NARA SPACE



TRANSFORMING OBSERVATIONS INTO ACTION:

GLOBAL COLLABORATIONS IN ENVIRONMENTAL MONITORING THROUGH SATELLITE ANALYTICS

© NARA SPACE TECHNOLOGY Inc. All rights reserved

NARA SPACE

Company Overview

Company Overview

2015

Established

24 M USD

Series B
Planned IPO in Q4 2025

2

Seoul Headquarters,
Busan Branch

75

Team Members

9

Ph. D.

31

M. Sc.

35

B. S.

Company Overview

Milestones

- **2015** Company Established
- **2017** Awarded by Ministry of Science
- **2018** Hyundai gift Car TV
- **2019** Partnership With Busan
- **2020** Pre-A Series Funding
- **2021** NASA Clps Mission
- **2022** Series-A Funding
- **2024** Series-B fundraising +14.5M

Patents

12 Registered Patents

Regarding Satellite Image Analysis





Partner & Customers

NASA · GISTDA · World Geospatial Industry Council · International Astronautical Federation · aws

KARI · KASI 한국천문연구원 · KASA 우주항공청 · ktl 한국산업기술시험원 · 국방과학연구소 Agency for Defense Development

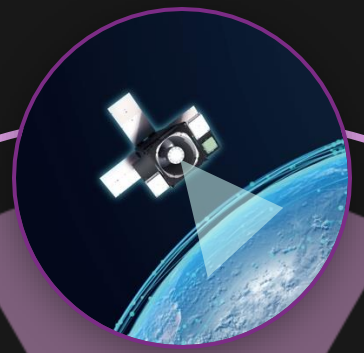
해양경찰청 Korea Coast Guard · NSR · Gyeonggi-do · 부산광역시 Busan Metropolitan City · SAMSUNG

SK securities · kt · 한화시스템 · AP위성통신(주) · GENOHCO

End-to-end Services

Nara Space Technology covers the entire spectrum of satellite solutions, from satellite design to mission operations to delivering value-added services for imagery, all managed in-house

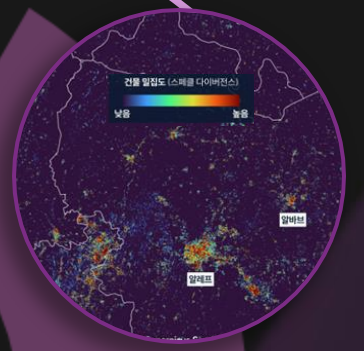
Mission Operations &
Data Acquisition



Satellite Design &
Development



Value-Added Services &
Insights



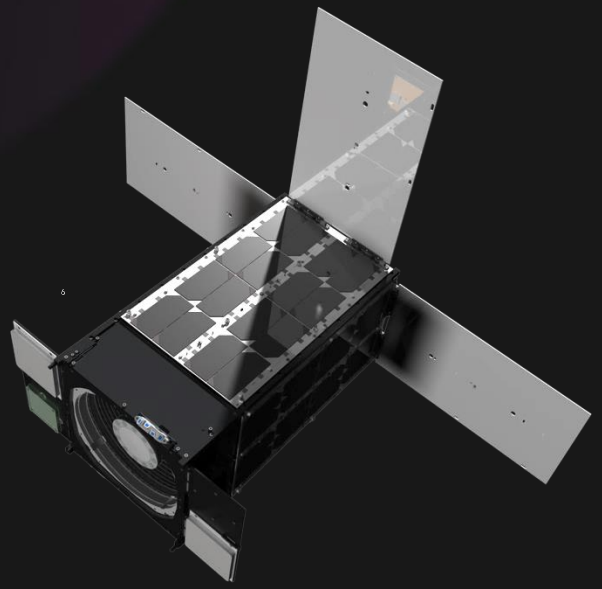
Satellite
solutions

NARA SPACE

Satellite Solution

Satellite Solution

Nara Space Technology covers the entire spectrum of satellite solutions, from satellite design to mission operations to delivering value-added services for imagery, all managed in-house

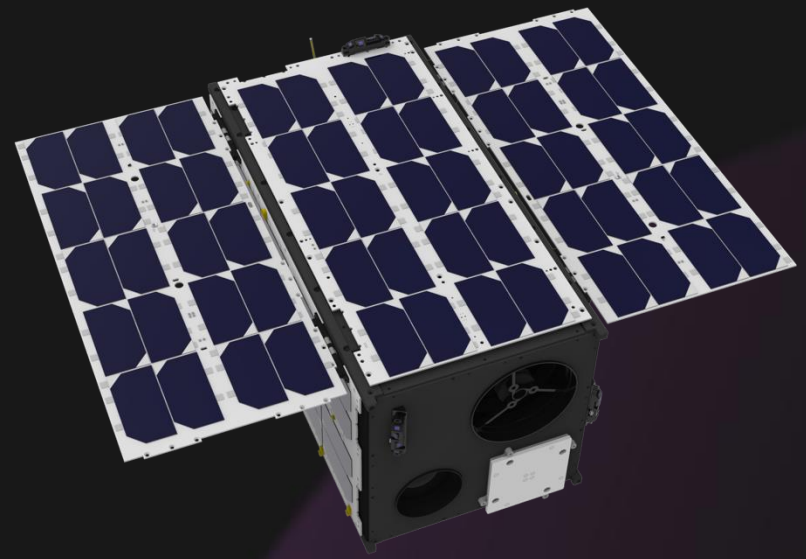


Observer

1.5m GSD Multispectral Satellite

Launched in 2023

Launch Planned in Nov 2025

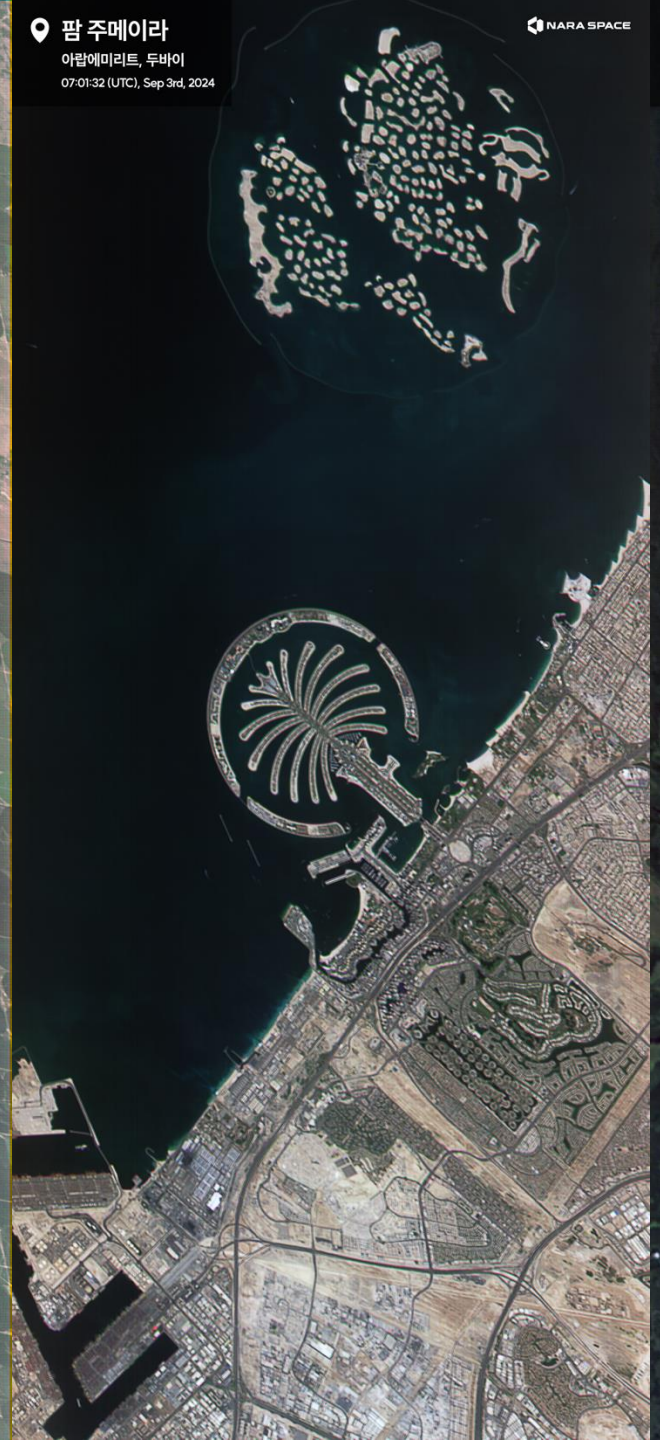


NarSha

Methane Detection Satellite

Launch Planned in 4Q 2026


중앙 회전식 원형 관개
미국, 네브래스카
17:32:18 (UTC), Jul 23th, 2024
NARA SPACE

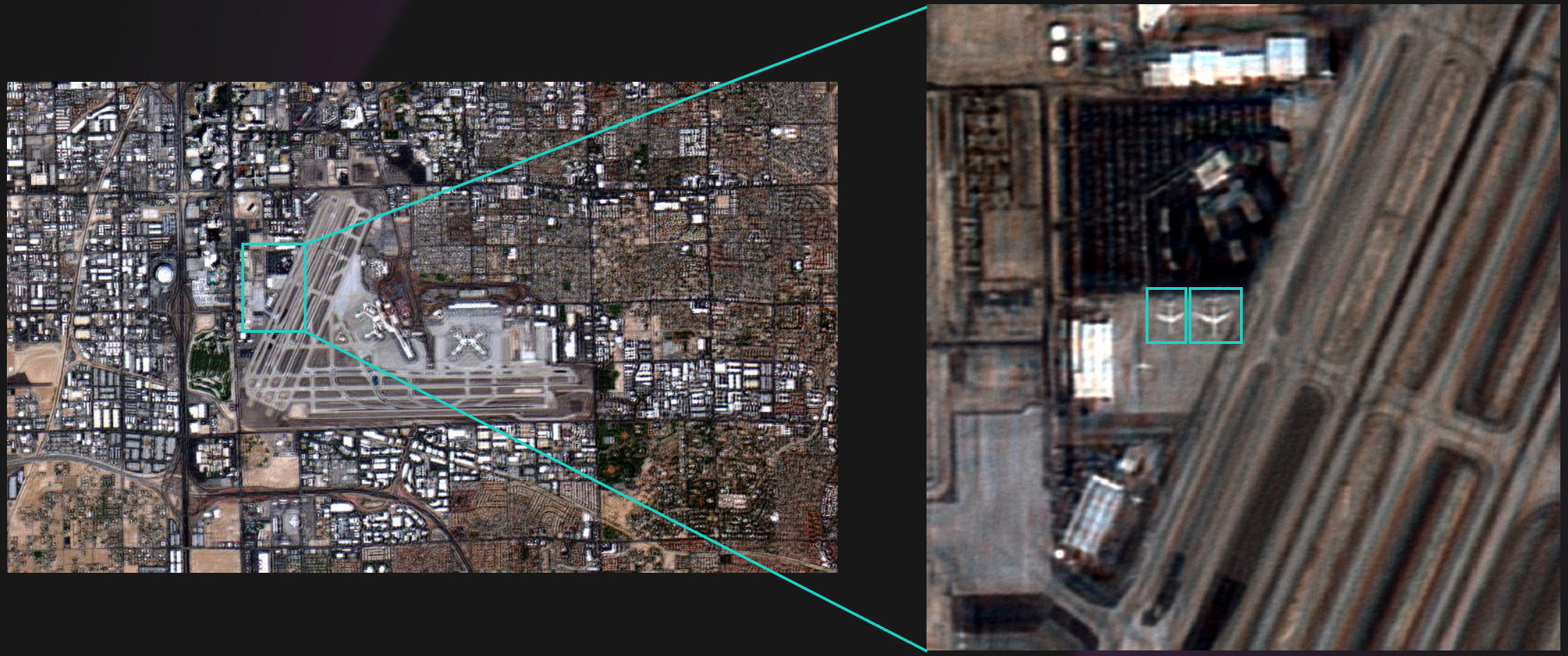

팜 주메이라
아랍에미리트, 두바이
07:01:32 (UTC), Sep 3rd, 2024
NARA SPACE


백두산
조선민주주의인민공화국-중국 국경
02:39:38 (UTC), Sep 12st, 2024
NARA SPACE


팰리세이드-LA 산불 (RGB)
미국, 캘리포니아 로스앤젤레스
18:50:13 (UTC), Jan 11st, 2025
NARA SPACE

Observer：Multispectral Imager

GSD 1.5 m with 8 Spectral Bands (PAN & R&G&B& VNIR & 3 Red Edges)





NARSHA : HYPER SPECTRAL IMAGE

The 1st Korean methane monitoring microsatellite constellation

- **SIZE**

16 U / 20 cm x 20 cm x 40 cm

- **MASS**

<25 kg

- **RESOLUTION**

Spatial : <25 m(VNIR & SWIR)

Spectral: <1 nm

- **FIELD OF VIEW**

10 km x 10 km

- **PAYLOAD**

VNIR (@400-1000 nm)

SWIR (CH4 @1625-1670 nm)

- **LAUNCH**

Q4 2026

Mission Impact Objectives

Obj. #1

Pinpoint high-emission methane sources of **100 kg/h or more** to improve emission hotspots monitoring, response and mitigation efforts

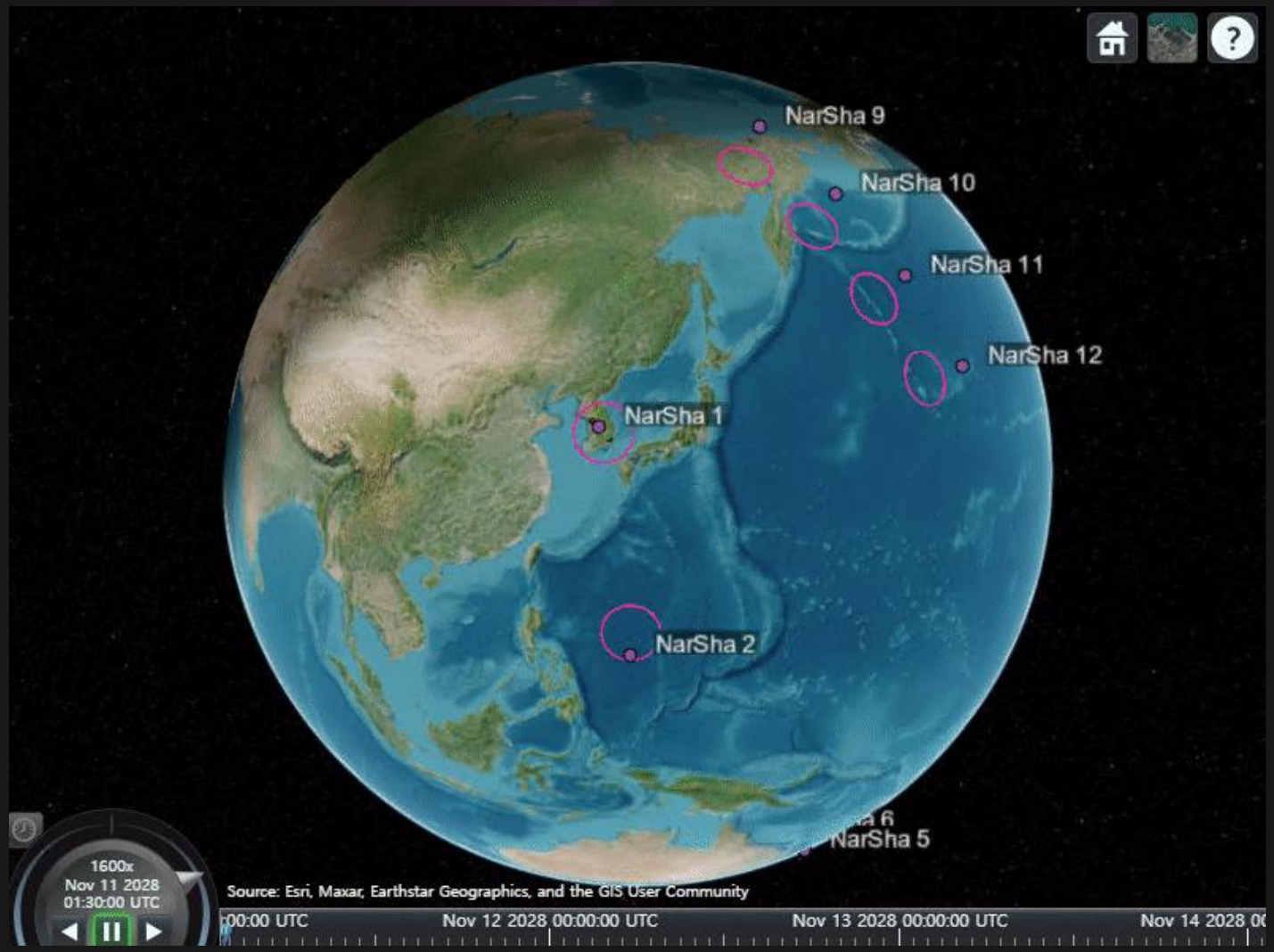
Obj. #2

Enhance observation frequency and bridge data gaps for critical sources by delivering timely, daily data

Obj. #3

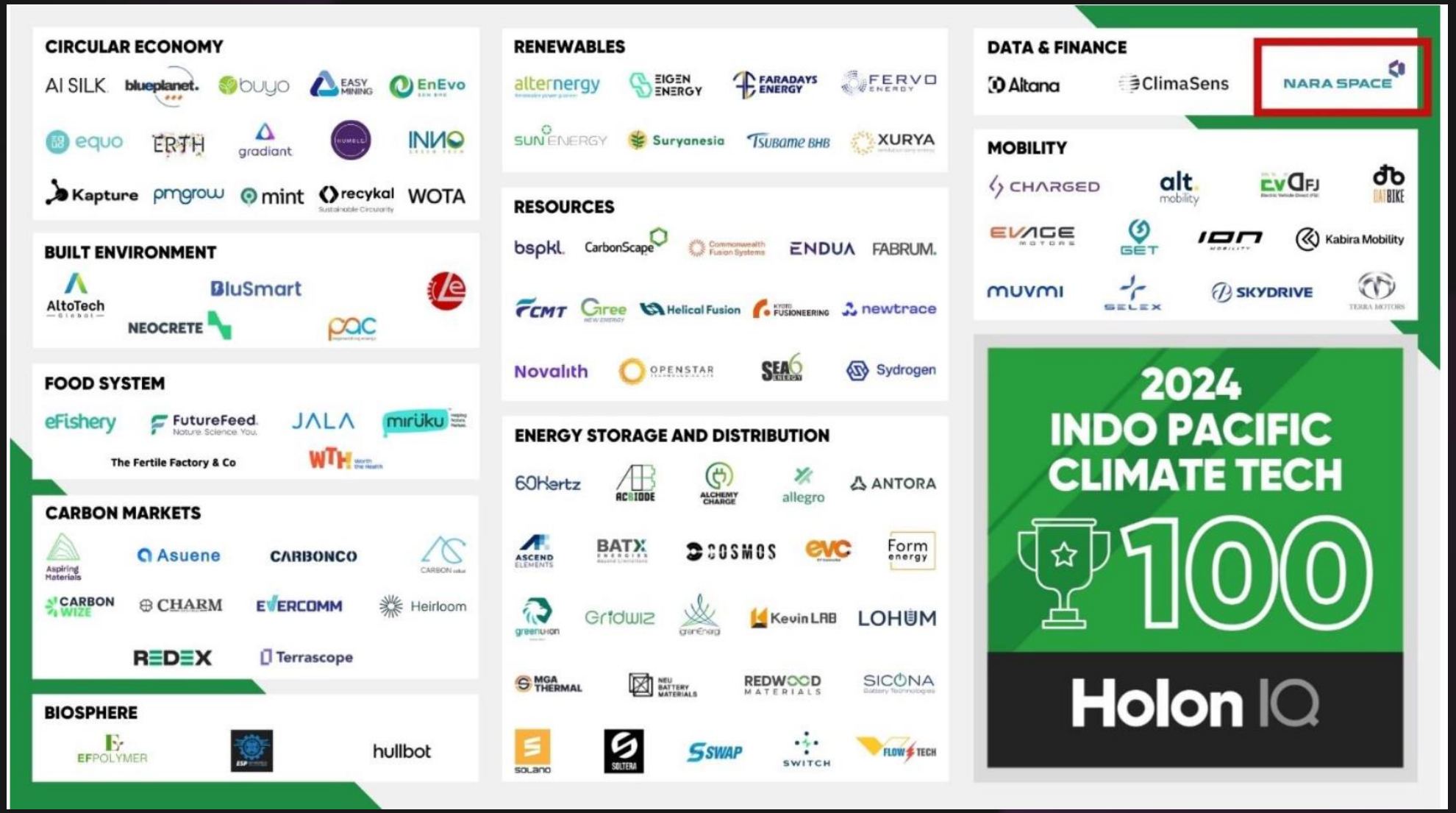
Delivering actionable data faster: ensure stakeholders can take data-driven actions within a four-week window

Constellation Design



Orbit type	Circular Sun-Synchronous orbit
Altitude	500-600 km
Total # of satellites	12
Number of planes	4
# of satellites per plane	2 or 4
LTAN	10:30, 11:30, 12:30, 13:30

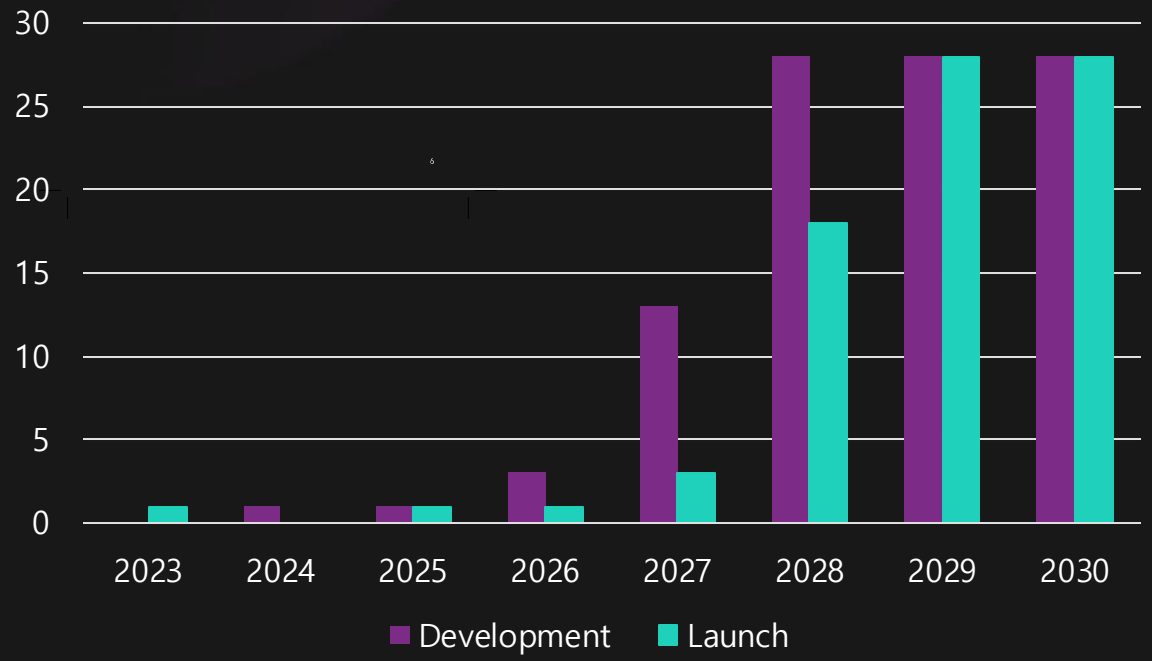
Indo Pacific Climate Tech Top 100



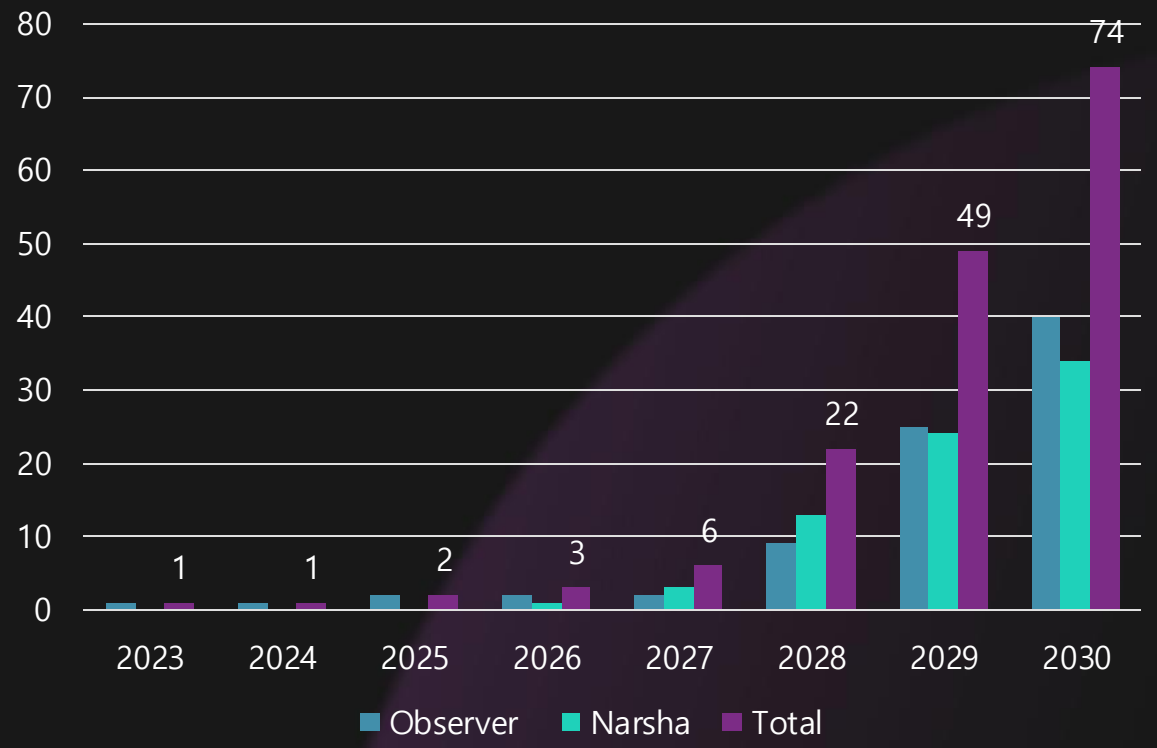
Satellite Solution

Nara Space Technology covers the entire spectrum of satellite solutions, from satellite design to mission operations to delivering value-added services for imagery, all managed in-house

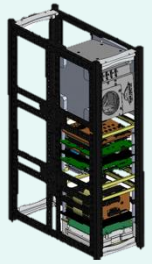
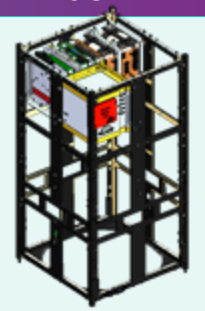
Nara Space Satellite Production/Launch Plan



Nara Space Satellite Operation Plan

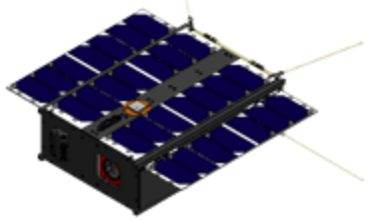


Standard Bus Portfolio

	6U	12U	16U
Configuration			
Spacecraft Mass	Up to 12 kg	Up to 24 kg	Up to 32 kg
Available Payload Size	3U (Under 6 kg)	8U (Under 13 kg)	12U (Under 19 kg)
Power Generation	20 W	50 ~ 100 Wh	50 ~ 100 Wh
Battery Capacity	86 Wh	172 Wh	172 Wh
Bus Interfaces	CAN, RS-422	CAN, RS-422	CAN, RS-422
TC/TM	9.6 kbps / 9.6 kbps (UHF) or 33.4 kbps / 83.52 kbps (S-band)	33.4 kbps / 83.52 kbps (S-band)	33.4 kbps / 83.52 kbps (S-band)
Data Downlink	2 Mbps (S-band) or 43 Mbps (X-band)	43 Mbps (X-band)	43 Mbps (X-band)
Payload Interfaces	CAN / SpW / RS-422	CAN / SpW / RS-422	CAN / SpW / RS-422
Payload Input Voltage	3.3, 5, 8, 12, 28 V (@ 2 A)	3.3, 5, 8, 12, 28 V (@ 2 A)	3.3, 5, 8, 12, 28 V (@ 2 A)

Customer Mission Portfolio

Delivered

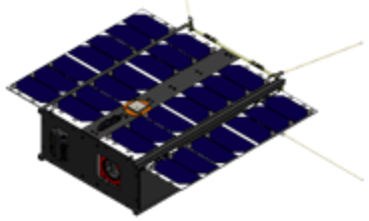


NSR 국가보안기술연구소 National Security Research Institute

6U(FlatSat)

Cyber Security
Tech-Demo Satellite
National Security Research Institute

On-Going

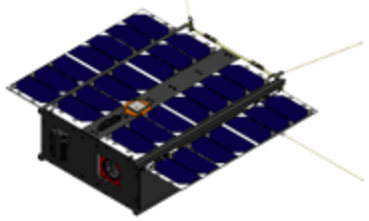


KISA Korea Internet & Security Agency

6U Mission

Quantum Cryptography
Tech-Demo Satellite
Korea Internet & Security Agency

Launched

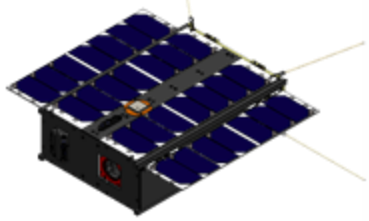


국방과학연구소 Agency for Defense Development

6U Mission

Anti-Jamming
Tech-Demo Satellite
Agency for Defense Development

On-Going



ETRI 한국전자통신연구원 Electronics and Telecommunications Research Institute

6U Mission

Pre-6G IoT-NTN Technology
Tech-Demo Satellite
Electronics and Telecommunications Research Institute

Delivered



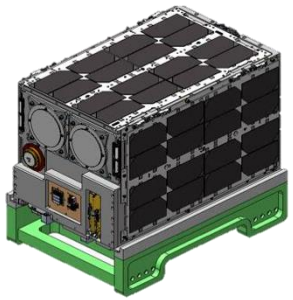
부산광역시 BUSAN METROPOLITAN CITY

12U Mission

Fine dust monitoring
With Polarimetric Camera
Busan City

Customer Mission Portfolio

On-going



12U Mission

Deep Space
Radiation Science
Korea Astronomy & Space Science Institute

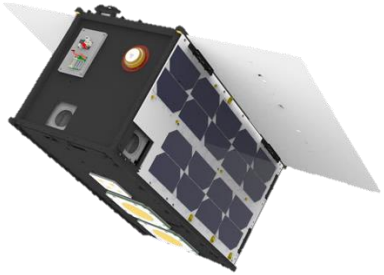
On-going



12U Mission

Standard Satellite
For Commercial Subsystem
Korea Aerospace Research Institute

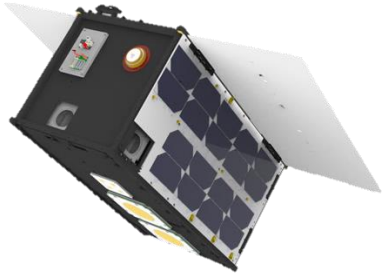
On-going



16U Mission

GHG Monitoring Satellite
Hanwha Systems

On-going



16U Mission

Methane Monitoring Satellite
Gyeonggi Province Government

Delivered

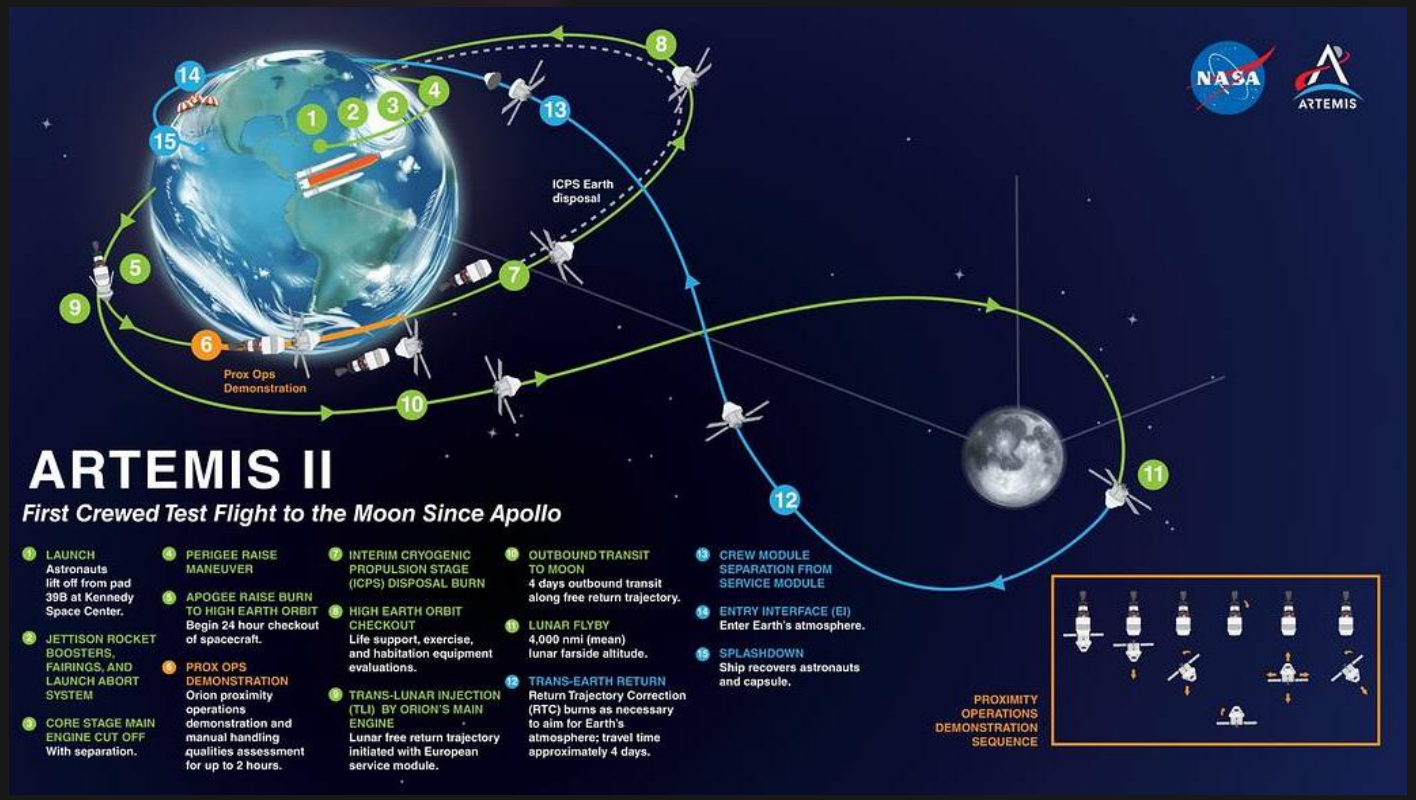


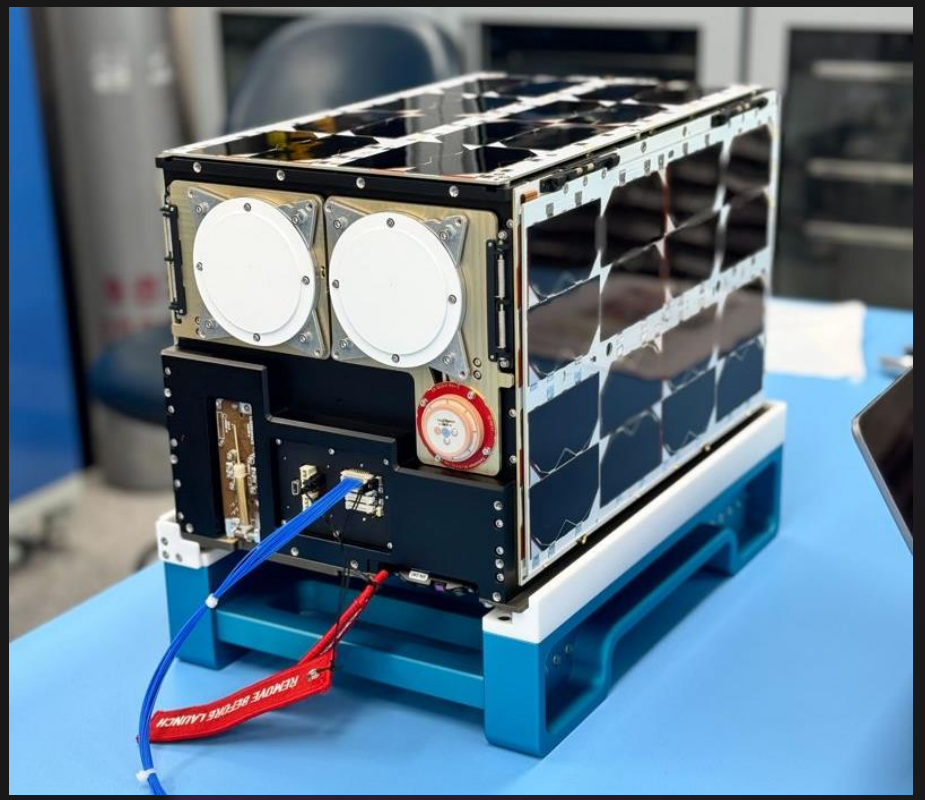
50 kg Platform

Relay Satellite Tech-Demo
Agency for Defense Development

Representative Mission : K-RadCube (Ongoing)

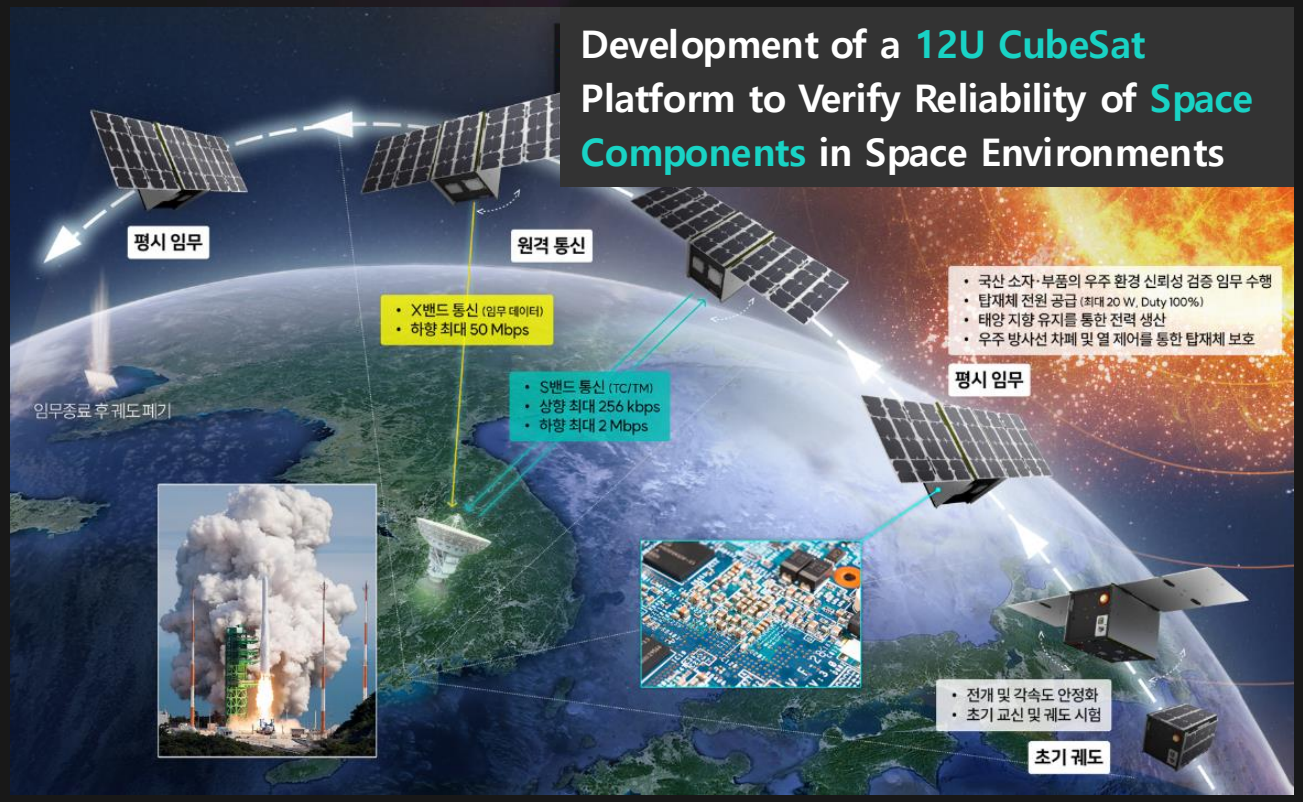
- Customer: NASA, KASA, KASI
- Mission Objective (Launch Date) : To investigate the radiation environment(2026)
- Remarks : Samsung & SK Hynix semiconductor testers will be loaded

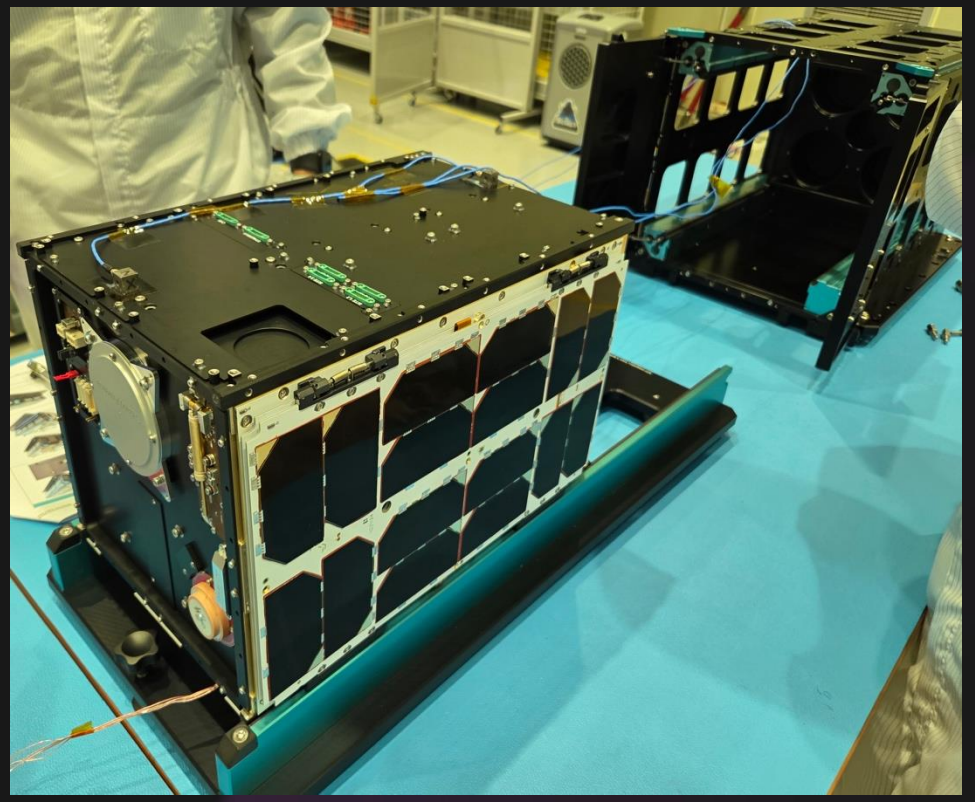




Representative Mission : E3Tester(Ongoing)

- Customer: KASA, KARI
- Mission Objective (Launch Date) : To demonstrate South Korean SMEs' space products on orbit(2025, 2026, 2027)
- Remarks : Secondary payload for KSLV-II(Korea Space Launch Vehicle-II) 4th , 5th and 6th Launch





NARA SPACE

Image Analysis Solution

Image Analysis Solution

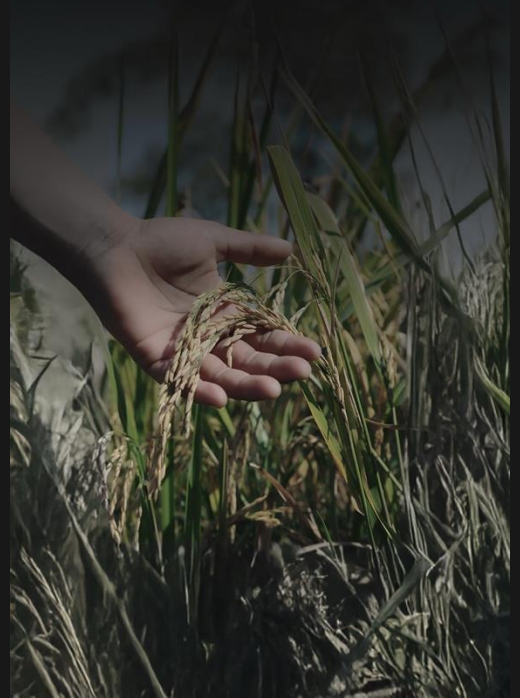
01. Finance

- Construction Monitoring
- Economic Activity Monitoring



02. Agriculture

- Yield Prediction
  - Corn
  - Beans
  - Wheat



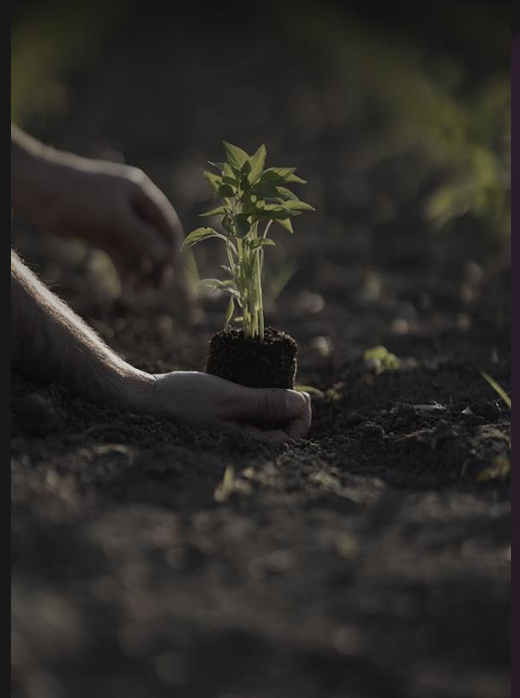
03. Natural Disaster

- Wild Fire Detection
- Flood Detection
- Land Slide Detection



04. Environment

- Tree Detection
- Land Classification
- Water Quality Assessment



05. Defense

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



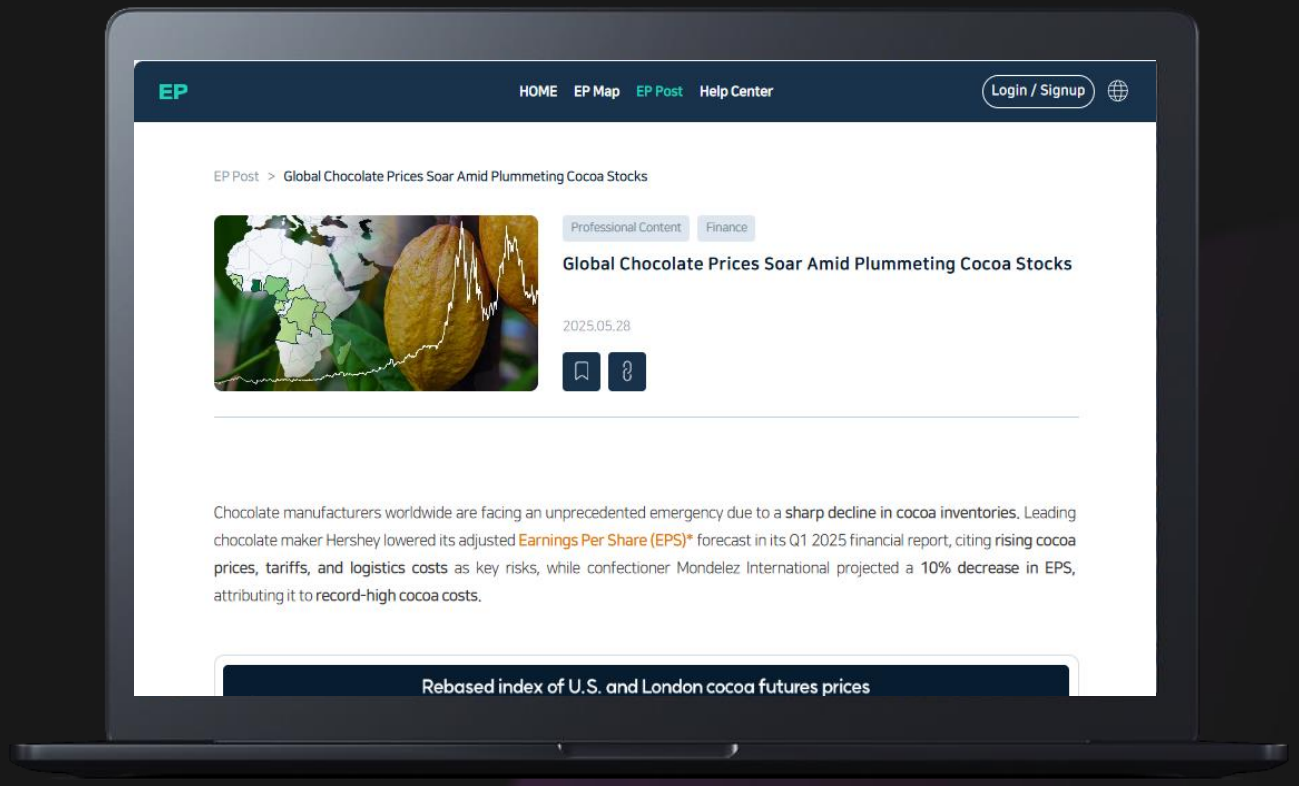
EarthPaper

Easy to Find
Easy to Purchase
Help Decision Making

EarthPaper is a platform for easily searching and purchasing satellite imagery through the web and tablets, offering image s at various resolutions.

It also offers reports analyzing satellite imagery and content capturing everyday life through satellite imagery.

EarthPaper aims to propose solutions for a better future by v iewing the Earth from a higher dimension through satellites.



EarthPaper : Finance Use Case

What if you could verify the construction progress without an on-site visit?



EarthPaper : Natural Disaster Use Case

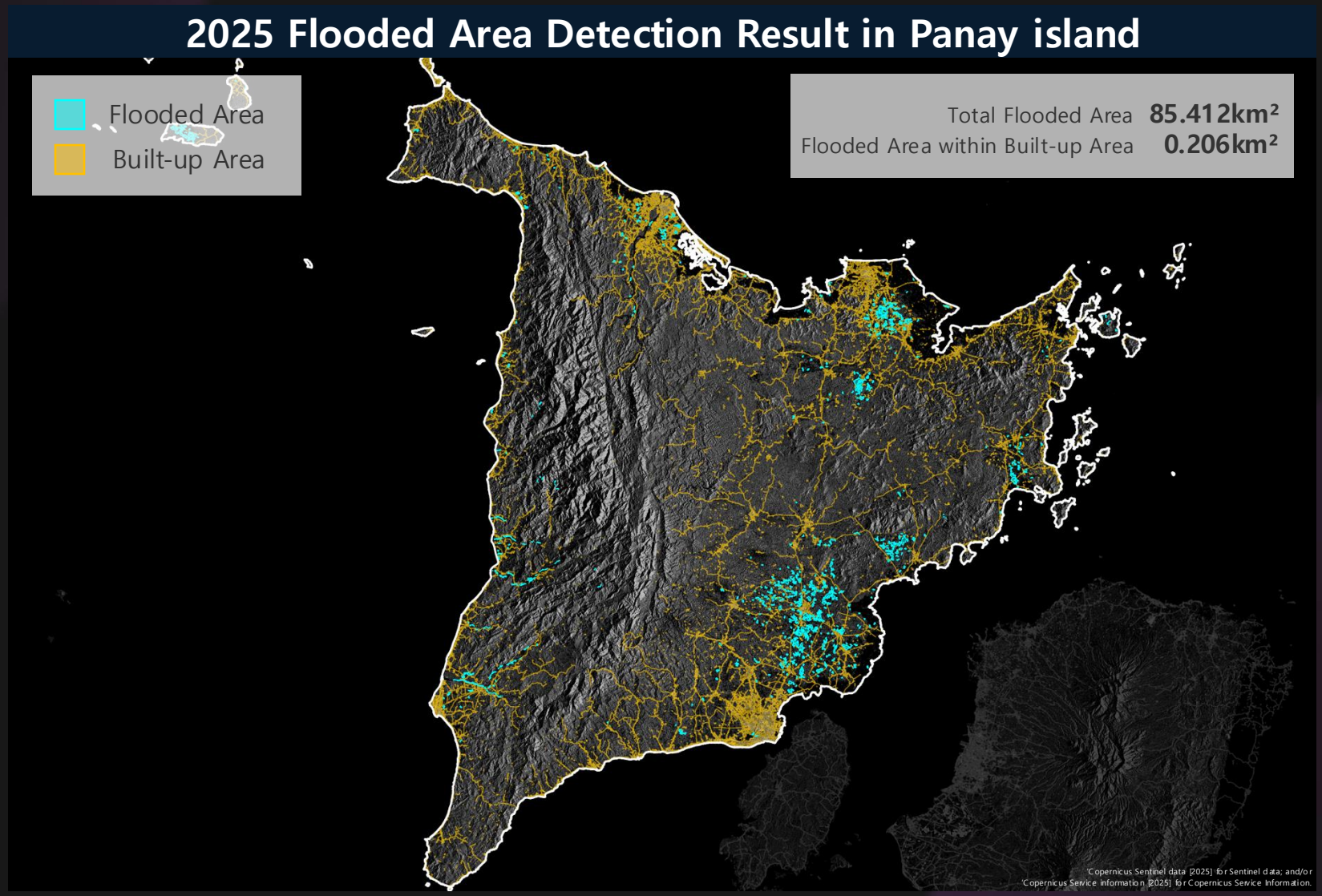
Satellite imagery quantified the extent of wildfire spread



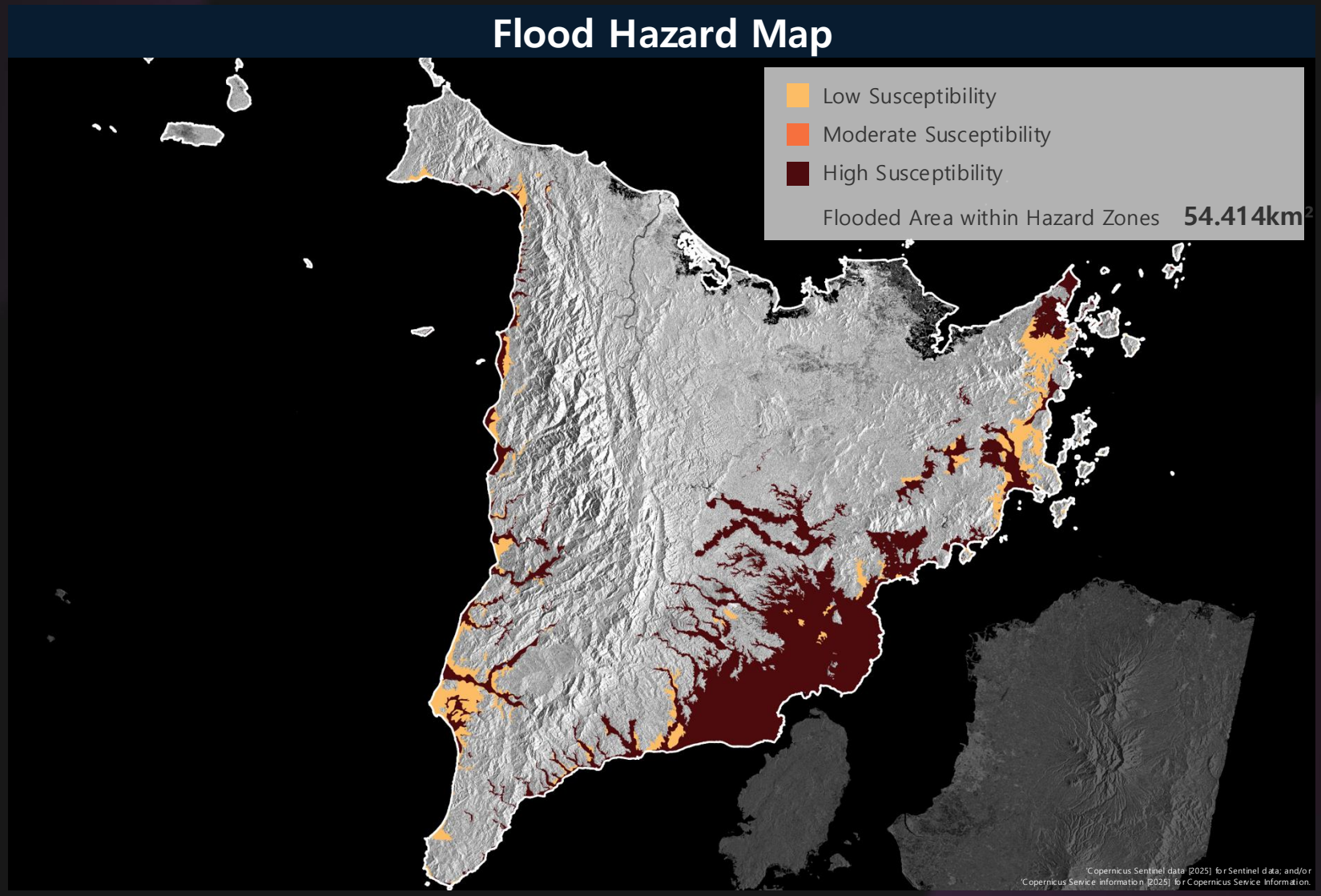
Eaton Wildfire

Detailed damage analysis was used for disaster response planning and insurance claims

EarthPaper : Flood Use Case



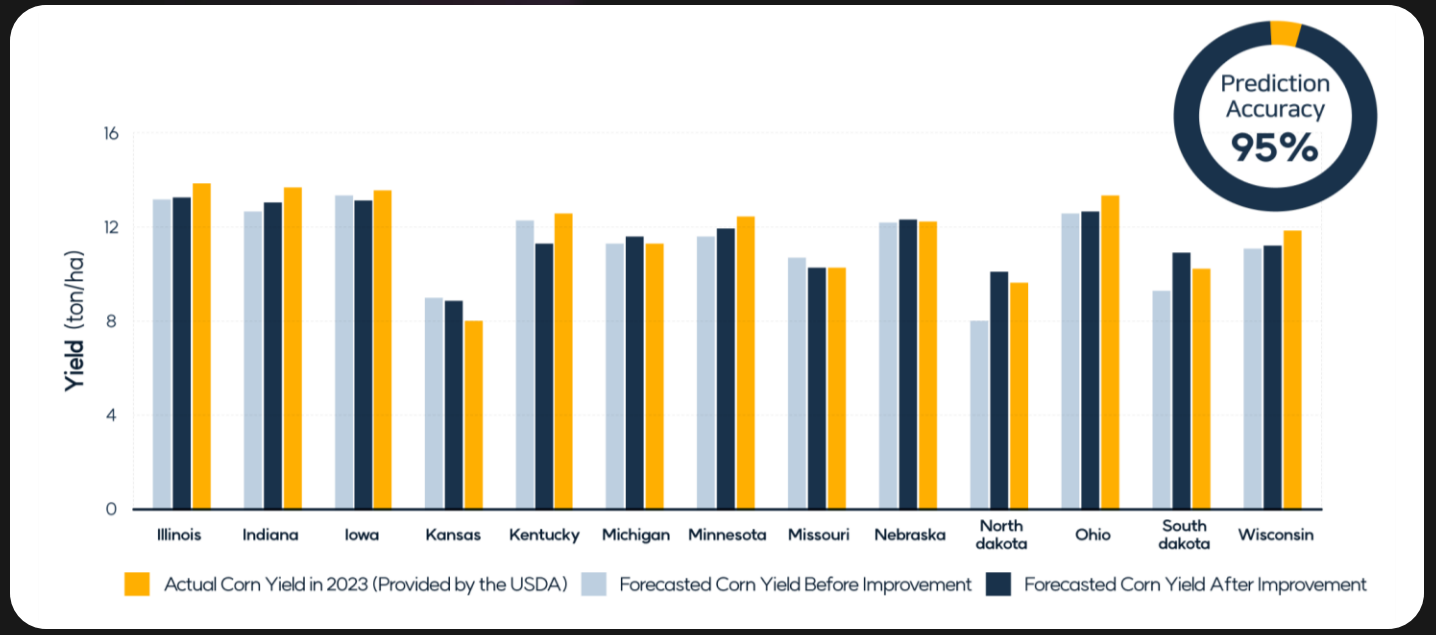
EarthPaper : Flood Use Case

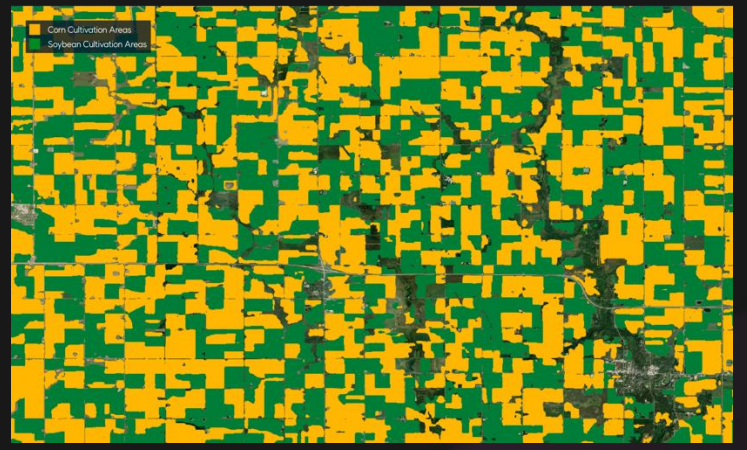


Flood hazard map data were sourced from the Mines and Geosciences Bureau (MGB) at 1:50,000 scale

EarthPaper : Agriculture Use Case

The Fastest & Most Accurate Yield Forecast





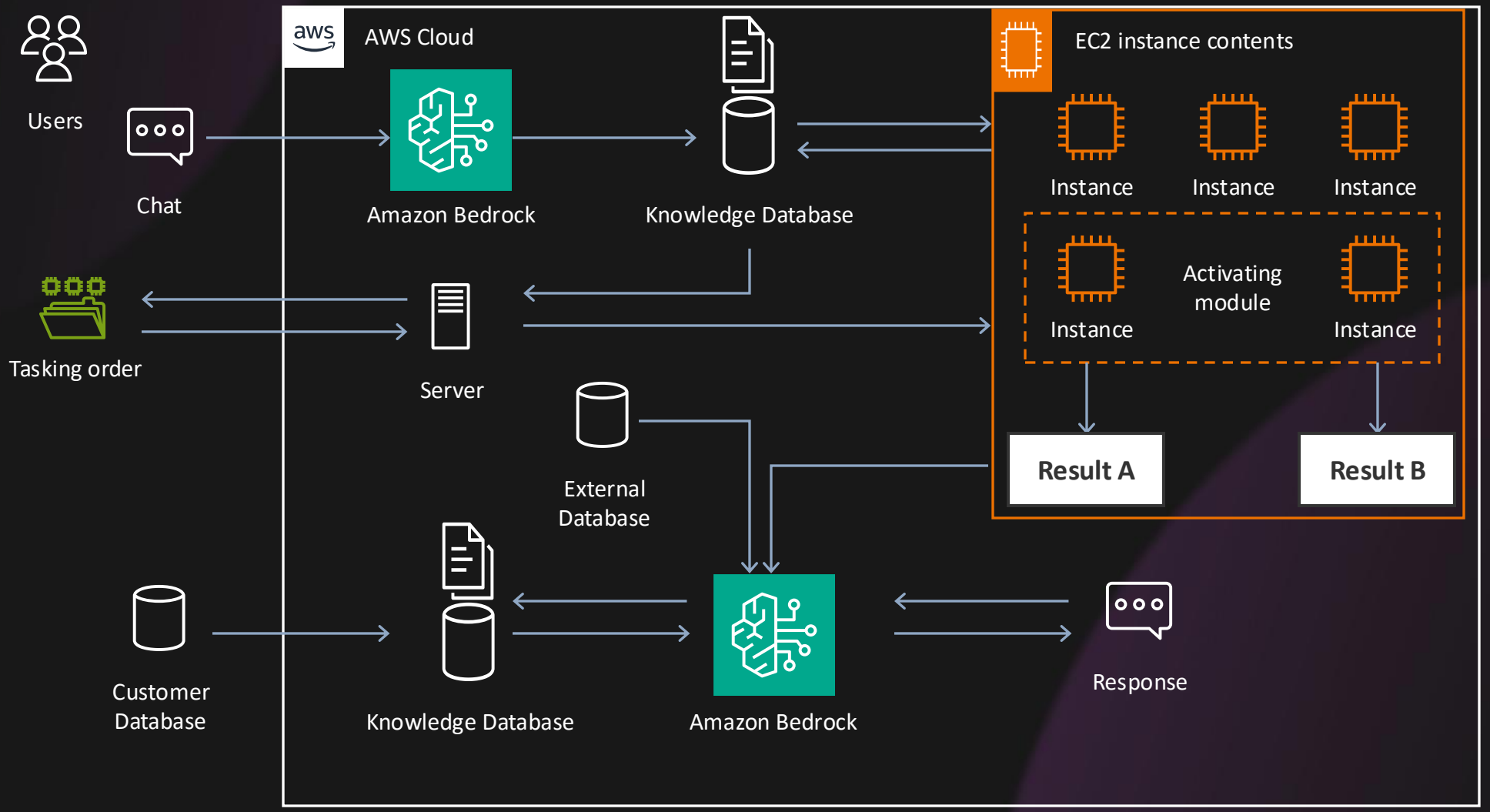


Comparison of actual vs. forecasted corn yields using the improved Nara Space model (2023)

Make informed trade decisions with the most reliable and fastest data available. & Reduce investment risks with accurate and timely yield forecasts.

EarthPaper + LLM

Turning Satellite Data into Instant Answers

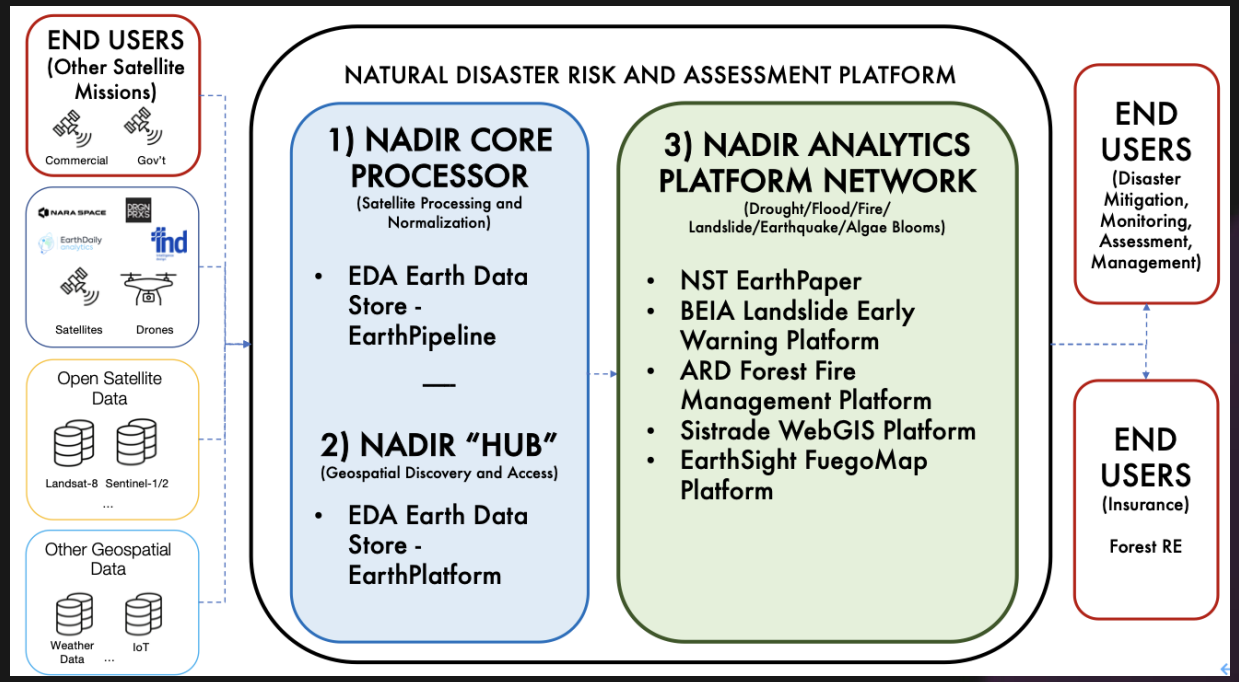


NARA SPACE

Global Remote Sensing Collaboration Projects

Project NADIR

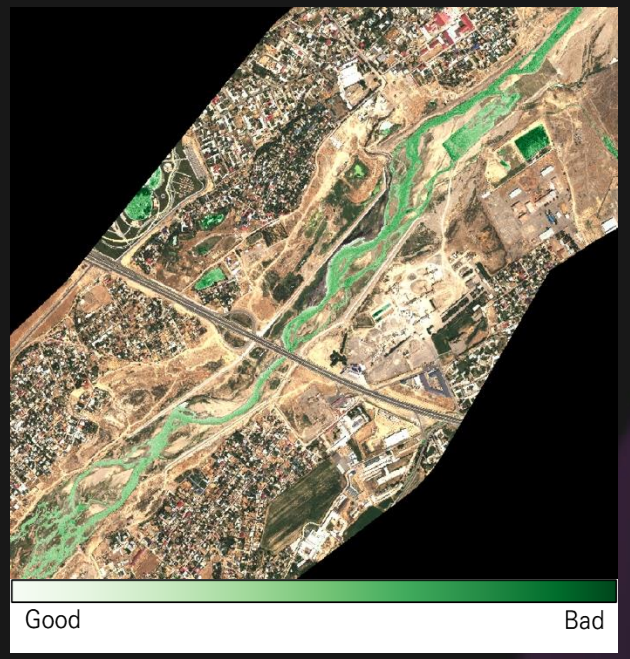
- Project Name : NADIR (NAtural DIsaster Risk and assessment platform)
- Program : ITEA4 – European R&D Collaboration
- Partnership : 9 Partners from 5 Countries including Nara Space (Korea)
- Goal : NADIR aims to build a natural Hazard/Disaster Risk and Assessment Platform to provide advanced risk assessment products



Chirchiq River Water Quality Monitoring

- Funding : Korea Institute of Environmental Technology (KEITI)
- Partnership : Geostory, Dongmun ENT, Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan
- Goal : Implementation of a smart water pollution management system and establishment of an environmental monitoring center in the Chirchiq River basin, Uzbekistan

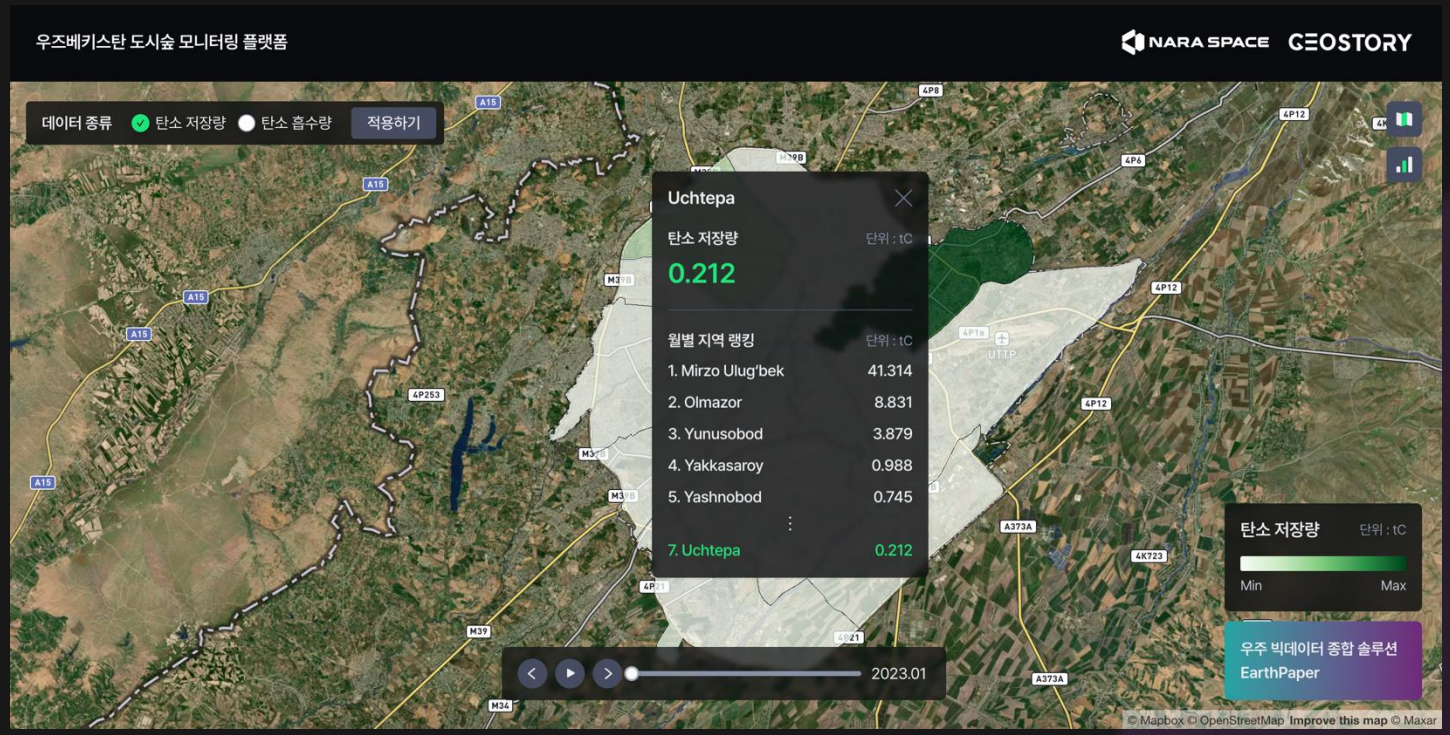






Development of an urban forest monitoring platform for Uzbekistan

- Funding : International Contractors Association of Korea
- Partnership : Geostory, Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan
- Goal : To quantify carbon storage and absorption in urban forests of Tashkent, Uzbekistan using satellite imagery, supporting local climate policy and urban forest management.



Project CompEnSate

- Project Name : CompEnSate (COMPutation of ENvironmental footprint supported with SATEllite imaging technology)
- Program : Eurostars3 – European R&D Collaboration
- Partnership : Nara Space (Korea) & Nature Preserve (Denmark)
- Goal : Build a digital platform to compute Environmental Footprint (EF) using satellite data

NARA SPACE

- **GHG observation**
- **Crop yield prediction**
- **Integration of satellite data**



Nature Preserve

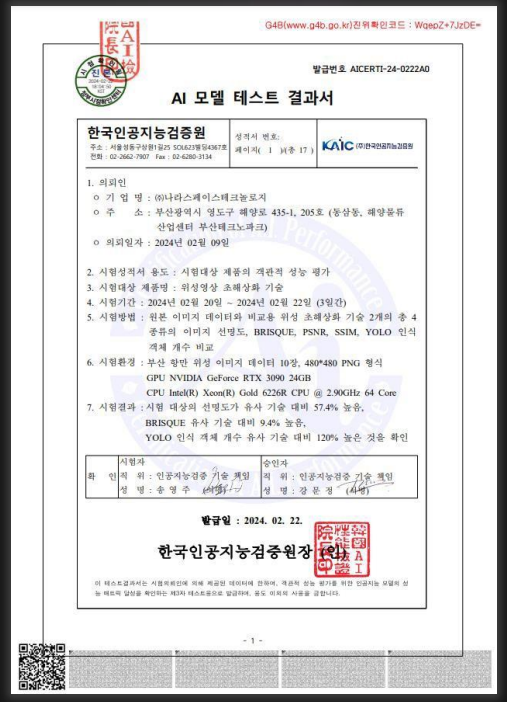
- **Development of Tier-2 EF platform**
- **GHG mitigation scenario & action plans**

NARA SPACE

Super Resolution

Super Resolution

- Satellite, drone & aerial imagery resolution **3+ times**
- AI to improve object detection capabilities
- KAIC (Korean AI Certification Agency) Top Certified



AI 모델 테스트 결과서

한국인공지능검증원

1. 의뢰인
   ㅇ 기 업 명 : (주)나라스페이스테크놀로지
   ㅇ 주 소 : 부산광역시 영도구 해양로 435-1, 205호 (동삼동, 해양물류산업센터 부산테크노파크)
   ㅇ 의뢰일자 : 2024년 02월 09일
2. 시험성적서 용도 : 시험대상 제품의 객관적 성능 평가
3. 시험대상 제품명 : 위성영상 초해상화 기술
4. 시험기간 : 2024년 02월 20일 ~ 2024년 02월 22일 (3일간)
5. 시험방법 : 원본 이미지 데이터와 비교용 위성 초해상화 기술 2개의 총 4종류의 이미지 선명도, BRISQUE, PSNR, SSIM, YOLO 인식 객체 개수 비교
6. 시험환경 : 부산 항만 위성 이미지 데이터 10장, 480*480 PNG 형식
   GPU NVIDIA GeForce RTX 3090 24GB
   CPU Intel(R) Xeon(R) Gold 6226R CPU @ 2.90GHz 64 Core
7. 시험결과 : 시험 대상의 선명도가 유사 기술 대비 57.4% 높음,
   BRISQUE 유사 기술 대비 9.4% 높음,
   YOLO 인식 객체 개수 유사 기술 대비 120% 높은 것을 확인

발급일 : 2024. 02. 22.

한국인공지능검증원장 인



이미지 6번

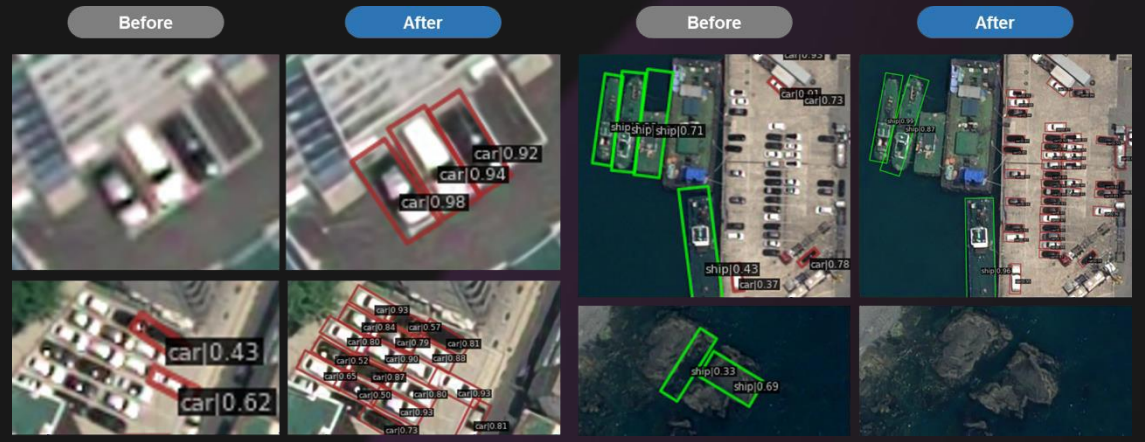
HAT

EDSR

2024 Super Resolution State-Of-The-Art

Model	PSNR ↑	SSIM	MOS	Paper	Code	Result	Year
HAT	29.38	0.8001		Activating More Pixels in Image Super-Resolution Transformer			2022
EDSR	28.80	0.7876		Enhanced Deep Residual Networks for Single Image Super-Resolution			2017

Contents	HAT (SOTA Rank 1)	EDSR (SOTA Rank 29)	Nara Space
Sharpness	8.82	10.53	13.89
# of Detected Object	4.3	4.4	9.5



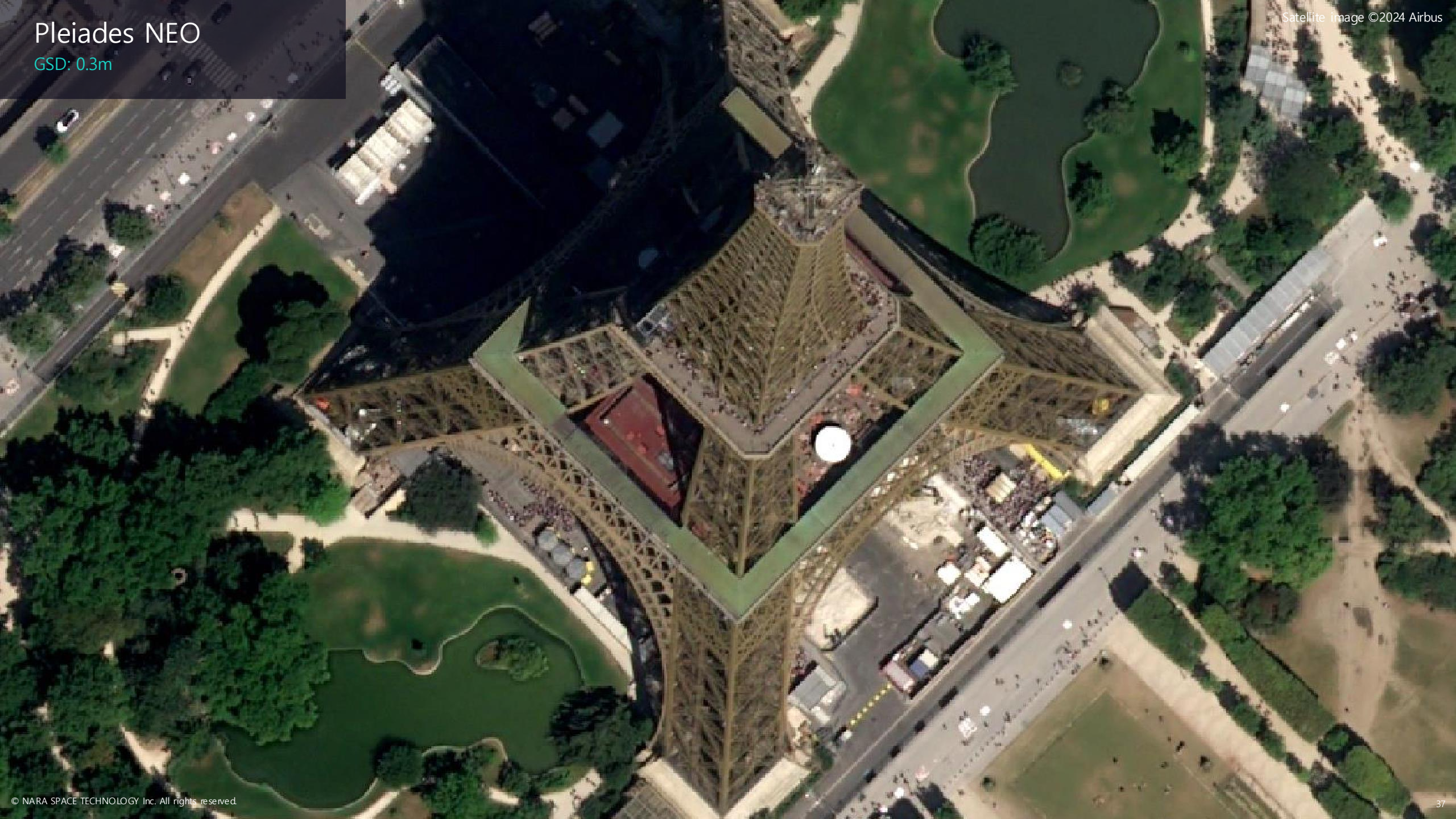
Super Resolution

Currently Available Super Resolution Algorithms

Low Resolution (>3m)	Mid Resolution (>0.5m)	High Resolution (>0.3m)
Sentinel-2 Planetscope	SPOT-6,7 BlackSky Satellogic KOMPSAT-3/3A THEOS-2 SuperView WorldView-2 Pleiades	Pleiades Neo WorldView-3

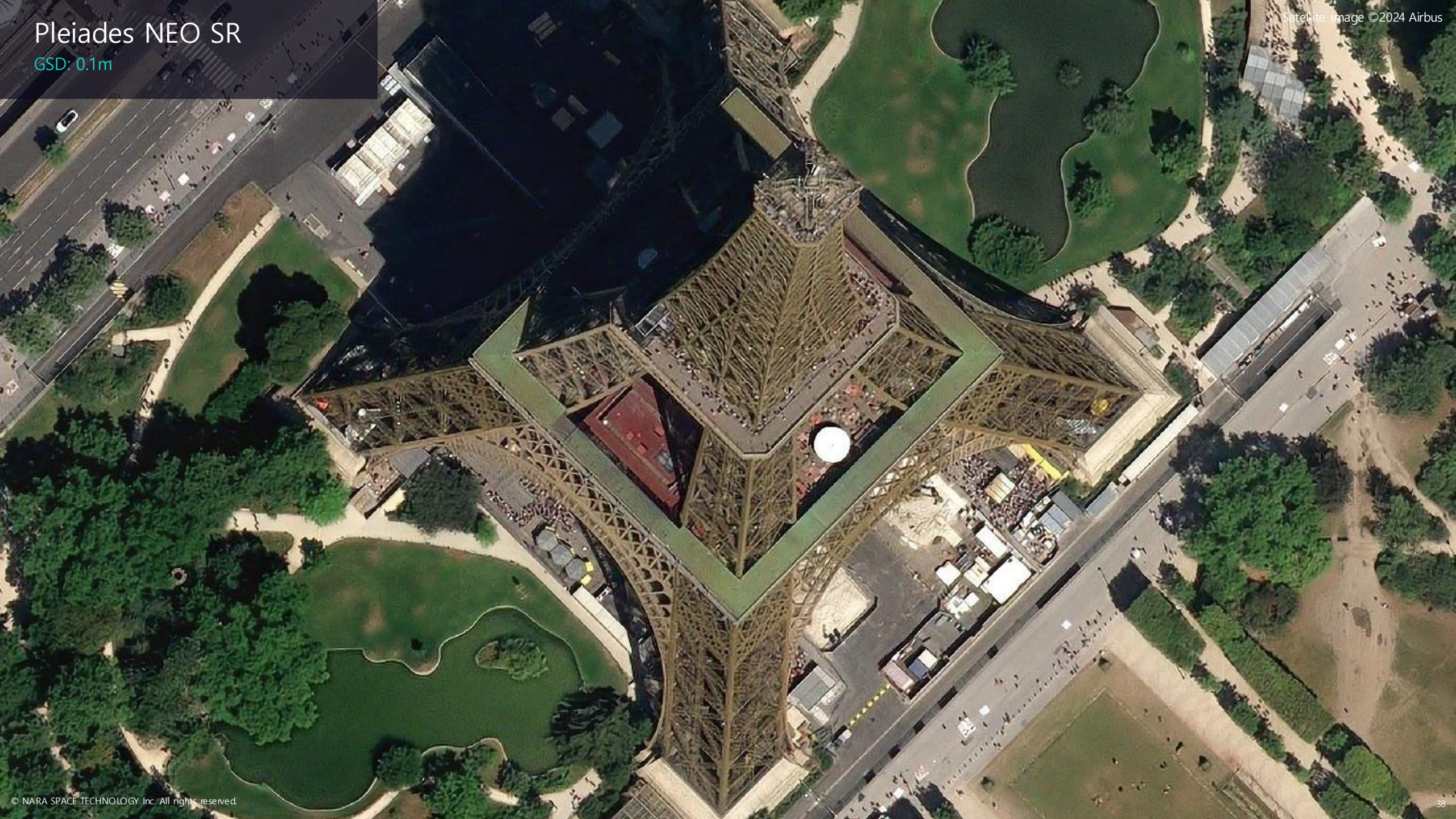
Pleiades NEO

GSD: 0.3m



Satellite image ©2024 Airbus

© NARA SPACE TECHNOLOGY Inc. All rights reserved.



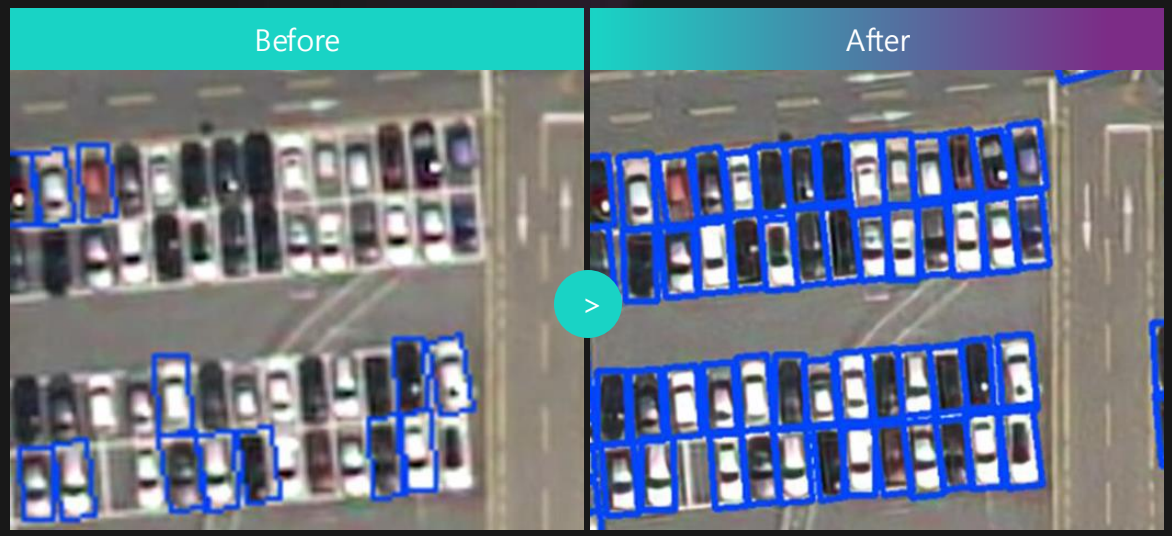
© NARA SPACE TECHNOLOGY Inc. All rights reserved.

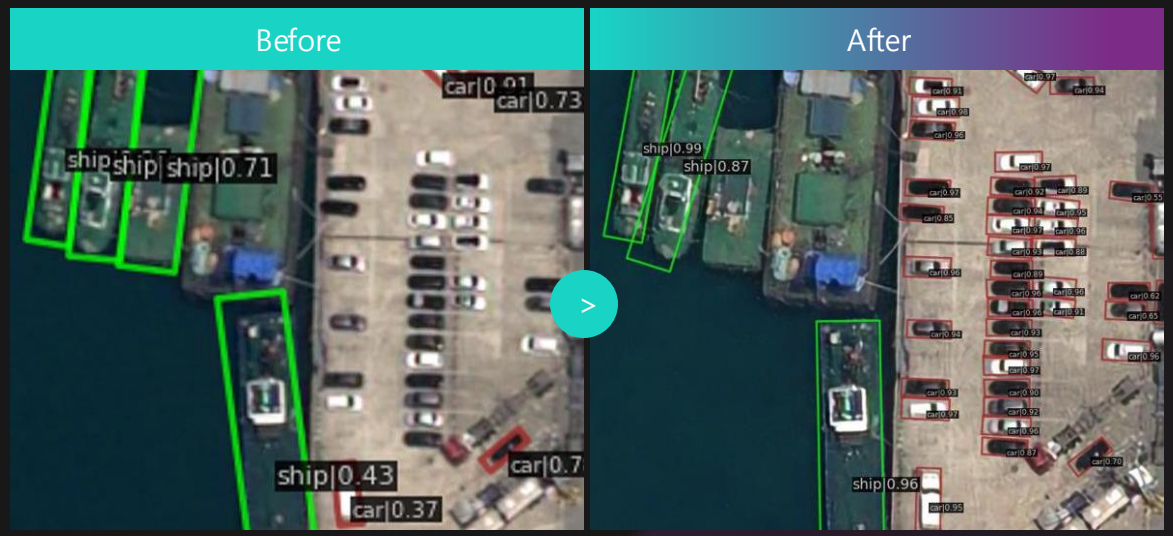

Sentinel-2
GSD: 10m
Satellite image ©2024 Copernicus Sentinel


Sentinel-2 SR
GSD: 3.2m
Satellite image ©2024 Copernicus Sentinel

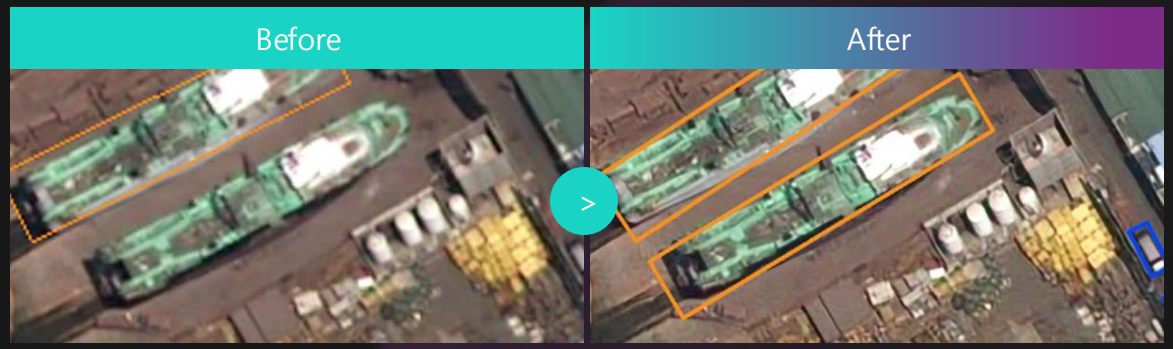
Super Resolution : Object Detection Enhancement

Maximize AI-based analysis performance: 20~30% increase of object detection accuracy after Super Resolution









Object Detection

Experience Nara Space's World Class Object Detection Algorithm

Nara Space's Object Detection outperforms DOTA Challenge's Rank 1 Algorithm

Nara Space Algorithm mAP : 0.838

DOTA Challenge Rank 1 Algorithm mAP : 0.822



Class	mAP
Small Vehicle	0.787
Large Vehicle	0.755
Vessel	0.903
Airplane	0.906
Mean	**0.838**

NARA SPACE



Thank you

Contact us:

Minsik Kim
VP of Business Development / Co-founder

Email : mskim@naraspace.com
Mobile +82 (10) 8863 - 2768

© NARA SPACE TECHNOLOGY Inc. All rights reserved