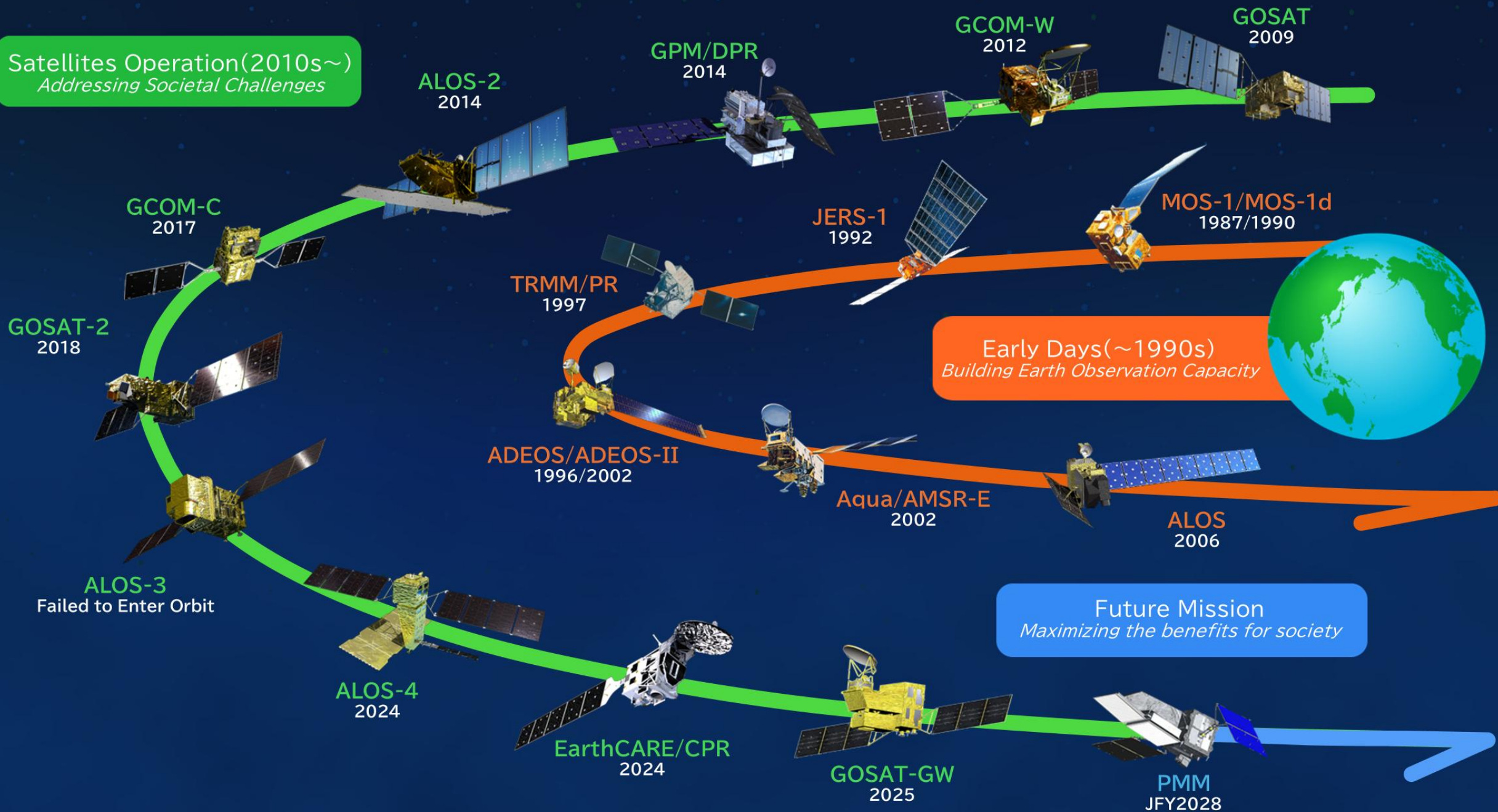


Overview of JAXA/CONSEO Initiatives for promoting the use of satellite-based solutions for smart cities.

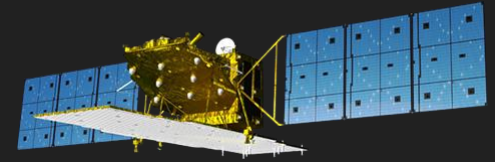
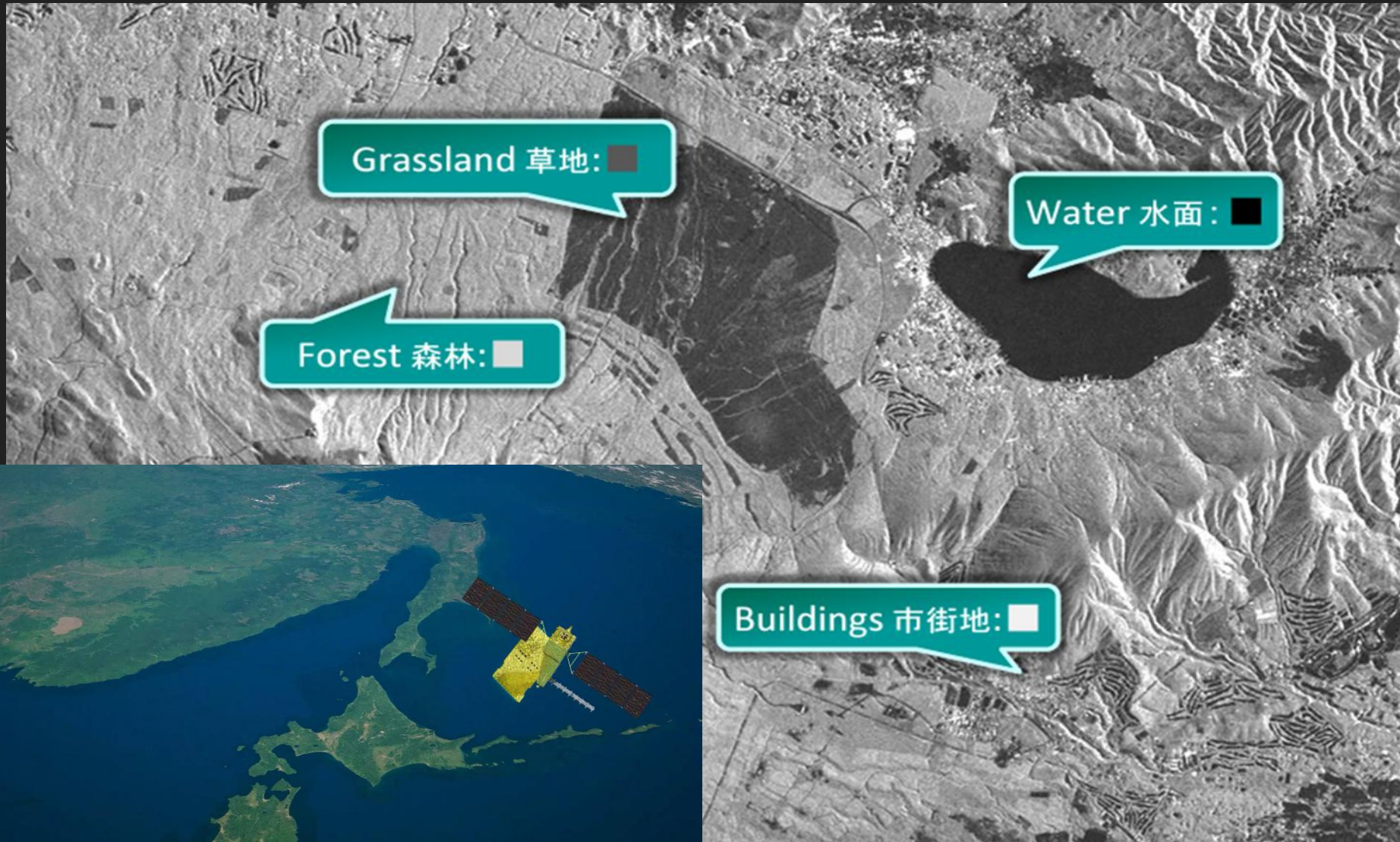
Yusuke Muraki

Advisor to the Director, Earth Observation Program Strategy Office,
Space Technology Directorate I, Japan Aerospace Exploration Agency (JAXA)/
Secretariat of the Consortium for Satellite Earth Observation(CONSEO)

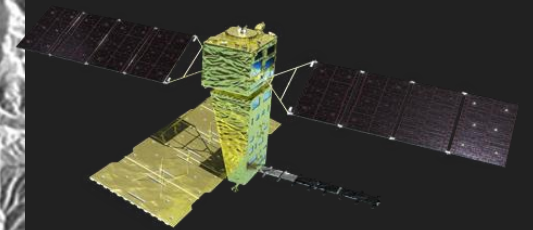
Satellites Operation(2010s~)
Addressing Societal Challenges



World's the Finest Resolution Phased Array Type L-band Radar



ALOS-2
Launched in 2014

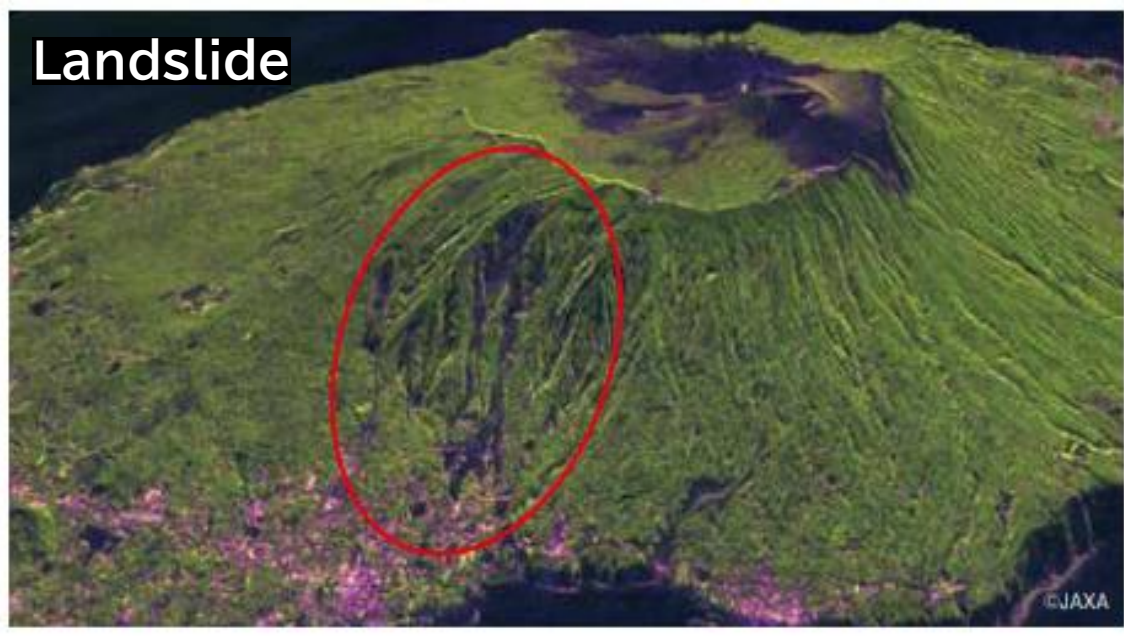


ALOS-4
Launched in 2024

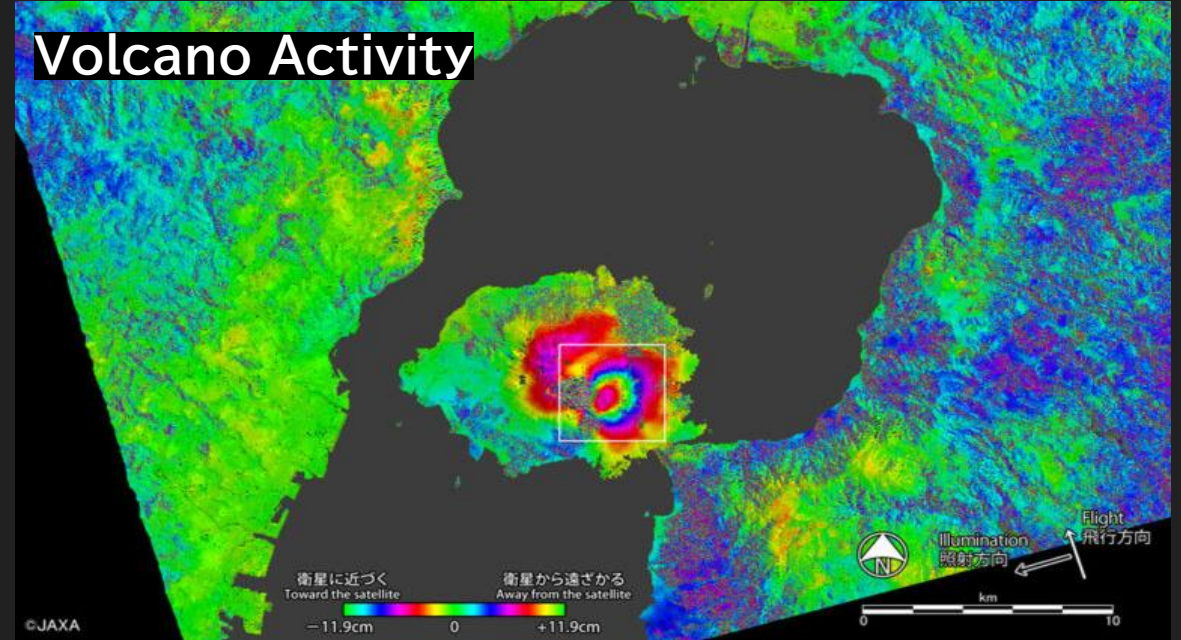


World's the Finest Resolution Phased Array Type L-band Radar

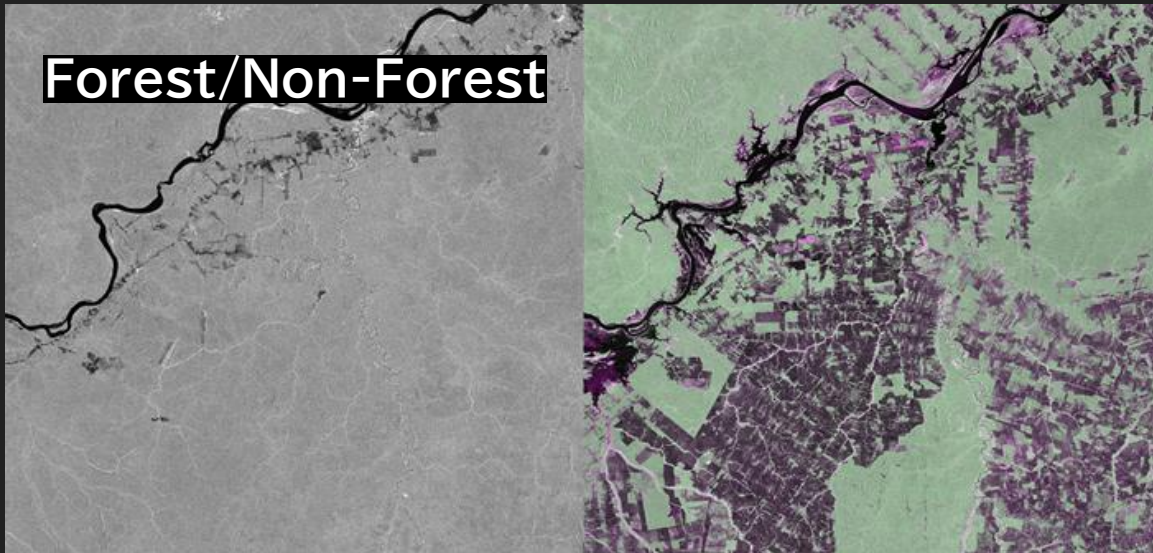
Landslide



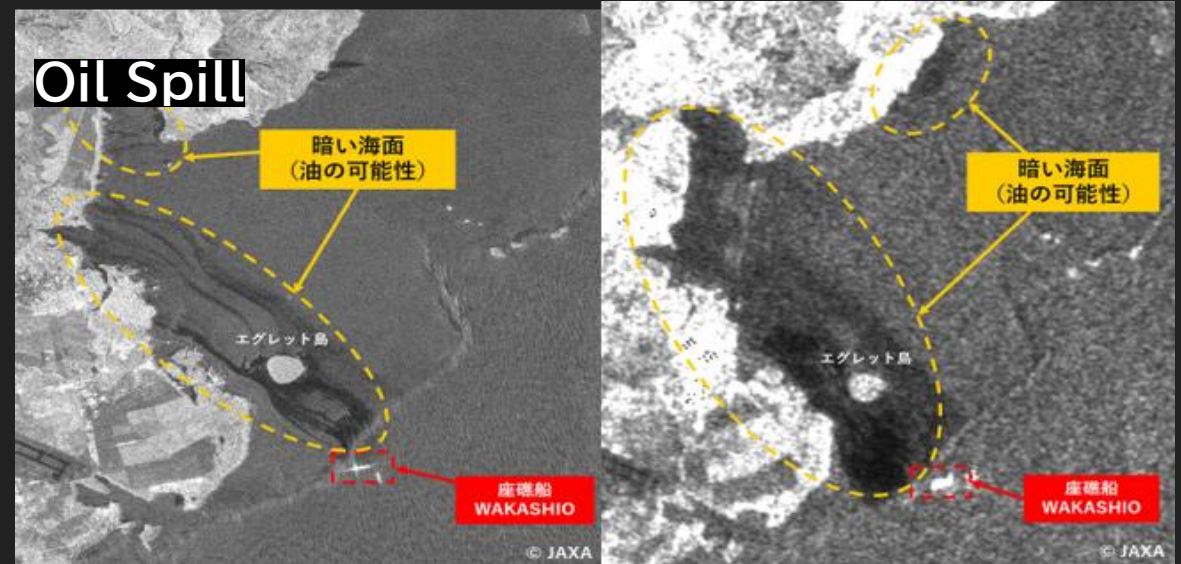
Volcano Activity



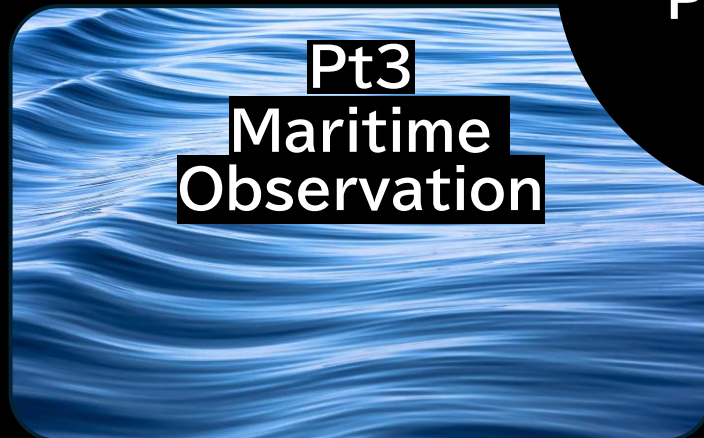
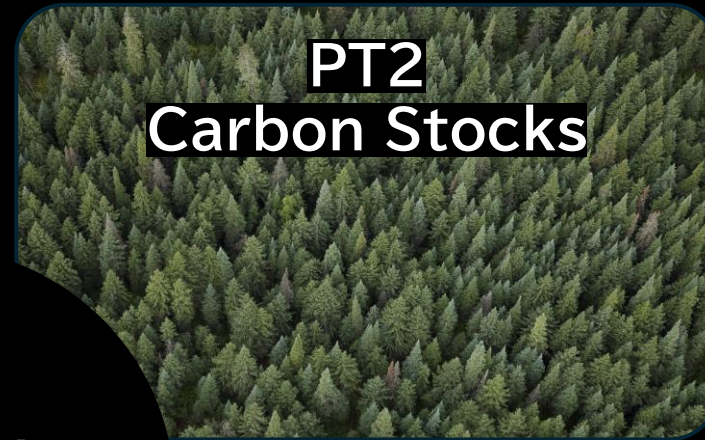
Forest/Non-Forest



Oil Spill



FOUR KEY PRIORITY THEMES



**Strategic
Priorities**

Societal Benefit

-  Disaster Resilience
-  Infrastructure Management
-  Climate Action
-  Safety and Security
-  Resource Management
-  Urban Development
-  Business

SP3 Maritime Observation



Strengthening capabilities for monitoring maritime conditions through satellite observation, while building cooperative relationships with surrounding countries

Challenges

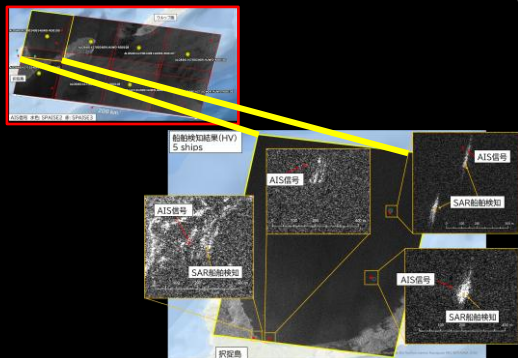


Enhancement of maritime observation capabilities across wide ocean areas through international cooperation

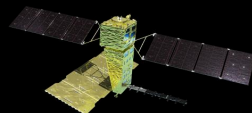
Actions

Strengthen capabilities for monitoring maritime activities and conditions through an extensive satellite observation network by public-private partnerships and promote international cooperation

Ship Detection



ALOS-4
(L-band SAR and AIS)



SP4 Infrastructure and Disaster Management



Leveraging satellite-based geospatial data and infrastructure monitoring services, we aim to streamline land management, build a digital disaster management platform, and create globally competitive businesses.

Challenges

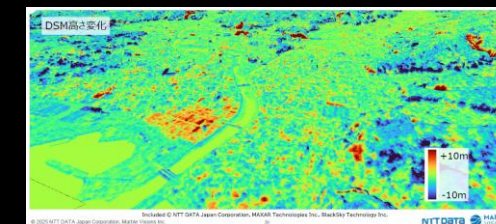
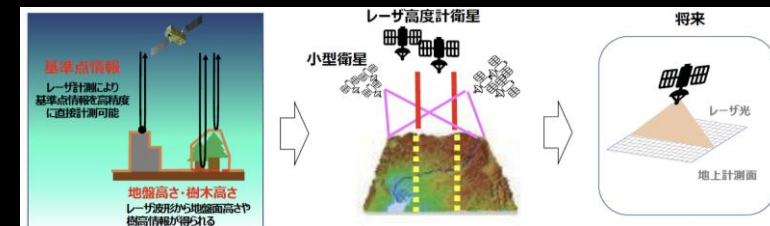
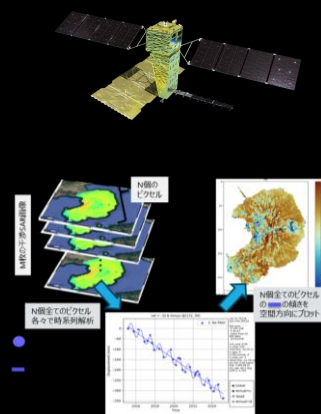


Disaster risk management/response and rapid damage assessment

Actions

Enable and deliver high-precision 3D topographical information and infrastructure monitoring capabilities and services through satellite observation

ALOS-4
(L-band SAR and AIS)



Consortium for Satellite Earth Observation (CONSEO)

- Platform for Industry-Academia-Government Partnership -



Purpose

Gathering players from industry, academia and government, the Consortium will **envisage the future** of Satellite Earth Observation and **realize** it through **co-creation**.

Vision

“Towards a better future for the entire planet”

Safe, secure, sustainable and prosperous society realized through creating innovation, enhancing space industry and acquiring scientific knowledge

Mission



JAXA serves as the secretariat

1. **Deliver recommendations** of the over all strategy of Earth observation satellite for Japanese society;
2. **Promote co-creation** among industry, academia and government, install outcome from Satellite Earth Observation to the society, and **establish an ecosystem**,
3. **Share value** of Satellite Earth Observation to gain support from the public for its promotion.



CONSEO

350+ Entities

CONSEO



Consortium for Satellite Earth Observation

Envision the future with
Satellite Earth Observation.



Satellite manufacturer/Satellite operator



Satellite data analysis



Data platformer



Weather service



Environment



Satellite data utilization



Consultation/Think tank



Big data analysis



Trading company



Information communication



Bussiness others



Media/Press



Local government



Academia (University/Research institute etc.)



Construction



Banking/Investment



Transportation



Insurance

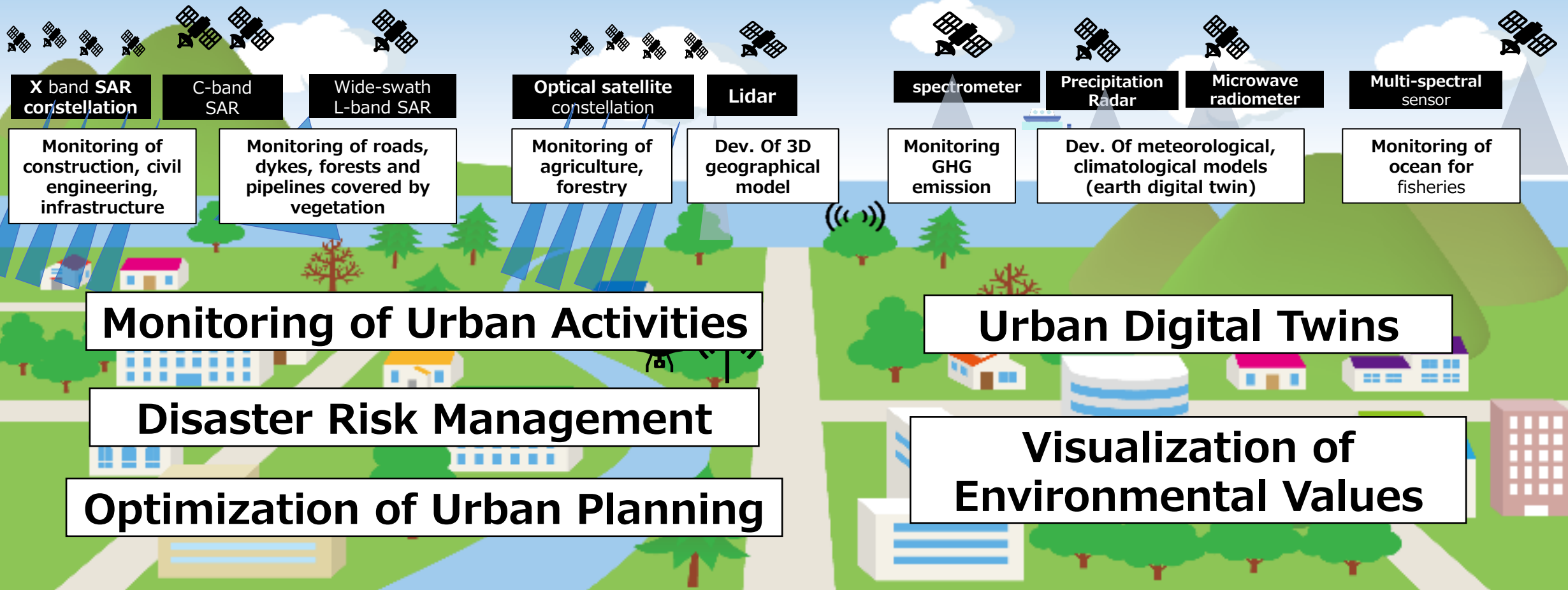


Ministry/ Government office



Satellite-data driven Smart City

proposed by CONSEO



Satellite Infrastructure Observations for Improvements such as Enhanced Inspection Efficiency and Disaster Risk Reduction

In Japan, the disaster risks associated with infrastructure built during the period of rapid economic growth (1955~1973) are increasing due to aging, and there is a growing need to reduce the costs of maintaining and managing infrastructure that requires regular maintenance. By using satellites to conduct wide-area and regular monitoring, the condition of large-scale infrastructure facilities such as roads, bridges, and airports, as well as the surrounding ground, can be visualized. This enables cost reduction and efficiency through high-precision surveying, narrowing down survey locations, and evaluating the effectiveness of remedial measures, while also reducing risks through repair work.

Service

■ Service Overview

- By measuring the changes in the distance between satellites and the ground surface at two different points in time or over a timeline, the fluctuations of infrastructure such as roads, bridges, river embankments, and airports, as well as changes in the ground surface, can be visualized.

■ Observation Mechanism by Satellite

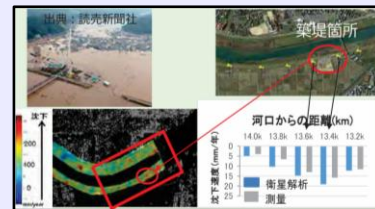
- The distance changes between the satellite and the ground surface are measured by performing an interferometric analysis of two images taken at different times, using the radio waves emitted by the SAR satellite, and calculating the phase difference (shift in the cycle).
- By leveraging a time-series of satellite images, infrastructure and ground surface deformations can be detected with precision in the millimeter to centimeter range.

■ Comparison with Conventional Information Gathering Methods

Conventional Methods (On-site surveys, measurements, GNSS sensors)	Satellite
- Millimeter-accurate measurement - Pinpoint measurements - On-demand observations - Observation after implementation/ installation of equipment - Measurement of absolute changes between two periods - Affected by terrestrial conditions (e.g., forests, disasters) - High accuracy (On-site surveys, GNSS sensors)	- Observation at millimeter to centimeter accuracy - Wide-range, areal observations - Regular observations over a long period - Past observations via archive data - Observation of relative changes between two periods - Observation from space, unaffected by terrestrial conditions - Lower accuracy than onsite-surveys/sensors

■ Example of Service Provided

Ground Deformation Analysis of River Embankments



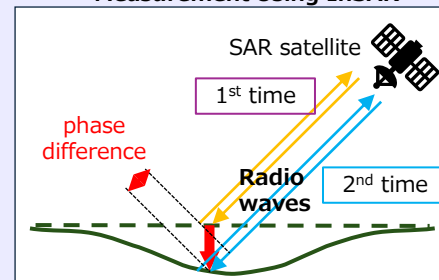
Source: JAXA

Top: Analysis of ground deformation around the dam gate Bottom: Settlement trend at the red pin location



Source: Synspec

The Phase Difference Measurement Using InSAR

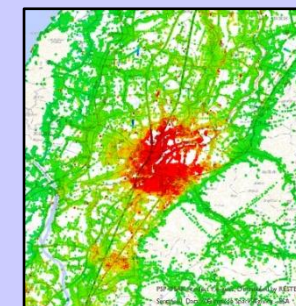


Target Users and Applications

- Research firms, etc.:** By utilizing remote observation for wide-range and areal surveys, as well as for infrastructure that is difficult to access, they **can improve survey efficiency and reduce survey costs.**
- Governments, Local authorities, Infrastructure-related companies:** By regularly and areally monitoring the changes in infrastructure and facilities, such as airports, roads, bridges, dams, and ports, including their surrounding areas, this **contributes to the development of foundational materials for inspection and repair plans, risk reduction through damage control measures, and improvements in business efficiency by evaluating the effectiveness of countermeasures.**

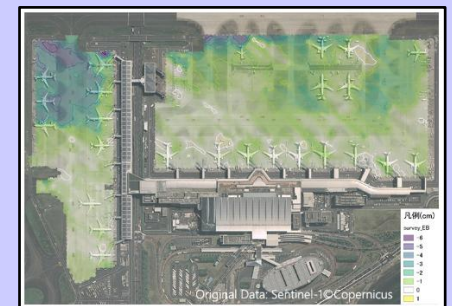
■ Example of Application

Assessment of Ground Deformation around Roads and Railways



Source: RESTEC

Assessment of Ground Deformation around Airport Aprons



Source: Nippon Koei

JAXA/CONSEO participation in Smart City Expo in Barcelona

- JAXA/CONSEO has continuously participated in and exhibited at the Smart City Expo, promoting the potential of satellite data utilization to the global smart city community, including stakeholders from across Europe.
- In 2025, JAXA/CONSEO also organized a stage event featuring speakers from ESA, further highlighting the role of satellite data in smart city development.

Stage Event in 2025: Eye in the sky for resilient and healthy cities - apply big data from space

Name

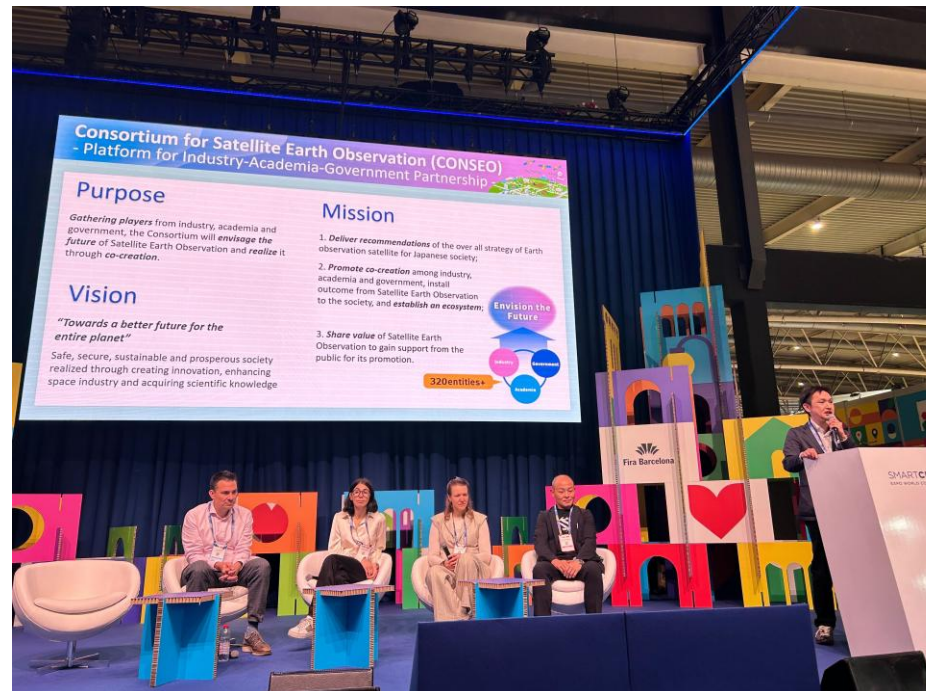
Yusuke Muraki
JAXA (Moderator)

Coco Antonissen
NSO

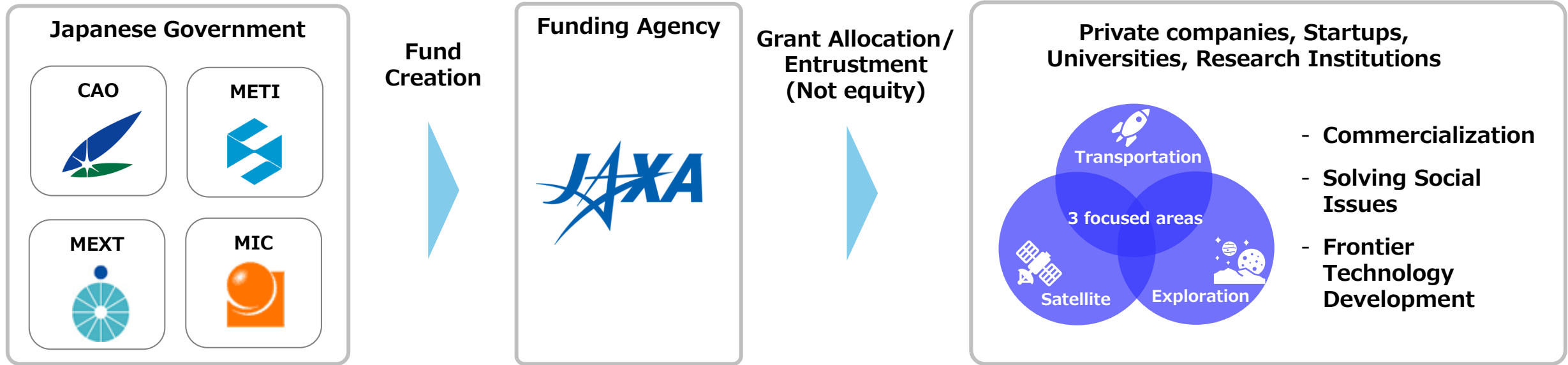
Beatrice Barresi
ESA

Alex Gluhak
OASC (Open and Agile Smart Cities)

Takayuki Odawara
Synspective



The Space Strategy Fund (SSF)



Aiming at securing 1 trillion yen (approx. 7.0 billion \$) in total up to 10 years

	1 st Phase (FY2024-)	2 nd Phase (FY2025-)	3 rd Phase (FY2026-)
Fund Size	300 B JPY	300 B JPY	200 B JPY
Number of Themes	22 themes	24 themes	19 themes

3 Goals

Expanding the space market

Double the size of Japanese domestic space market 4T JPY→ 8T JPY (approx. 60B USD) in the early 2030s

Solving global and social issues

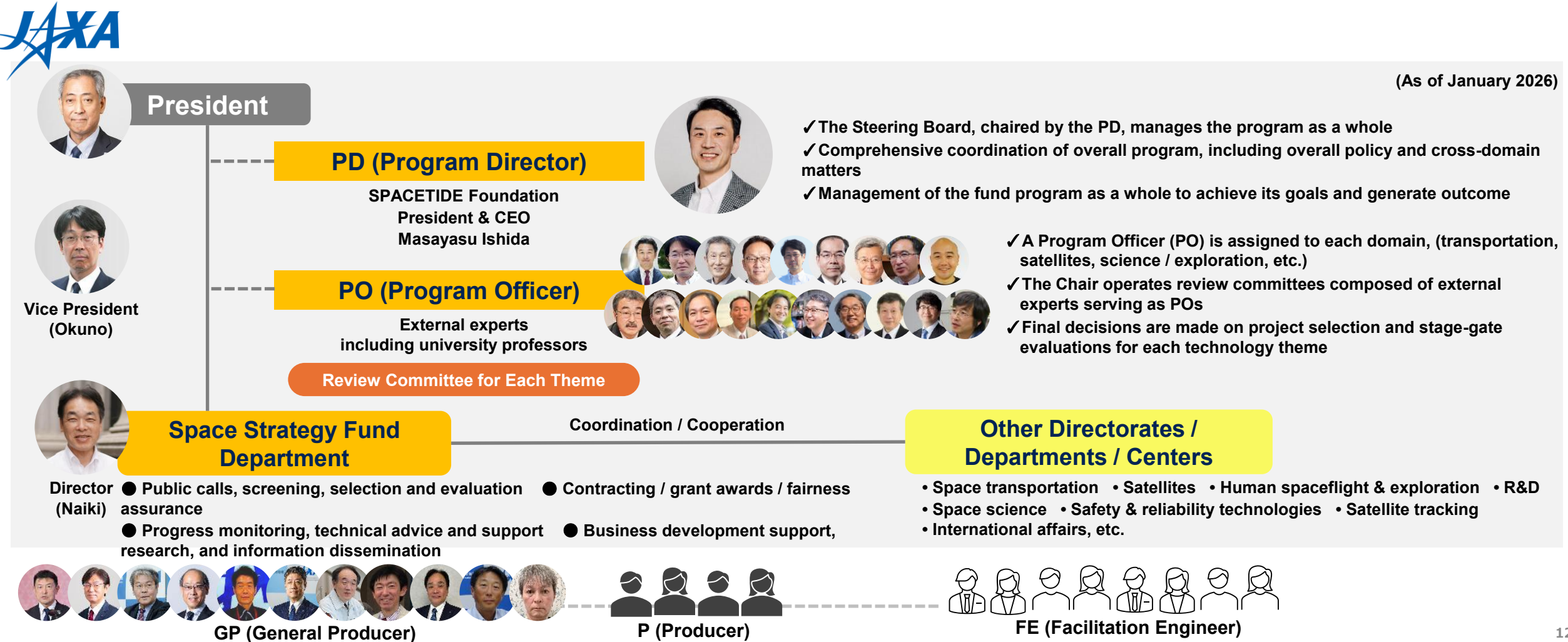
Contribute to solve global and social issues by utilizing space

Pioneering frontier

Deeper exploration of knowledge in the universe, and stronger basic and fundamental technologies

Management Structure of the Space Strategy Fund at JAXA

- In managing the Space Strategic Fund, **JAXA has cooperation of leading experts**, both within and outside the agency.



SSF Direction of Technology Development

Space Transportation

- ✓ Establish low-cost space transportation systems that can accommodate the diversifying launching needs for satellites manufactured both in Japan and overseas.
KPI: Improve Japan's rocket launching capabilities by securing approx. 30 flagship and private rocket launches annually by the first half of 2030s.
- ✓ Establish industrial infrastructure to achieve the above target and ensure its independence and autonomy, while acquiring the technology required to realize new space transportation systems and enhance Japan's overall international competitiveness.

Satellite

- ✓ Realize autonomous satellite systems that will increase international competitiveness of Japanese private companies (including startups) providing small to large-scale satellite services (communications, observation, etc.) and on-orbit servicing.
KPI: Establish more than five satellite systems through domestic private companies by early 2030s.
- ✓ Establish the domestic industrial infrastructure to achieve the above target and ensure its independence and autonomy, while acquiring innovative satellite infrastructure technologies to improve Japan's overall international competitiveness.
- ✓ Expand space-related markets through the use of satellite systems, including those mentioned above.
KPI: By the early 2030s, complete implementation of more than 30 major communications and satellite data utilization services by domestic private companies, etc. in Japan and overseas.

Exploration

- ✓ Ensure Japan's international presence in space explorations to the Moon, Mars and beyond, and initiatives to expand realms of human activity.
KPI: By the early 2030s, ensure that domestic private companies, universities, etc. will participate in more than 10 new missions and projects to explore the Moon, Mars and beyond.
- ✓ Create and expand post-ISS businesses initiated by Japanese private companies from 2030 onwards.
KPI: By the early 2030s, create more than 10 new business projects by Japanese companies utilizing low Earth orbit.
- ✓ In addition, leverage these opportunities to accomplish exceptional scientific results in fields such as solar system science and astrophysics, and contribute to large-scale international projects.



Toward Satellite-Driven Smart Cities: Strengthening Japan-Europe Collaboration



- JAXA and CONSEO are working together with industry, academia, and government to accelerate the social implementation of satellite data applications, including those related to smart cities.
- To achieve this goal, it is essential to combine the strengths of Japan and Europe and to engage directly with the smart city community.
- We therefore have high expectations for future Japan-Europe collaboration and hope that today's webinar will serve as a starting point for new partnerships, innovative services, and concrete projects.