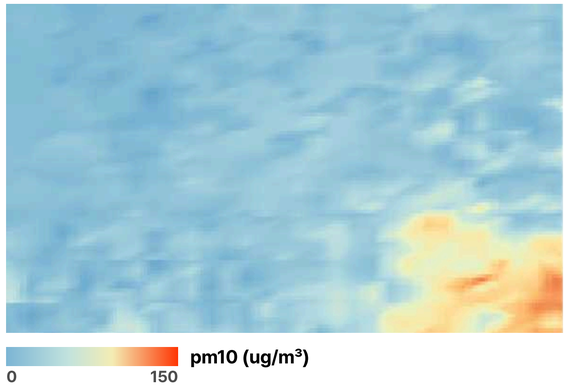
Sea Fog Monitoring

Particulate Matter Concentration Monitoring

Satellite-derived PM10 concentration map (7 km spatial resolution)

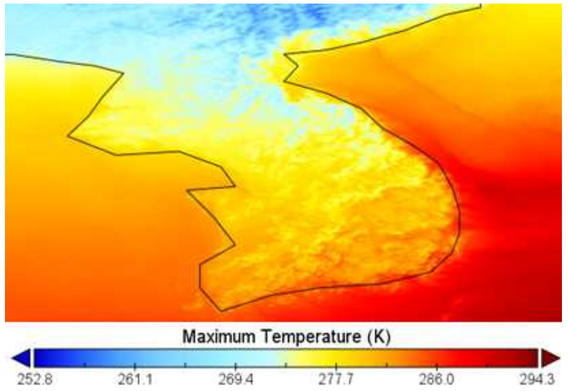


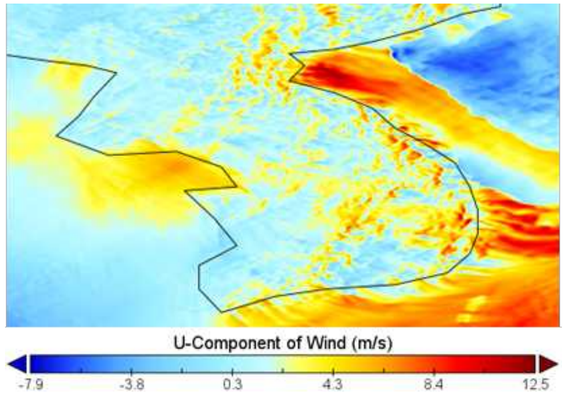
PM10 map fused with meteorological data (1.5 km spatial resolution)



Numerical model-based meteorological data (1.5 km spatial resolution)

Air temperature, wind direction, wind speed, and precipitation, etc.





Technical Specifications

Input Data

Low-resolution Particulate Matter data and numerical model-based meteorological data

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

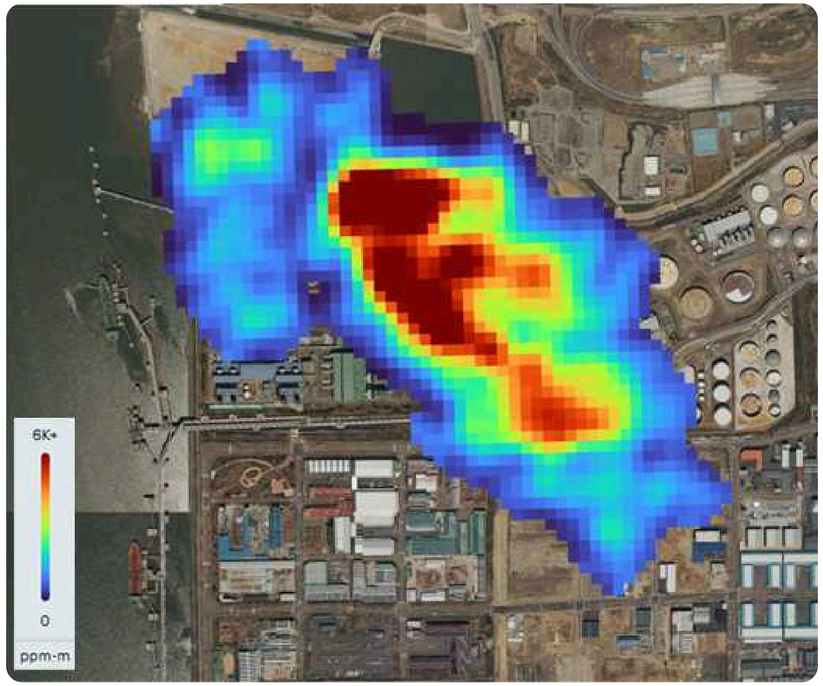
1 High-resolution, Decision-ready Particulate Matter Monitoring

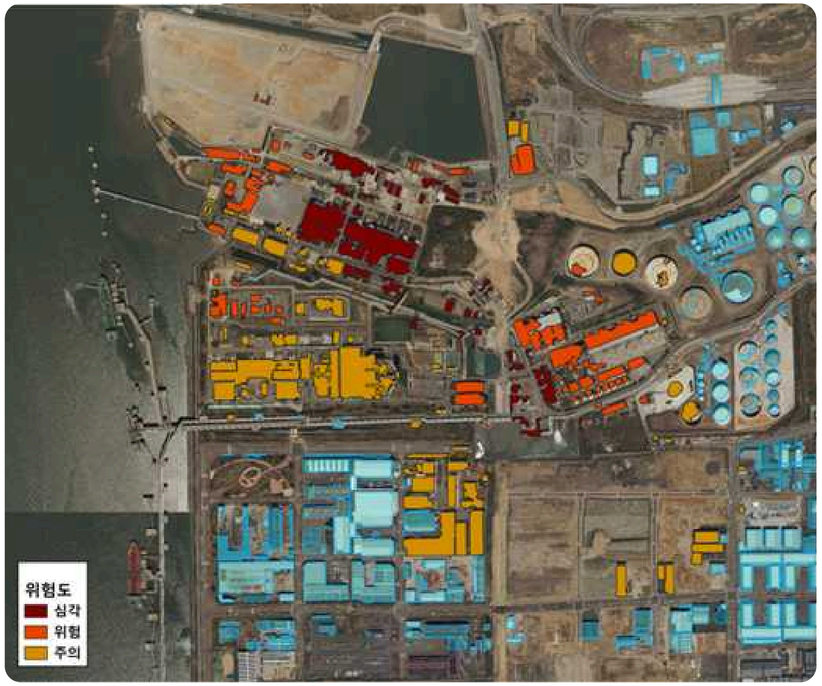
By fusing satellite-derived particulate matter data with numerical weather model outputs, we deliver more precise, higher-resolution air quality information—enabling more reliable assessment of PM exposure and spatial variability than satellite data alone.

2 AI-driven Estimation Tailored to Local Environmental Conditions

AI-based models account for regional characteristics such as urban vs. rural settings, coastal vs. inland areas, and complex terrain, producing more accurate PM concentration estimates that support localized air quality management and policy decisions.

Methane Concentration & Emission Monitoring





Technical Specifications

Input Data

Methane Column Concentration and Meteorological Data (Wind Speed, Direction, etc.)

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Satellite-based Methane Monitoring at Regional and National Scales

Satellite observations enable continuous monitoring of methane concentrations across large geographic areas, supporting the identification of super-emitters and providing quantitative emission insights integrated with meteorological conditions such as wind speed and direction.

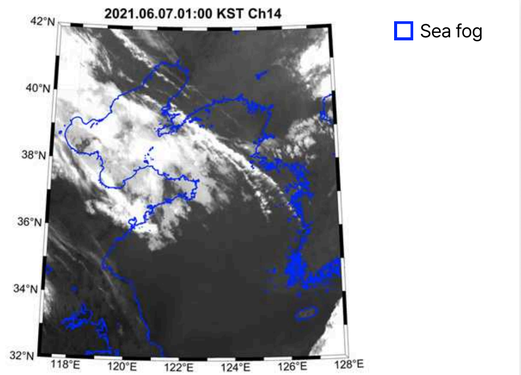
Key Advantages

2 High-precision Methane Source Identification Powered by AI

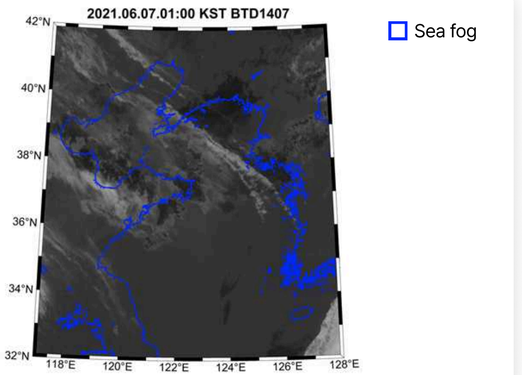
Deep learning–based source detection enables precise identification of methane-emitting commercial and industrial facilities, allowing emissions to be traced to individual sites and supporting targeted mitigation, regulatory compliance, and emissions reduction strategies.

Sea Fog Monitoring

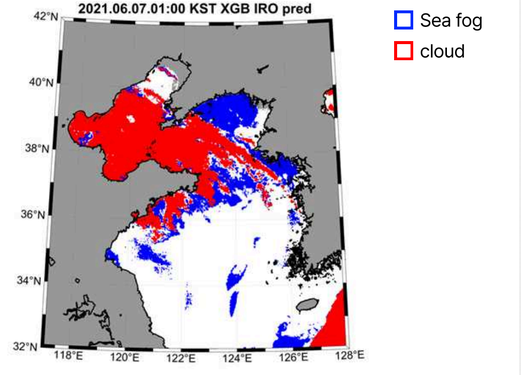
Satellite-based Thermal Infrared Imagery



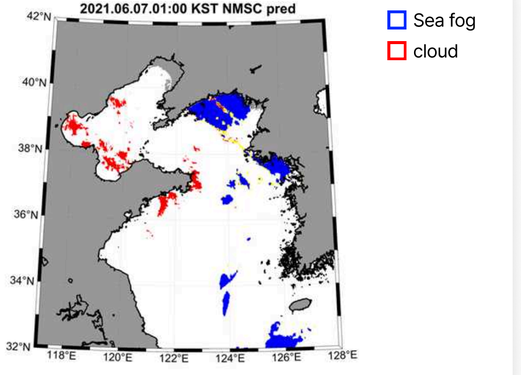
Sea Fog Enhanced Imagery



Our Sea Fog and Cloud Detection Results



KMA (Korea Meteorological Administration) Sea Fog and Cloud Detection Results



Technical Specifications

Input Data

Red, Green, Blue, TIR, SWIR, etc. bands

Output Format

Raster (GeoTIFF, PNG)

Key Advantages

1 Sea Fog Monitoring Optimized for the Korean Maritime Environment

Sea fog monitoring is optimized for the meteorological and oceanographic characteristics of the Korean maritime environment, enabling high-precision identification of fog formation and persistence through frequent, region-tailored updates.

2 High-frequency Sea Fog Monitoring for Operational Decision Support

With sea fog updates available at 10-minute intervals, the system supports time-critical decision-making for shipping operators, port authorities, and maritime safety agencies, helping reduce navigational risk and improve operational safety.

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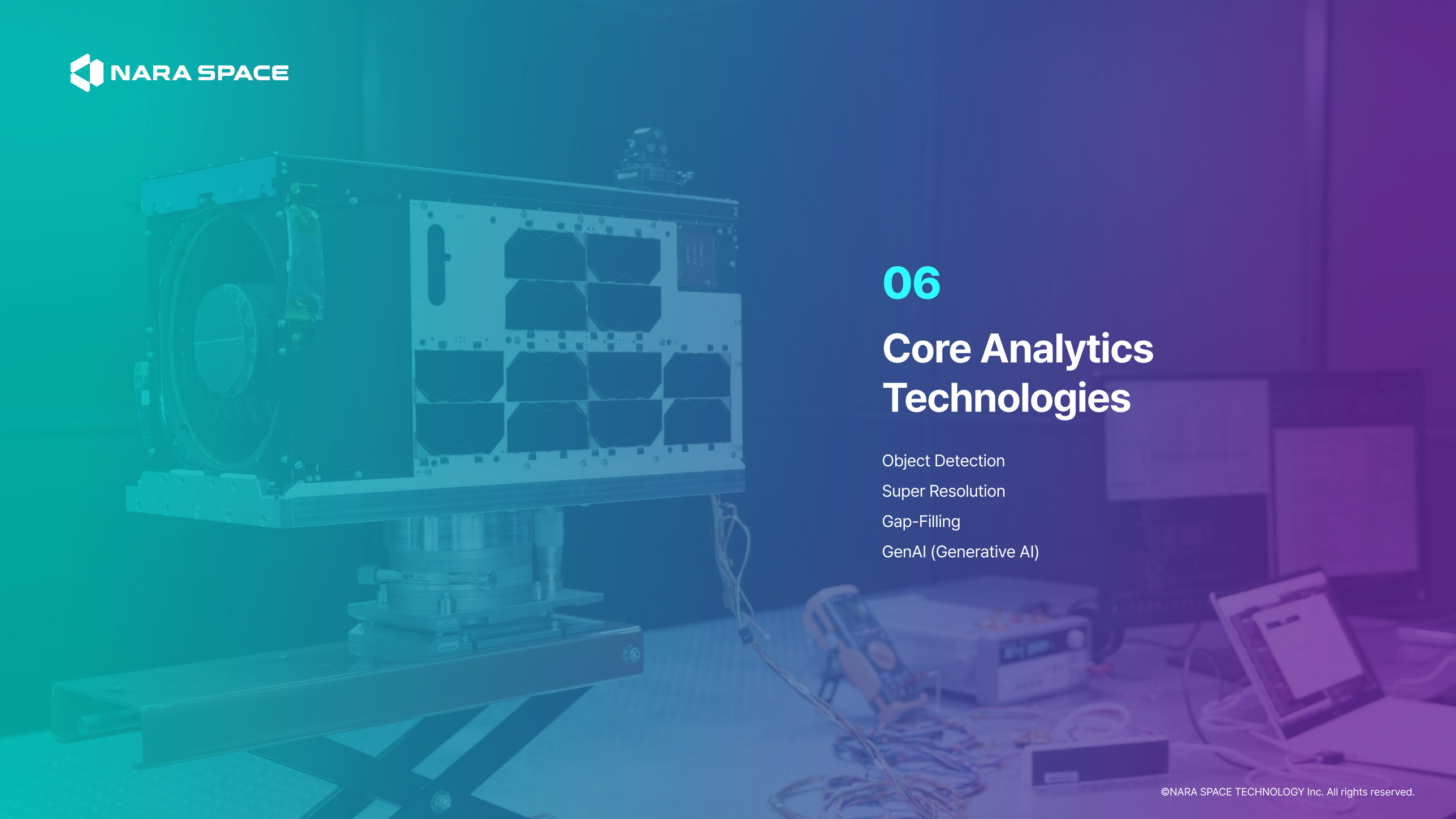


06

Core Analytics Technologies

Object Detection

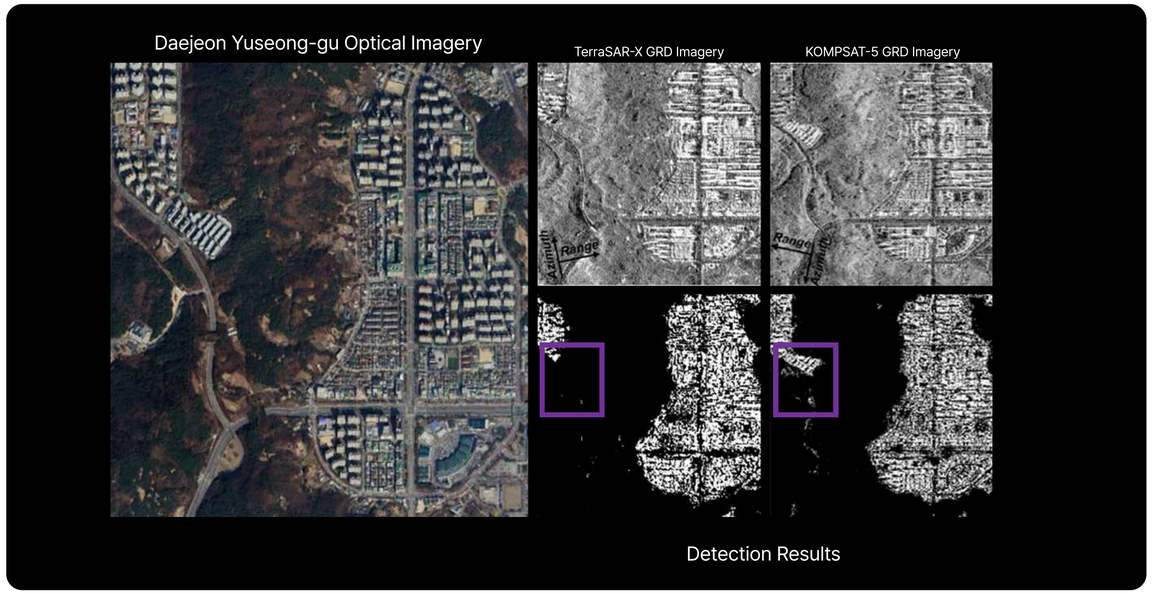
Super Resolution

Gap-Filling

GenAI (Generative AI)

Object Detection : Urban Area Detection Based on SAR Imagery

Daejeon Yuseong-gu Optical Imagery



Technical Specifications

Available Resolution	3 m (TerraSAR-X), 5 m (KOMPSAT-5)
Input Data	SAR GRD Image Before and After the Event
Output Format	Raster (GeoTIFF, PNG)

Key Advantages

1 Extraction of building-specific SAR scattering mechanisms

Achieve high-precision detection by analyzing building-specific SAR scattering behaviors—such as shadowing and double-bounce effects—far surpassing the limitations of traditional backscatter-only analysis.

2 High-precision detection of urban environments

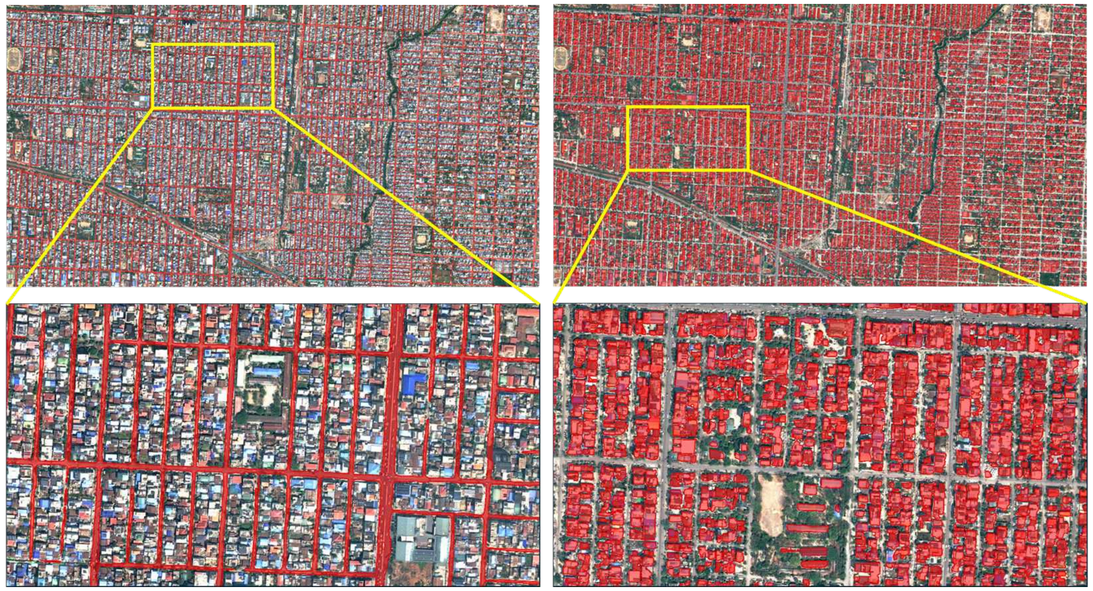
Using extracted morphological features, our solution can accurately identify densely built-up zones and urban structures, enabling valuable applications in urban planning, infrastructure monitoring, and post-disaster damage assessment.

3 Comparative analytics across multiple imagery types

Enable robust cross-verification by comparing not only identical SAR images but also data from different SAR sensors, providing a more comprehensive and multi-layered analytical perspective.

Object Detection : Optical Image-Based Building / Road Detection

Mandalay, Myanmar



Technical Specifications

Recommended Resolution	~ 1 m
Input Data	RGB band
Output Format	Raster (GeoTIFF, PNG), Vector (GeoJson)
Accuracy (mIoU)	0.84 (mIoU accuracy on test data with resolution under 1 meter)

Key Advantages

1 Robust Object Detection Model Built on Global Datasets

By jointly training on diverse domestic and international datasets,
the model ensures consistent and stable performance regardless of regional characteristics or environmental variations.

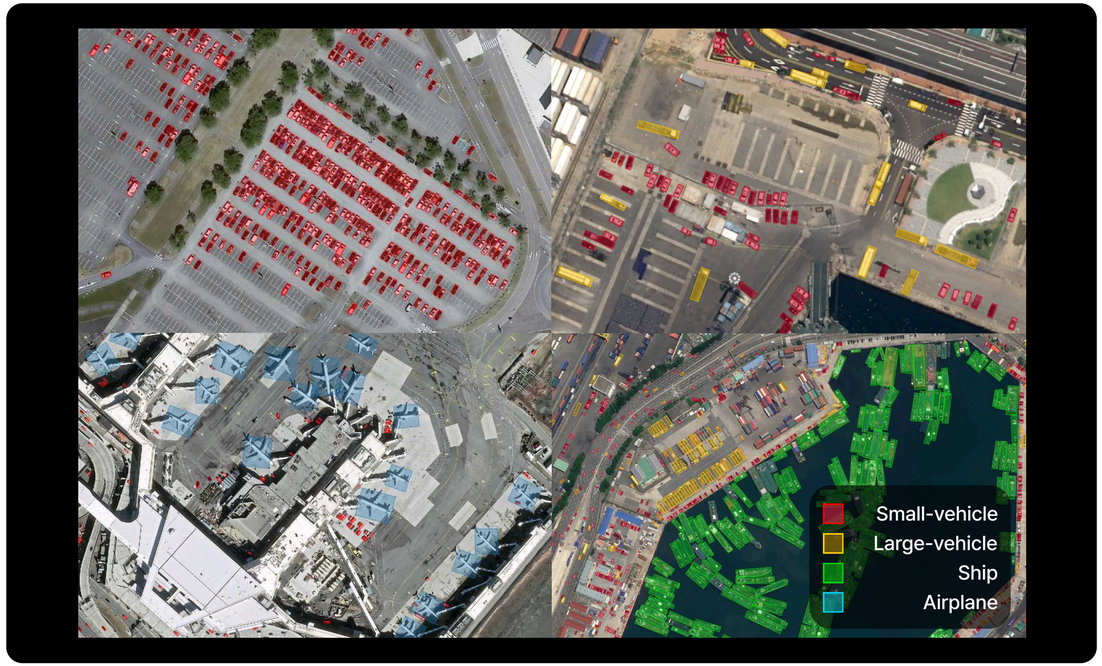
2 High-Precision Urban Area Detection through Ultra-High-Resolution Training

Accurately detects building boundaries with mIoU 0.84 on imagery with spatial resolution finer than 1 meter.

3 High-Speed Analysis Enabled by an Efficient Inference Model

Achieves fast inference of approximately 13 seconds per 1000 × 1000 pixel input, enabling rapid and accurate detection across large-scale spatial areas.

Object Detection : Transportation Means



Technical Specifications

Recommended Resolution	~ 0.5 m
Training Data	Self-Constructed Data (Pleiades, Pleiades Neo), DOTA Dataset (Satellite and Aerial Imagery), AI Hub (Kompsat-3, Kompsat-3A)
Input Data	RGB band
Output Format	Vector (GeoJson, SHP)

Key Advantages

1 Training on multi-resolution satellite and aerial imagery

Leveraging datasets such as Pleiades, Pleiades Neo, and DOTA, we combine imagery at various resolutions with Super-Resolution (SR) outputs to deliver robust detection performance at 0.5 m–class high resolution.

2 Enhanced accuracy through Super-Resolution integration

By sharpening object boundaries with advanced Super-Resolution technology, we simultaneously improve detection accuracy and the visual quality of the results.

3 High-precision detection across five transportation classes

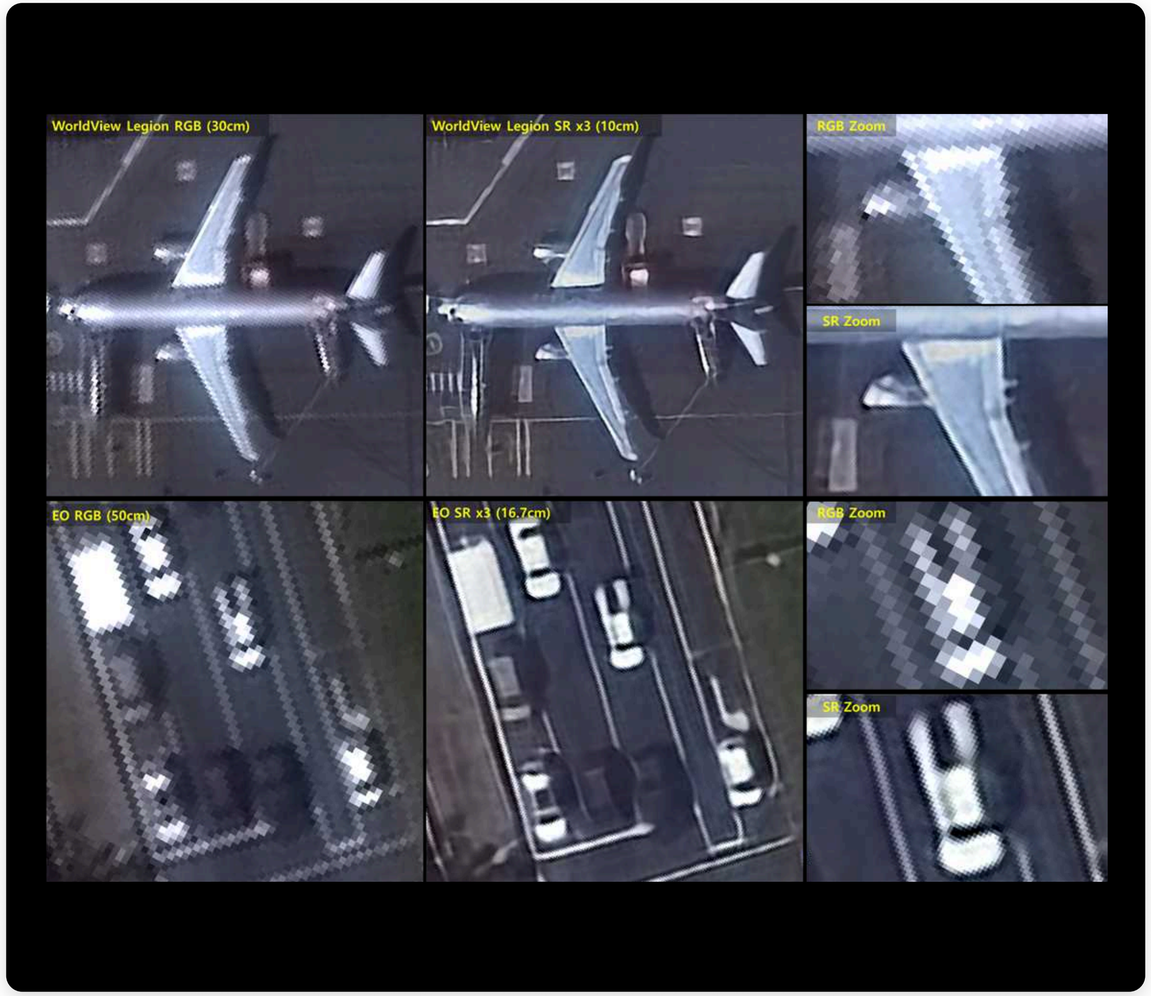
The model distinguishes multiple transportation asset types—such as fire trucks, heavy vehicles, ships, and aircraft—achieving an average recall above 0.98 accuracy across five transportation classes.

Transportation Means Object Detection Accuracy

Class	Small Vehicles	Large Vehicles	Ships	Airplanes	Average
Recall	0.98	0.93	1.00	1.00	0.98
AP	0.90	0.73	0.94	0.90	0.87

Super Resolution

3X Super Resolution to a WorldView Legion (30 cm) image



Key Advantages

1 High-quality super-resolution tailored to your satellite imagery

Incorporates satellite-specific characteristics—such as brightness, noise patterns, and atmospheric effects—to preserve original features while enhancing spatial resolution, enabling more precise object detection and analysis.

2 Fast processing of large-scale imagery through model lightweighting and optimization

By lightweighting the model and optimizing inference, high-volume, large-area satellite imagery can be processed at high speed, ensuring both high throughput and consistent image quality.

3 Maximizing value from existing low-resolution imagery and reducing costs

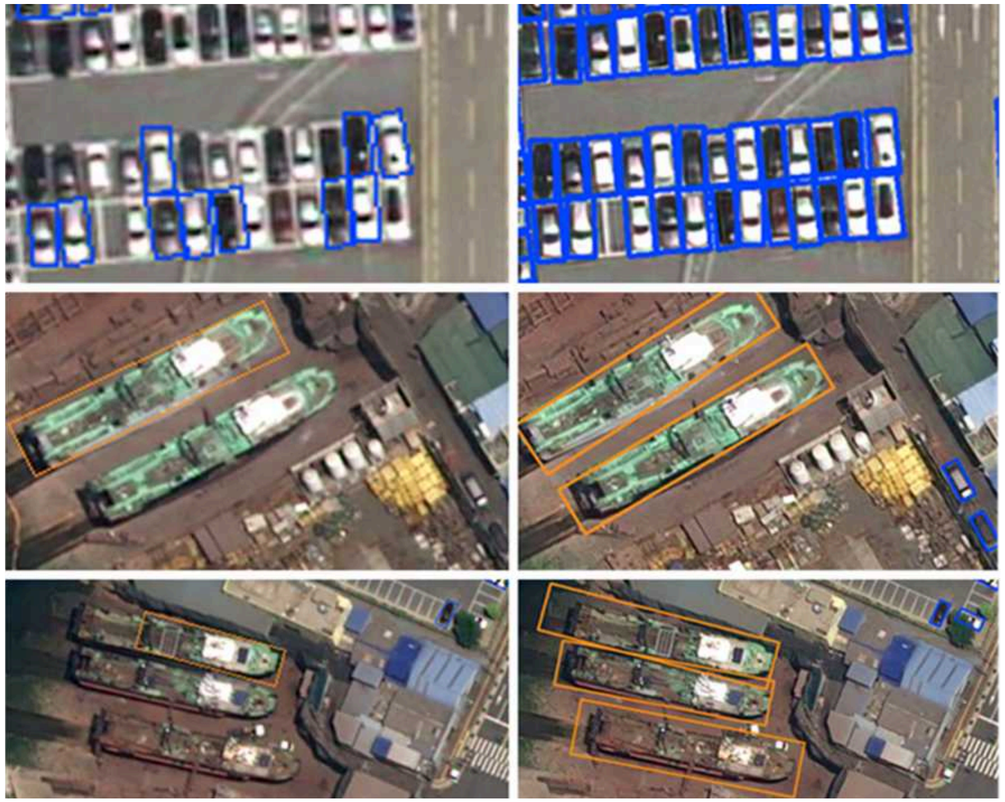
By upscaling existing low-resolution archives—such as Landsat and Sentinel—into high-resolution products, you can reduce reliance on costly high-resolution acquisitions while significantly increasing data utilization.

4 Boosting accuracy across multiple analysis workflows

Applying super-resolution enhances performance in change detection, object detection, and disaster monitoring, improving both detection accuracy and overall analysis quality.

Super Resolution

Accuracy Improvement After SR Application



Performance Improvement Cases Before / After SR Application

Performance Improvement Cases Before / After SR Application					
Class	Small Vehicles	Large Vehicles	Ships	Airplanes	Average
Recall	0.61 → **0.98**	0.84 → **0.93**	0.97 → **1.00**	1.00 → **1.00**	0.85 → **0.98**
AP	0.59 → **0.90**	0.55 → **0.73**	0.89 → **0.94**	0.98 → **0.90**	0.75 → **0.87**

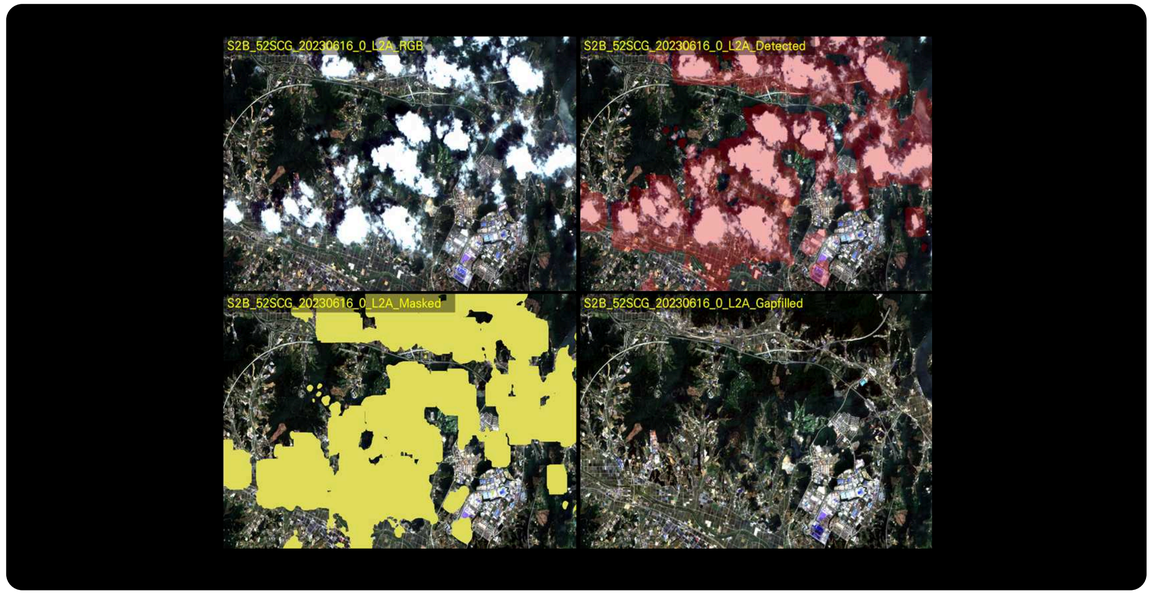
Technical Specifications

Recommended Resolution	0.3 m - 10 m
Applicable Satellites	Applicable to more than 20 high- to low-resolution satellite types
Input Data	RGB / RGBN
Output Format	Raster (GeoTIFF, PNG / 8bit)

Gap-Filling

The images illustrate the cloud and cloud-shadow masking and gap-filling process applied to Sentinel-2 (10 m) imagery for the Korean peninsula

Gap-filling



Technical Specifications

Recommended Resolution	~ 30 m
Training Data	Landsat 8-9 (30 m) , Sentinel-2 (10 m)
Input Data	RGB + a
Output Format	Raster (GeoTIFF, PNG / 8bit , 16bit)

Key Advantages

1 Deep learning–based precise cloud detection

Leveraging advanced deep learning models, cloud-covered areas are detected far more accurately than with conventional threshold-based methods.

2 Continuous monitoring without cloud constraints

By reconstructing areas obscured by clouds and cloud shadows, continuous observation becomes possible without interruption, while preserving both spatial and temporal resolution.

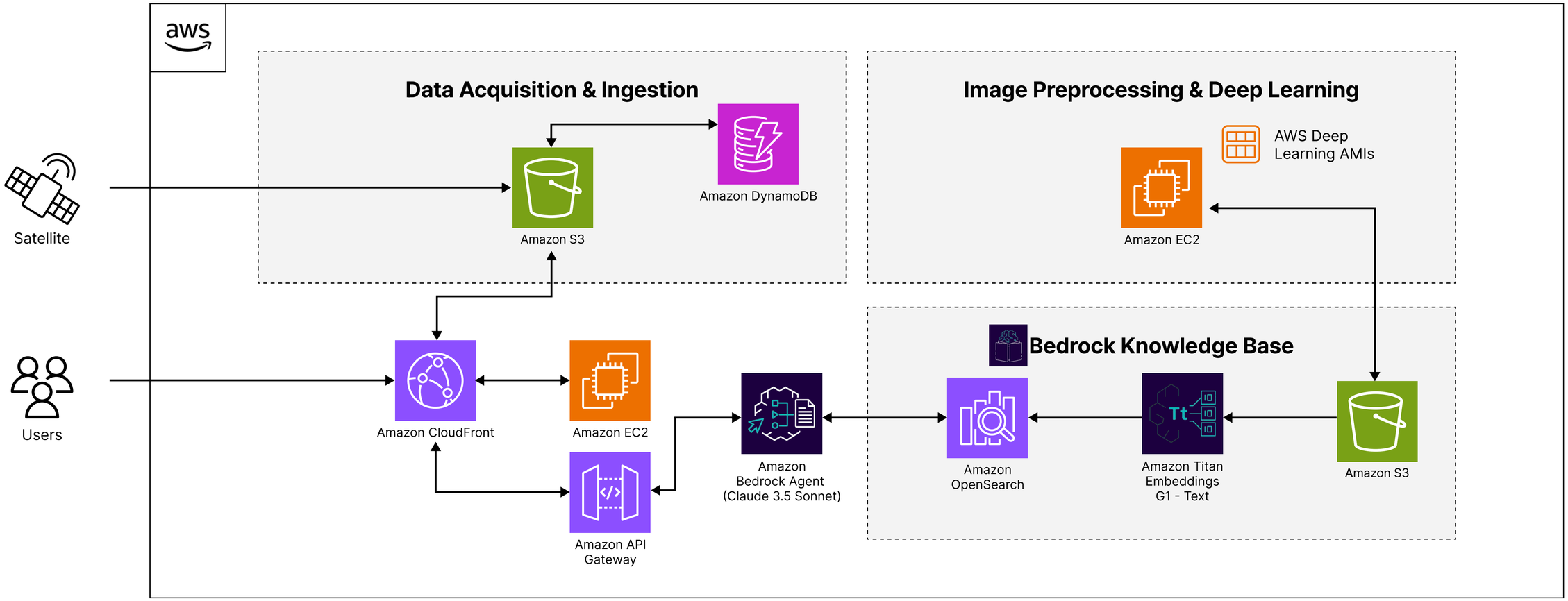
3 Seamless restoration of cloud-obscured areas

Advanced machine learning algorithms naturally reconstruct missing regions, preserving land-cover patterns even in complex terrain.

4 Purpose-built for time-series intelligence

Delivers gap-free time-series imagery for use cases that demand continuous monitoring, including land-cover change detection, agricultural monitoring, and water resource management.

Automatic Reporting Using Gen AI



Key Advantages

1 Save time

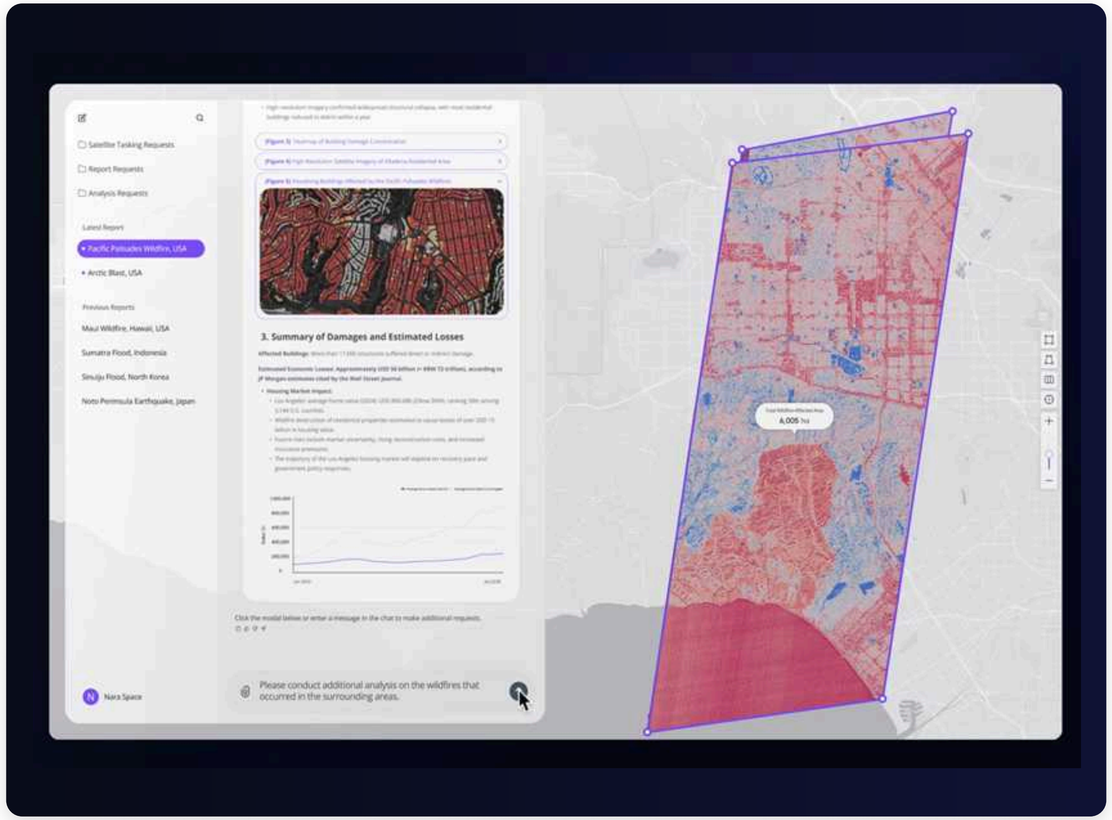
By leveraging Gen AI, report generation is dramatically reduced, enabling actionable insights in record time.

2 Minimized Hallucinations

By leveraging a rich, domain-specific knowledge base, the system significantly reduces hallucinations and delivers reliable analytical results.

Gen AI-Based Customer-Specific Copilot System

Copilot System Example



Key Advantages

1 User-friendly chatbot interface

An intuitive, conversational system that lets users easily request satellite image analysis and receive their results in no time.

2 Proactive, automated reporting

When a disaster occurs, the system automatically runs the analysis and delivers a report to the user, without requiring any manual request.

3 On-demand, deeper analysis

Once an initial report has been generated, users can immediately request additional or more detailed analyses to support in-depth decision-making.

4 24/7 Availability

The Gen AI system delivers essential information instantly, without time constraints or waiting periods, enabling timely decision-making during critical moments.

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Thank you

Contact us: sales@naraspace.com