Space Strategy Fund(First Phase) PR Sheets

Space Strategy Fund Department
Japan Aerospace Exploration Agency (JAXA)

July 2026

Overview

The Space Strategy Fund Program sets technology development themes in three fields: transportation, satellites and related systems, and exploration. The program aims to support bold technology development by startups, universities, and other entities, with the fund established at JAXA aiming at 1 trillion yen to provide sustained support over a period of up to ten years.

For Phase 1, for which calls for proposals began in 2024, 55 Representative Organizations were selected across all 22 themes, based on the implementation policy defined by the relevant ministries. Technology development has already commenced at each Representative Organization.

This booklet was compiled by JAXA based on summaries prepared by each Representative Organization, outlining the content and intended outcomes of each Technology Development project. Each Representative Organization has a responsibility for the PR sheet content.

Contents 【Transportation】

Contents 【Satellites】

Contents 【Satellites】

SPACE STRATEGY FUND

Development/Verification of Parts/Components for Establishing Satellites Supply Chain

Feasibility Study of Overseas Demonstration of Satellite Data Utilization System.

Contents【Exploration】

SPACE STRATEGY FUND

Contents 【Cross Cutting】

SX Research and Development Site

Establishment of Metal 3D Additive Manufacturing Technology for Large Precision Parts Mountable on Future Rockets

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Nikon Corporation, NTT DATA XAM Technologies Corporation, Shimane University, The University of Tokyo, Tohoku University

Overview

Realizing innovative weight reduction and performance enhancement of next-generation space transportation vehicles via meter-class large-scale metal 3D additive manufacturing technology

We will establish technology to fabricate meter-class structural components using large-scale metal 3D additive manufacturing, enabling significant reductions in costs and lead times for reliable rocket engine manufacturing.

1)development of domestic **large-scale L-PBF** and **high-speed, high-precision DED equipment**;
2)**simulation-based process development** and **in-process monitoring technologies** to ensure high quality and low cost; and
3)establishment of a **lifetime process for copper alloys** used in rocket engine combustion chambers.

Implementation period (planned)

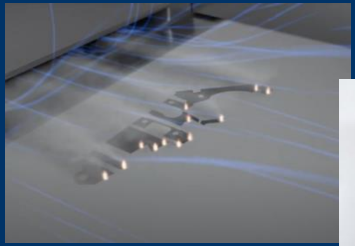
※Varies depending on stage gate evaluation, etc.

December 2024 – March 2029 (4 years)

Point of Contact for international communication

Nikon Corporation, Public Relations Section
E-mail: pr.dept@nikon.com

Metal 3D Additive Manufacturing Technology



L-PBF Fabrication Technology
High-speed fabrication with 12 lasers

Demonstrator of large-scale fabrication with 1,500mm height

High-precision DED Fabrication Technology

Spiral Pipes

Machine	Next Generation DED (under development)
Material	Ni625 (Inconel 625)
Outer Diameter / Inner Diameter / Height	1.25 mm / 0.75 mm / 38 mm
Build Time	17 min.

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Application to Rocket Engine Manufacturing

Dev. Items

Advancement of Fabrication Processes

Copper Alloy Process Development

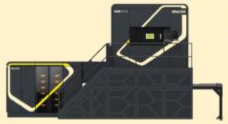
Large-scale PBF process development

High-speed, High-precision DED Equipment Development

❑ Fuel injector

NXG XII 600

Build Size: 600mm x 600mm x 600mm



❑ Combustion Chamber

NXG 600E

Build Size: 600mm x 600mm x 1500mm

❑ Nozzle Skirt

High-speed, High-precision DED Equipment Development

Build Size: Φ2000㎜ x 2500mm

Low Cost / Short Lead Time / Lightweight / High Performance

Development of Metal 3D Additive Manufacturing technology (WAAM) for Large Liquid Propellant Tanks for space transportation systems

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Shimizu Corporation
Taiyo Nippon Sanso Corporation, Hiroshima University, Saitama University

Overview

Target Outcome : Establishment of technology for monolithic fabrication of large propellant tanks(φ2.5m) for space transportation systems using WAAM

- Metal 3D additive manufacturing technology to produce large components is expected to reduce manufacturing cost and duration.
- Shimizu has been developing Wire-Arc Additive Manufacturing (WAAM), a metal 3D additive manufacturing technology, for aluminum-alloy-architectural exterior materials and its application to rocket fuel tanks.
- In this project, accumulated WAAM technology is leveraged to address challenges for large structures: (1) establishing process of large-scale fabrication and (2) improving fabrication quality.

Key Development (1): Establishing Process of Large-Scale Fabrication

- Developing new fabrication equipment, in-process control software and measurement devices to identify and solve challenges in tank fabrication. (Shimizu Corporation, Taiyo Nippon Sanso Corporation)

Key Development (2): Improving Fabrication Quality

- Enhancing internal and geometric quality by utilizing in-process measurement data (Shimizu Corporation), stabilizing layer thickness (Saitama University), and improving robot spatial accuracy (Hiroshima University).

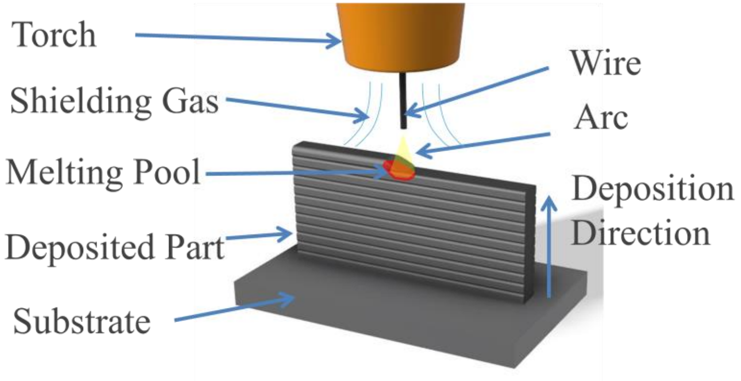
Implementation period (planned)

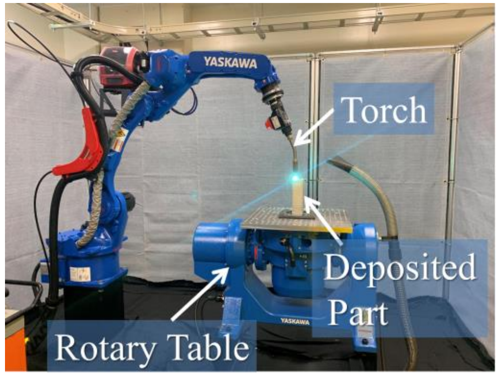
※Varies depending on stage gate evaluation, etc.

December 2024 - March 2029 (5 years)

Point of Contact for international communication

E-mail : yamazaki.kohei@shimz.co.jp / m.matsuura@shimz.co.jp





WAAM Mechanism (Left) and Equipment with a Torch Mounted on a Robot Arm (Right)

WAAM System (Left) and a Small Tank (40 cm Diameter) Fabricated with WAAM Technology (Right)

Developing ground-based infrastructure technologies for the recovery of reusable spacecraft

SPACE STRATEGY FUND

Implementing Organizations

NYK (Nippon Yusen Kaisha) Line (Lead), Mitsubishi Heavy Industries, Ltd. (Partner)

Overview

Fusion of Ocean and Space: Establishing Offshore Recovery Infrastructure for Reusable Rockets to Enable Low-Cost, High-Frequency Space Transportation

In Japan, a maritime nation with limited land availability, offshore recovery technologies are gaining increasing importance as a key component of future space transportation systems. This project aims to establish core technologies for offshore recovery using vessels capable of operating in harsh sea and weather conditions, at distance of approximately 1,000 km from port, thereby contributing to the realization of cost-efficient, high-frequency reusable rocket operations.

To achieve this objective, we will develop and validate four critical technology domains: **(1)rocket capture**, **(2)post-landing safing**, **(3)offshore landing deck systems**, and **(4)remote operation.** These components will be integrated into a prototype recovery vessel, followed by comprehensive demonstration tests both onshore and offshore to verify performance and operational feasibility.

Furthermore, based on the knowledge gained through R&D, we will formulate design guidelines for offshore recovery vessels, including recovery and command ships, to support practical implementation. Through these efforts, we aim not only to facilitate rocket reusability for launch operators, but also to promote new entry into the space industry by shipbuilders and maritime companies, while creating additional value through the integration of ocean and space businesses, including future applications in offshore launch systems and satellite data utilization.

Implementation Period (Planned) *Subject to change based on stage evaluations, etc.

April 2025 – March 2029 (4 years)

Commissioned or Subsidized

- Commissioned *Subject to change based on stage evaluations

Media Inquiries Contact

- NYK Line Corporate Communication Group, Media Relations Team
- Email: NYKJP.ML.MEDIA@nykgroup.com

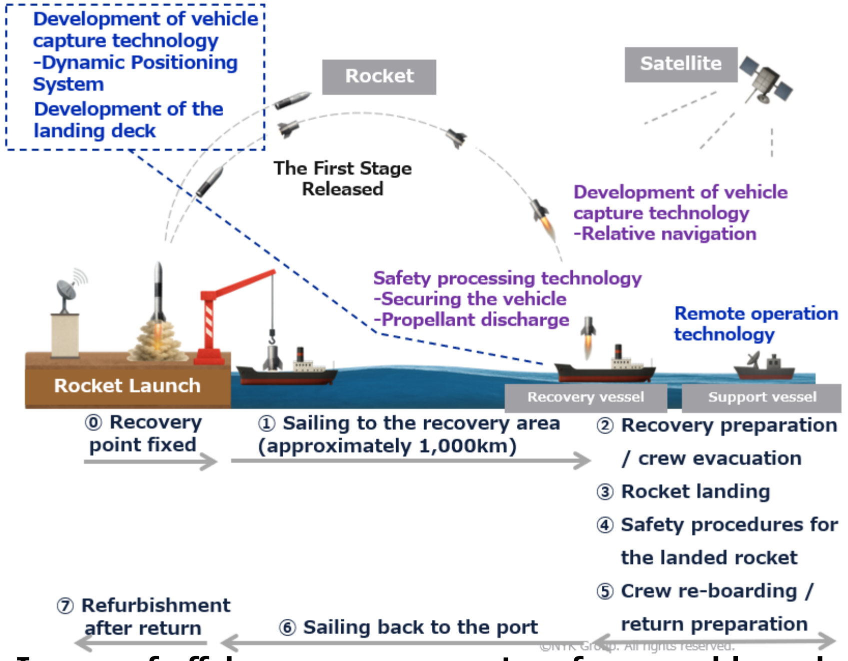
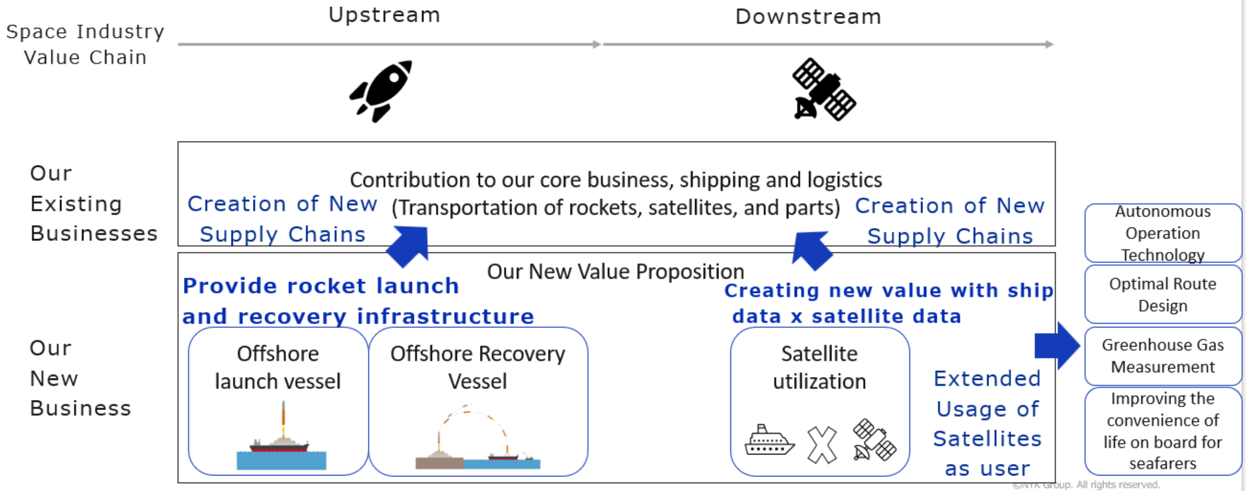


Image of offshore recovery system for reusable rockets



Concept of NYK Space Business Development

Ground-Based Infrastructure Technology for Launch Sites and Spaceports to Support High-Frequency Launches

SPACE STRATEGY FUND

Implementing Agency Name

※Bold: Representative organization, Regular: Collaborative organization

SPACE COTAN Co., Ltd., Shimizu Corporation, IWAYA INC., NEC Networks & System Integration Corporation, Applied Meteorological Engineering Consulting Services Co.,Ltd., Muroran Institute of Technology

Objectives

Realization of a Spaceport Capable of High-Frequency Launch Operations

- With the goal of commercializing Hokkaido Spaceport (HOSPO), this project aims to develop a facility capable of supporting high-frequency launch operations, guided by a comprehensive medium- to long-term strategy for a sustainable spaceport business.
- HOSPO is a commercial spaceport established to advance the vision of creating a "Space Silicon Valley" in Hokkaido. By positioning the spaceport as a hub for talent and industry, the project seeks to drive broad regional economic growth.

Technology Development Outputs

To enable high-frequency launch operations, this project defines the additional spaceport functions needed to accommodate a diverse range of launch vehicles. Accordingly, research and development will address four priority technical challenges:

1. Standardization of Launch Pad Interfaces
2. Cryogenic Propellant Management
3. Common Radio System
4. Weather Forecasting

Implementation Period (Planned)

※Varies depending on stage gate evaluation, etc.

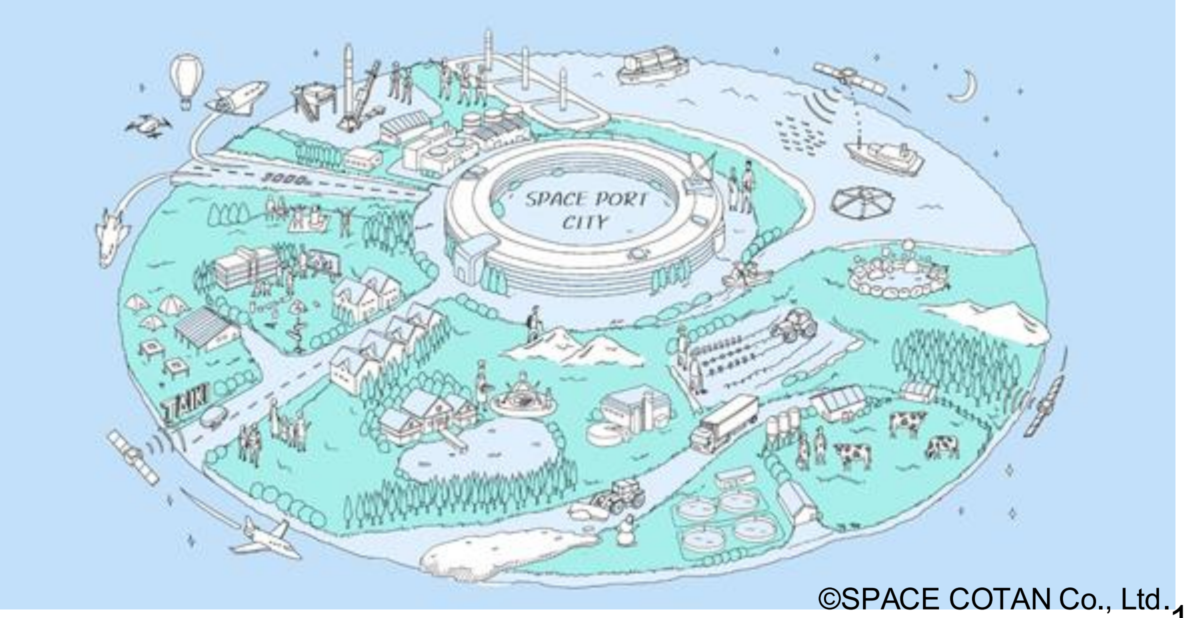
March 2025 to March 2029 (4 years)

Point of Contact (International)

E-mail：press@spacecotan.com

Key Technology Challenges

Standardization of Launch Pad Interfaces	Cryogenic Propellant Management
Common Radio Systems	Weather Forecasting



"Space Silicon Valley" Concept

Establishment and functional verification to expand production capability for major materials in anticipation of solid motor demand

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

IHI Aerospace Co., Ltd. Toray Industries, Inc. ON Elastomer Co., Ltd.
Nippon Carbon Co., Ltd. Gun-Ei Chemical Industry Co., Ltd.
Resonac Techno Service Co., Ltd. Rocket Link Technology Co., Ltd.

Overview

Establishment to expand production capability for major materials of solid rocket motor

1) With the expansion of space utilization for ground-based infrastructure, **the government has set a policy goal to secure the domestic capability to launch approximately 30 rockets per year by the early 2030s.**

2) To achieve this, **we aim to more than double the production of solid rocket motor and strengthen the production capability of major materials used in solid motors.**

3) **Further mass production of solid motors will enable us to meet the diverse demand for satellite launches, contributing to Japan's autonomy in space activities as well as the independence and flexibility of its space transportation systems.**

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

From April 2025 to January 2030(5years)

Point of Contact for international communication

HP : https://www.ihi.co.jp/ia/en/contact/index.html

Major materials targeted for production capability expansion in this development:
・Motor case material
・Nozzle and nozzle materials
・Insulation
・Pyrotechnics
・Propellant

SSF 1st Phase: Development/Verification of Satellite Communication Technology with Quantum Cryptography.

R&D on Small LEO Satellite Enabling Information-Theoretically Secure Key Sharing

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

National Institute of Information and Communications Technology (NICT) / Sony Computer Science Laboratories, Inc. / Mitsubishi Electric Corporation / SKY Perfect JSAT Corporation

Overview

Construction of a satellite-based, distance-independent, and information-theoretically secure quantum key distribution (QKD) network.

We will develop a **compact system integrating QKD** physical-layer encryption, and optical communication functions, suitabkle for installation on **a small Low-Earth-orbit satellite**.

1) **transportable ground station** mounted on an 8 ton-class truck, featuring a 40cm-diameter telescope with high-sensitivity photon detection and high-precision satellite tracking capability;

2) **high-efficiency free-space optical communication equipment** capable of delivering highly directional QKD signals from satellite to ground;

3) a 300-kg-class satellite bus with **body-pointing accuracy at the several-hundred-microradian level**; and

4) **by the early 2030s**, building an ecosystem comprising manufacturers, service providers, and users in **the field of quantum-secure communications**.

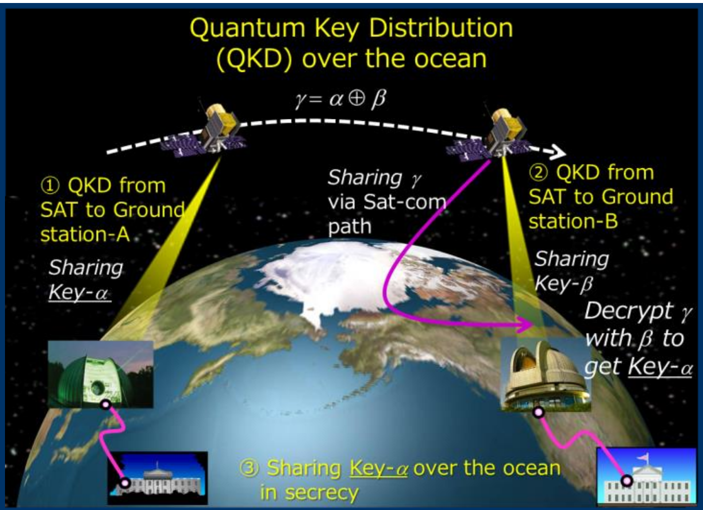
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

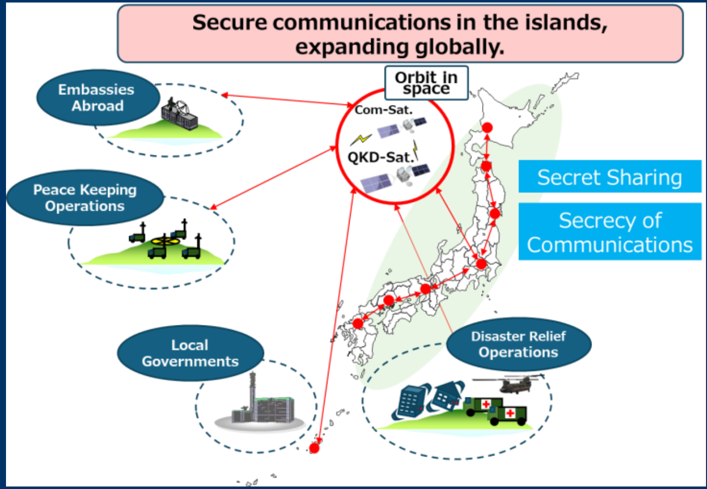
March 2025 – March 2030 (5 years)

Point of Contact for international communication

National Institute of Information and Communications Technology (NICT)
Press Office, Public Relations Department E-mail: publicity@nict.go.jp



Global QKD via LEO Satellite (Concept)



Use Case Examples

Development of Optical Router Core Technologies Required for Realizing Space Optical Communication Networks

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

NEC Corporation
Tohoku University

Overview

A Network Connecting the World

- NEC aims to build an optical communication satellite constellation to provide space network services in specific regions, including Japan.
- In this initiative, optical terminals provide the characteristics of low latency and high-capacity communications.
- For RFcommunications, NEC plans to adopt the 5G-NTN standard to build a system capable of accommodating users more efficiently than conventional satellite communication methods.

- **To make "space optical communication network with interconnectivity, high-speed capability, and stability" a reality, NEC will develop optical router software (route control algorithm) which is a core element for stable communication by leveraging not only expertise in the space sector but also insights gained from NEC's 5G business.**

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

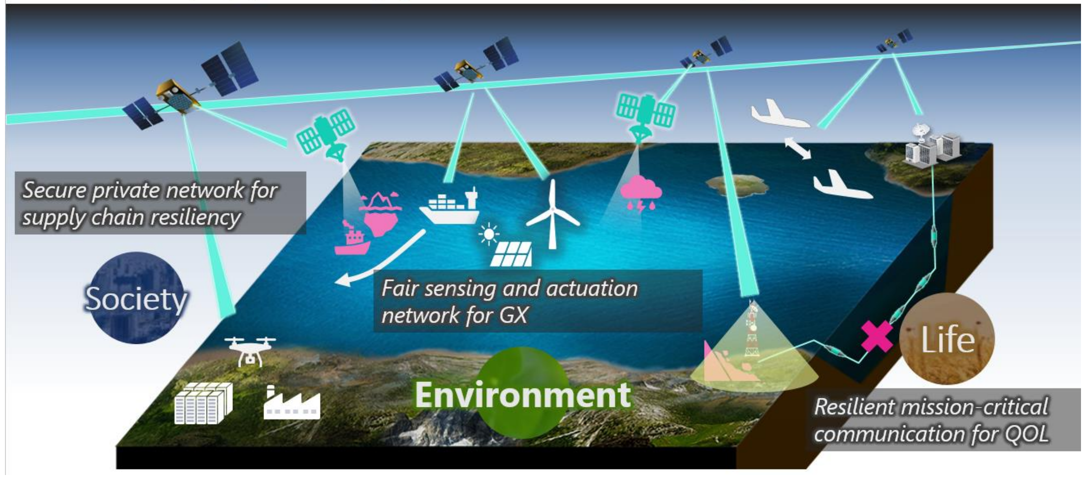
January 2025 ~ March 2028 (4 years)

Point of Contact for international communication

E-mail : info@space.jp.nec.com

SDI business considering by NEC

As part of its activities to realize NEC 2030VISION, NEC has promoted a plan to build "Space Digital Infrastructure" (SDI) by establishing optical communication networks in space.



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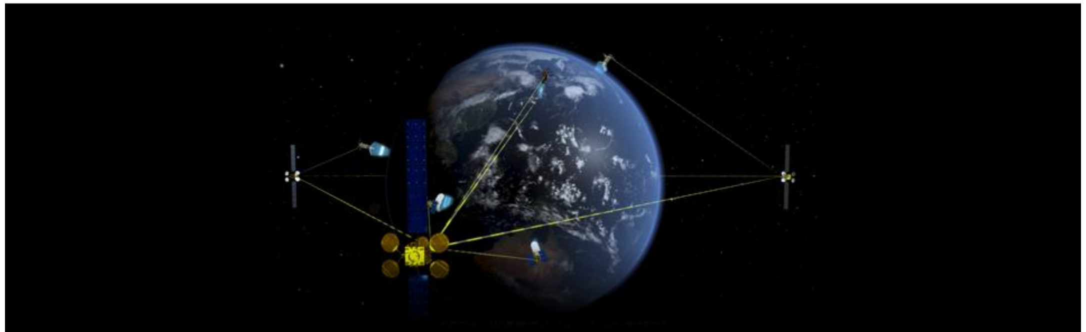
NEC's efforts toward a World-view of space optical network



Efforts toward Optical Inter-Satellite Communication between LEO and GEO

Demo Successful achievement of the world's fastest optical inter-satellite communication at a speed of 1.8 Gbps between the Laser Utilizing Communication System (LUCAS) and the Advanced Land Observing Satellite-4 (ALOS-4).

©NEC

Development of a Small Optical Satellite System with 40-cm-class Spatial Resolution and Generation of World-class Three-Dimensional Geospatial Information

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular : Collaborative organization

Marble Visions Inc., Canon Electronics Inc., Pasco Corporation, NTT Data Japan Corporation, Axelspace Corporation

Overview

Building a 3D Digital Twin Environment and EO-integrated IT Infrastructure for a Sustainable Future Society

We are developing a world-class satellite observation system for 3D digital by vertically integrating the full spectrum—from satellite design, development, and operations to data analytics and IT solutions. The system consists of:

1) **a small optical satellite with 40-cm-class resolution, providing imagery suitable for urban planning;**
2) **tandem-satellite operation technology, enabling 3D stereo observation and wide-area coverage of 50 km or more;** and
3) **near–real-time processing technology, generating and applying 3D geospatial information from satellite data.**

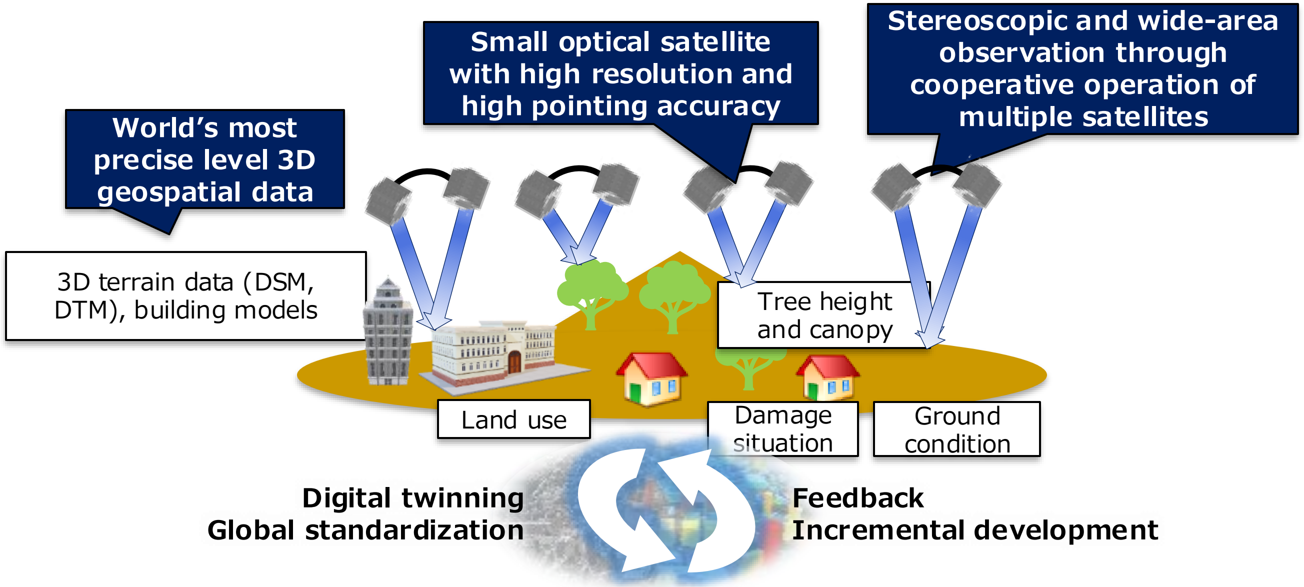
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

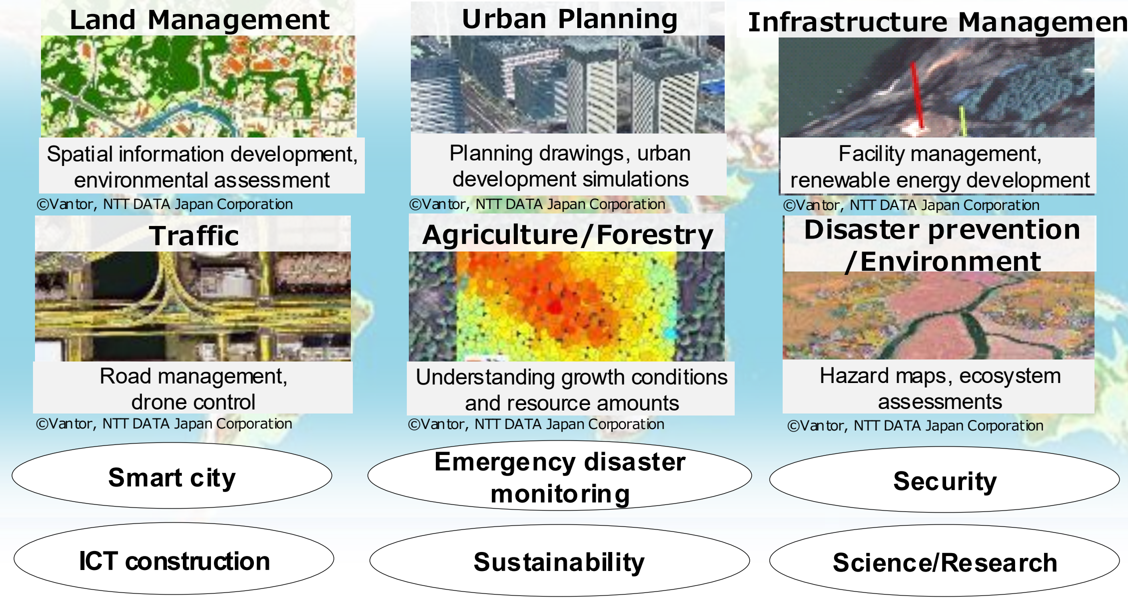
April 2025 to March 2030 (5 years)

Point of Contact for international communication

E-mail : info@marble-visions.com



Expanding to various public and industrial sectors to meet social needs



SSF 1st Phase : Innovative satellite LiDAR technology utilizing high power lasers

Development of Innovative Satellite LiDAR Technology by Integration of Photonic-crystal Laser and Solid-state Crystal

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular : Collaborative organization

Kyoto University, Kyoto University PCSEL Research Center,
Osaka University, National Institute for Fusion Science, HyTILA Corporation

Overview

Development of Ultra-compact High-intensity Short-pulse Laser for Future Imaging LiDAR

Satellite-mounted LiDAR altimeters are anticipated to revolutionize satellite observation, enabling collection of highly precise 3D terrain information and accurate measurement of forest properties. Existing solutions use multi-stage amplifiers and complex optical systems to generate laser pulses of an intensity sufficient for altimetry. However, this results in bulky light sources (Fig. 1a), making it difficult to achieve imaging measurements using multiple light sources mounted on single satellites.

This project aims to realize an ultra-compact, high-intensity, short-pulse laser (Fig. 1b) whose volume is less than 1/100 of existing solutions. This will be achieved by integrating a photonic-crystal surface-emitting laser (PCSEL), capable of high-brightness operation, with a solid-state crystal capable of storing large amounts of energy. Furthermore, we plan to develop array and beam-scanning technologies for these ultra-compact lasers. These achievements will enable beam scanning of terrestrial surfaces (Fig. 2) along with satellite-mounted LiDAR altimetry, which has been previously difficult to achieve.

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

March 2025 to March 2030 (5 years)

Point of Contact for international communication

Susumu Noda E-mail : jaxakikin-ku@nano.kuee.kyoto-u.ac.jp

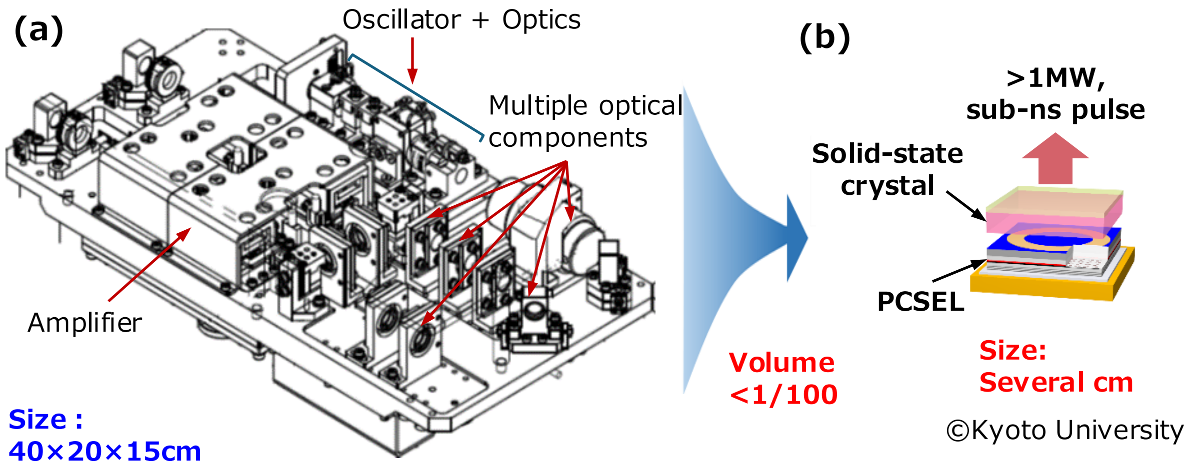


Fig. 1(a): Example of an existing high-power, short-pulse generator (MOLI) for space LiDAR [LRSJ **1**(2), 45 (2020)]. **(b):** Schematic diagram of an ultra-compact (1/100 volume reduction), high-intensity (>1 MW) short-pulse (sub-ns) laser integrating a PCSEL and a solid-state crystal.

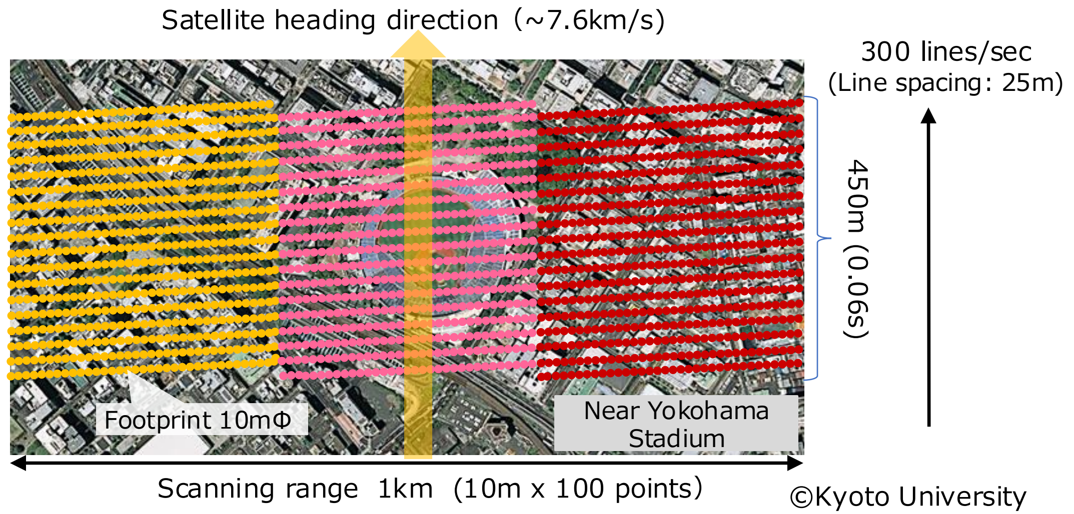


Fig. 2: Illustration of beam scanning of terrestrial surfaces based on arrayed light source integrating PCSELs and solid-state crystals.

Development of Formation-Flying Technology Enabling High-Precision Configuration Control of Ultra-Large-Scale Satellite Arrays

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Interstellar Technologies Inc., Institute of Science Tokyo, Nara Institute of Science and Technology, the University of Osaka, Shonan Institute of Technology, and the University of Aizu

Overview

Satellite Control Technology for Next-Generation Broadband Device-to-Device Communication

- Terrestrial Networks (TN) cover only about 60 percent of Japan, while demand for connectivity beyond terrestrial coverage continues to expand. Seamless satellite connectivity is expected to create a market exceeding USD 7 billion annually.
- We aim to realize broadband D2D (Direct-to-Device) communication enabling direct satellite access from existing smartphones and in-vehicle devices. Conventional single-spacecraft systems cannot provide the antenna aperture required for such broadband links.
- To overcome this limitation, we are developing an architecture in which approximately 5 cm-class ultra-miniaturized satellites serve as elements of a distributed phased-array antenna, forming a formation flying system of 10,000 to 100,000 spacecraft operating as a single large-scale aperture.
- This requires configuration control at frequency-dependent spacings below the service-link wavelength, achieved through electromagnetic formation flying for stable, high-precision array control in orbit.

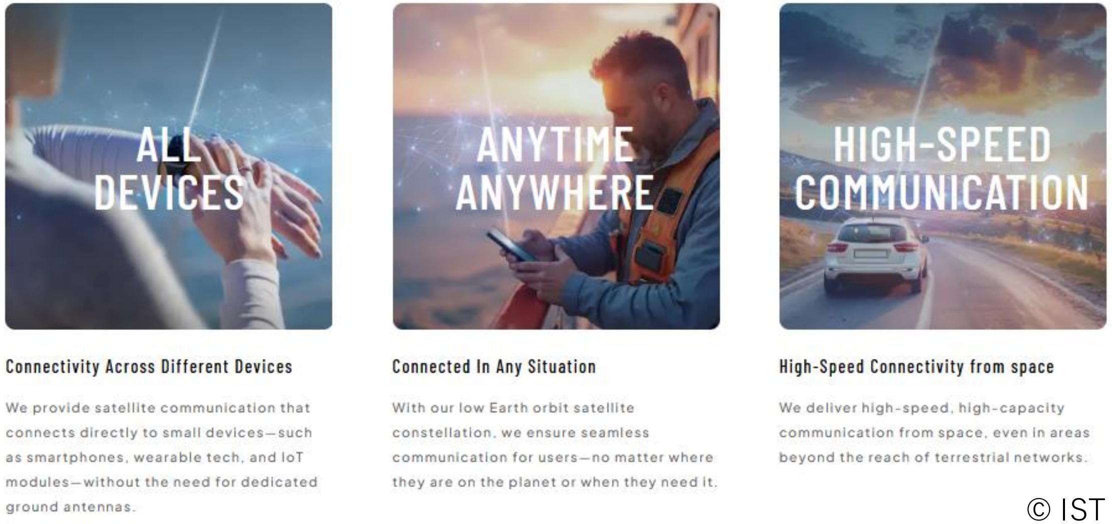
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

April 2025 to March 2028 (3 years)

Point of Contact for international communication

IST Public Relations E-mail: press@istellartech.com



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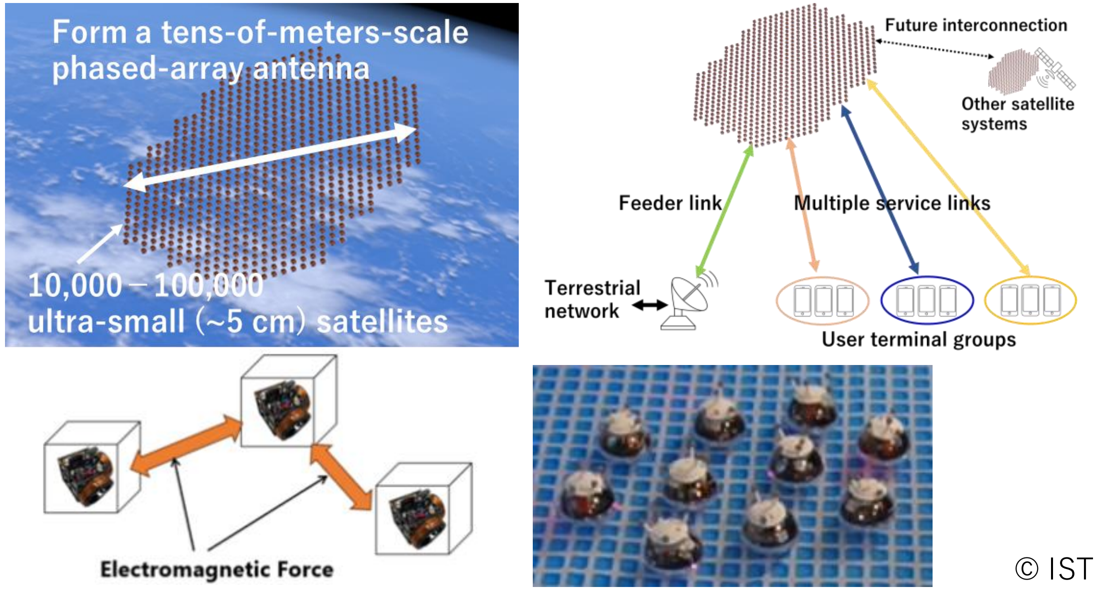
Service Concept of a Next-Generation Communication Constellation



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Ultra-Large-Scale Formation Flying and Configuration Control Experiments

SSF 1st Phase： High Accuracy Satellite Formation Flight Technology

Demonstration of High Accuracy Formation Flying Control Technologies through SEIRIOS

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

The University of Tokyo, Nagoya University, Meisei University, The University of Osaka, Seiren Co., Ltd., and Chubu University

Overview

Pioneering a Future Where High Accuracy Formation Flying Becomes a Key Enabling Technology for Space Missions

To realize this vision, we aim to achieve the following three objectives:

1. Development and On-Orbit Demonstration of SEIRIOS

We will develop and demonstrate SEIRIOS, a high accuracy formation flying mission for interferometric observation based on small satellites.

2. Development of Advanced Ground Test Facilities

We will develop and establish a suite of advanced ground-based experimental facilities for the verification and validation of formation flying technologies prior to flight.

3. Building a Formation Flying Community

We will accumulate technical expertise and operational know-how in formation flying, while fostering a community of researchers and users that will generate and support future formation flying missions.

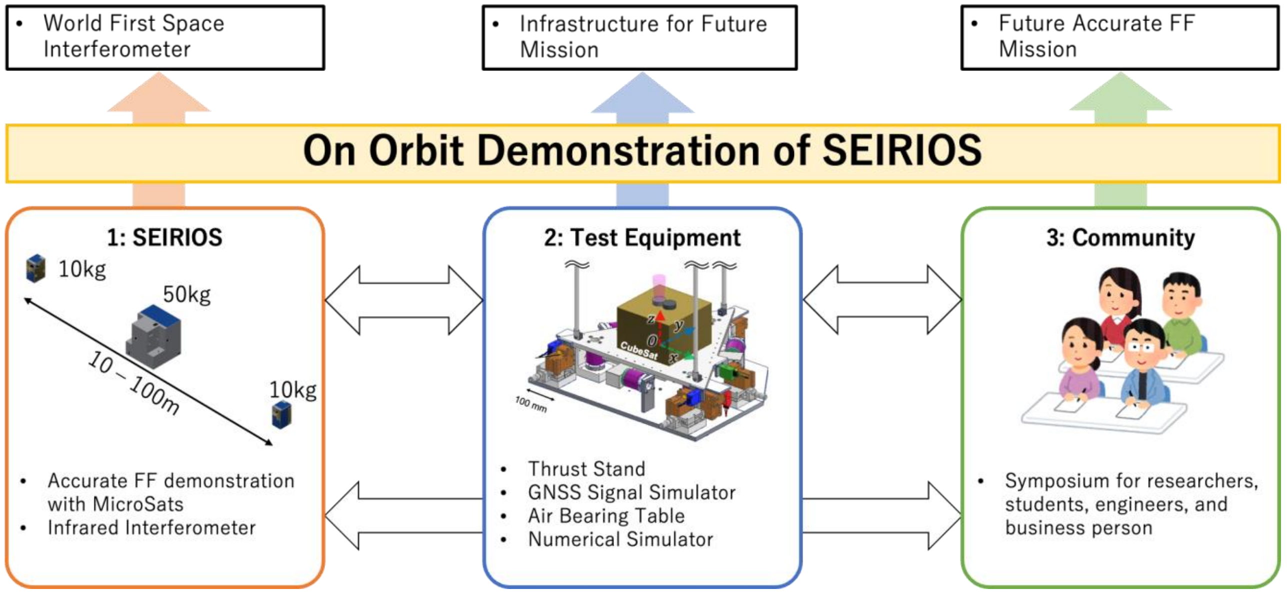
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

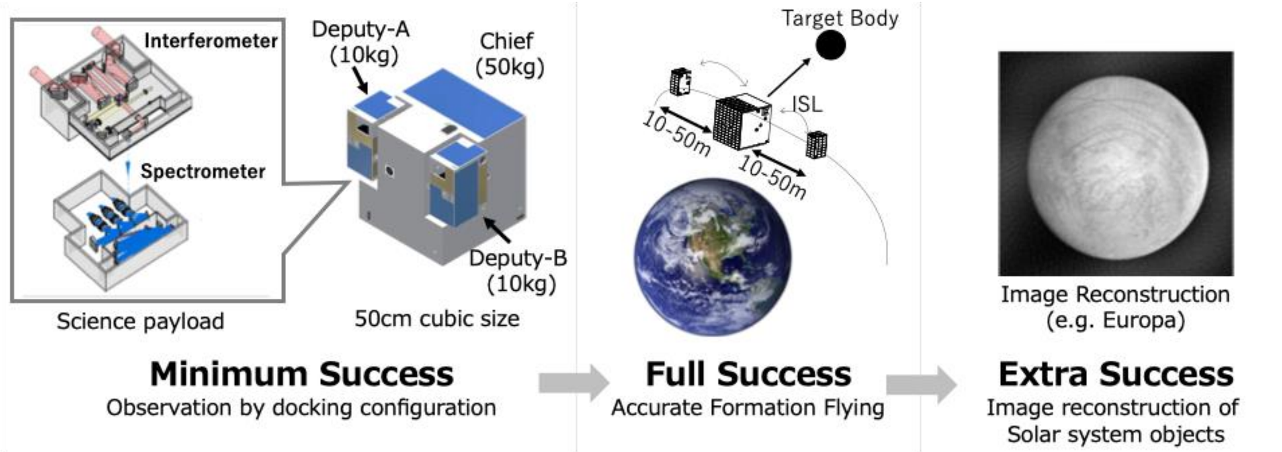
March 2025 to March 2032 (7 years)

Point of Contact for international communication

Satoshi Ikari E-mail： seirios-info@space.t.u-tokyo.ac.jp



Overview of the proposal ©The University of Tokyo



Overview of the SEIRIOS mission ©The University of Tokyo

Demonstration of nanosatellite formation flying and application to space MIMO communications

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Nagoya University; Meisei University; Mitsubishi Electric Corporation; Nagoya Institute of Technology; National Institute of Information and Communications Technology; Shibaura Institute of Technology; Waseda University

Overview

Small satellites enable low-cost multi-satellite formation flying, creating functions that a single satellite cannot achieve. However, strict limits on mass, volume, and power make conventional orbit control difficult. This project focuses on effects that become significant as satellites are miniaturized, such as space environmental forces and interactions among onboard components. By actively utilizing these effects, we aim to establish a flexible software-defined formation flying technology that enables orbit control while minimizing propellant consumption.

This project aims to realize propellant-less formation flying for small satellites and apply it to space MIMO communications. A flexible software-defined platform enables satellite formations to be deployed, reconfigured, and maintained semi-permanently with sub-meter-level precision. By expanding communication capacity through efficient frequency sharing, this technology supports global IoT connectivity and contributes to solutions for frequency congestion, space debris, and sustainable space business.

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

March 2025 – January 2032 (7 years)

Point of Contact for international communication

・Takaya Inamori ・E-mail : smallvehicle-contact@nuae.nagoya-u.ac.jp

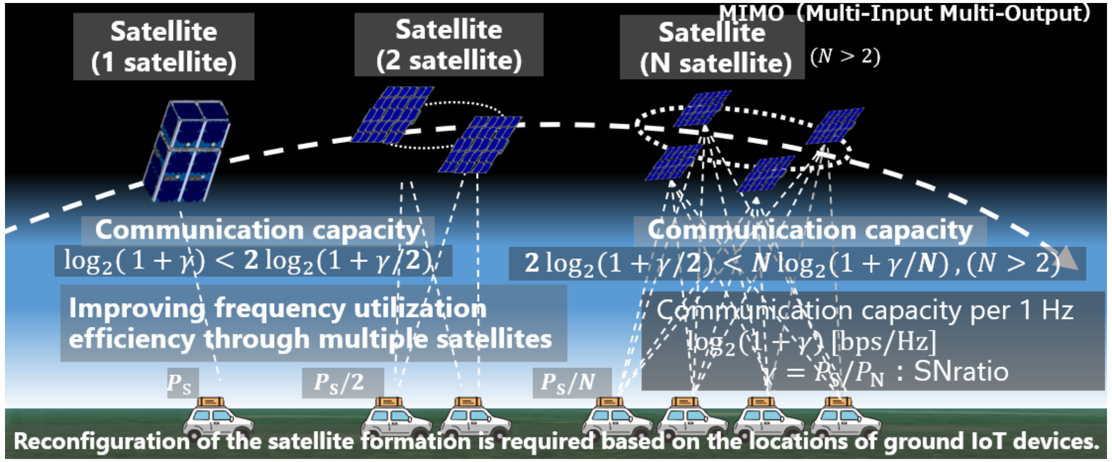


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Fig. 1. Application of Satellite Formation Flying to Space MIMO Communications

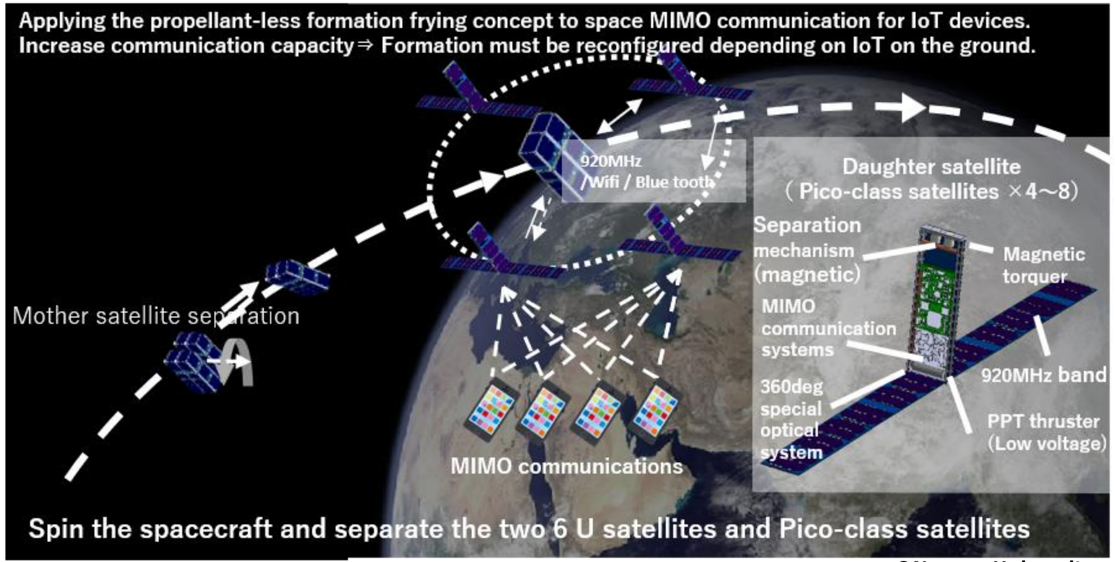

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Fig. 2. Overview of the Space Demonstration in the R&D Project

Development of a Multi-Purpose Satellite Constellation

(A satellite constellation equipped with sensors capable of expanding multi-wavelength and multi-frequency data acquisition)

SPACE STRATEGY FUND

Implementing Organization (Bold: Lead organization / Regular: Partner organizations)

ArkEdge Space Inc.

Target Outcome (Impact)

Realization of a Multi-Purpose Satellite Constellation Supporting Safe and Secure Maritime Activities. By deploying a constellation of small satellites equipped with advanced multi-wavelength and multi-frequency sensing capabilities, the system will enable high-frequency, global transmission and reception of VDES/IoT data and collection of RF data at scale—creating new value in the following areas:

- **Maritime Safety & Security:** Vessel tracking, crew safety monitoring, and risk information provision
- **Maritime Operational Efficiency:** Port optimization, logistics support, and maritime digital transformation (DX)
- **Contribution to Global Challenges:** Climate change mitigation, sustainable resource utilization, and environmental anomaly detection

Technology Development (Outputs)

- **Mass-Production Satellite Bus Development:** Establish mass production of small satellite buses forming the constellation. Through the adoption of cost-effective COTS components and optimized manufacturing processes, achieve both high reliability and cost reduction.
- **Common Infrastructure Development:** Develop inter-satellite communication–based Tip & Cue capabilities and establish an integrated mission control system for heterogeneous satellite fleets, enabling automated and efficient simultaneous operation of diverse satellites.
- **Constellation Deployment:** Deploy small satellites equipped with VDES/IoT communication functions and RF data collection capabilities to build a multi-purpose constellation that serves as critical infrastructure for maritime domain awareness and maritime digital transformation (DX) advancement.

Project Period (Planned) *

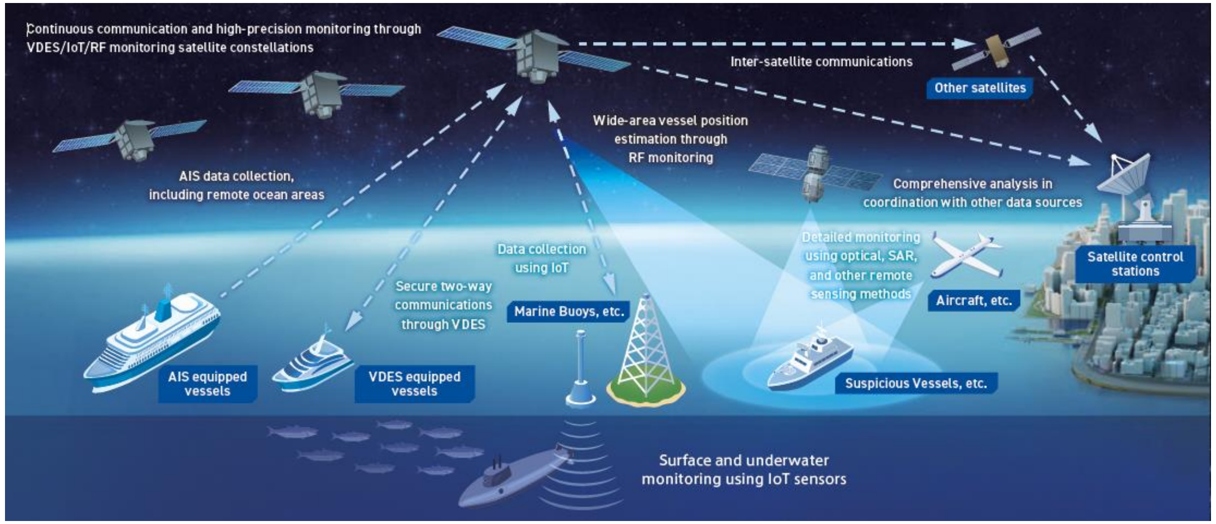
April 2025 – March 2032 (7 years)

Funding *subject to stage-gate evaluation

Subsidy (2/3 cost coverage)

Media Contact

Public Relations: Takayuki Kawakatsu E-mail : ae-pr@arkedgespace.com



Service Concept of the Multi-Purpose Satellite Constellation

- AIS : Automatic Identification System
- VDES : VHF Data Exchange System (two-way maritime communication system)
- IoT : Internet of Things
- RF : Radio Frequency

Acceleration of mass production of small SAR satellites and Strengthening technological development capabilities to establish competitive advantage

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Institute for Q-shu Pioneers of Space, Inc.
Alouette Technology Inc.

Overview

Near Real-Time Data Service
“Observing almost Anywhere in the World at an Average Interval of 10–20 Minutes”

Output

1. To build a constellation of 36 small SAR satellites at an early stage, we establish a mass production system launching more than six satellites per year.
2. To boost product competitiveness, we minimize manufacturing and operational costs per-satellite while developing next-generation satellites with wider coverage and higher spatial resolution.
3. To ensure faster data delivery, we reduce latency from observation request to data provision.
4. By leveraging high-frequency observations from our constellation, we will achieve product advancement.

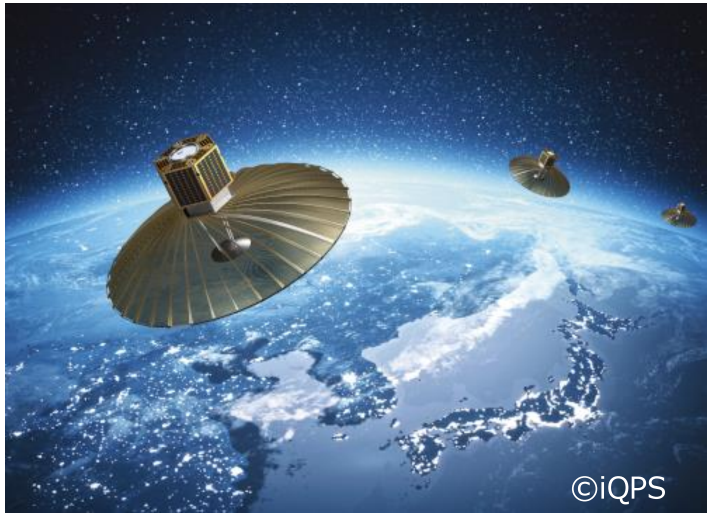
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

March 2025 – March 2029 (4 years)

Point of Contact for international communication

E-mail : press@i-qps.com



Constellation Image of the Small SAR Satellite “QPS-SAR”

January 2024,
Image acquired after the Noto Peninsula Earthquake
(Large-scale fire area)

September 2024,
Image acquired at Typhoon Damage in Vietnam
(Phon Chau Bridge Collapse Section)

Mass production and launch of small SAR satellites with incremental performance upgrades

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Synspective Inc.

Overview

Establishing a SAR satellite constellation and providing services that meet global and domestic customer needs

We will deploy a sufficient number of satellites equipped with internationally competitive small SAR technologies (high-resolution, wide-area observation, InSAR, etc.) to launch services meeting customer standards for responsiveness and imaging frequency, securing large-scale domestic and international procurement.

Technical development targets:

1) **Establishing a mass-production system** through satellite manufacturing; executing the production and constellation build-out.
2) In-orbit demonstration of **onboard data processing and inter-satellite links (ISL)** to achieve rapid responsiveness, including "Tip & Cue" use-case verification.
3) In-orbit demonstration of **autonomous orbit control technology**, essential for achieving internationally competitive, **high-frequency Interferometric SAR (InSAR)**.

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

Dec 20, 2024 – Mar 31, 2029 (Approx. 4 years and 3 months)

Point of Contact for international communication

E-mail：press@synspective.com

Establishment of SAR Satellite Constellation

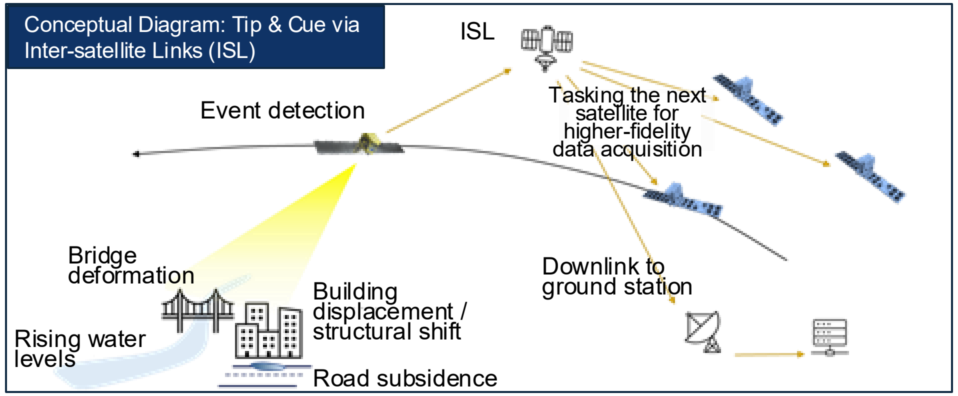
Near Real-Time
All-weather,
24/7 Observation
Wide-area & High-resolution

Manufacture and orbital deployment of 14 SAR satellites via the Space Strategy Fund.

Focus on "Iterative Manufacturing" (data-driven continuous improvement) during mass production.

Tip & Cue: A satellite detects an event, processes data onboard, and rapidly transmits the results to other satellites via inter-satellite links to update their observation plans.

⇒ Enables rapid, detailed follow-up observations based on detected events.



SSF 1st Phase: Accelerating the Deployment of Commercial Satellite Constellations

Technical Development and System Demonstration for Optical Communication Satellite Constellation

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

NEC Corporation

Overview

A Network Connecting the World

- We aim to build an optical communication satellite constellation with a sufficient number of satellites deployed to enable service launch in specific regions, including Japan, equipped with optical communication terminals enabling low-latency, high-capacity communications.
- For RFcommunications, we plan to adopt the 5G-NTN standard to build a system capable of accommodating users more efficiently than conventional satellite communication methods.

NEC will develop the network technologies necessary to realize an optical communication satellite constellation that is resilient and secure, enabling independence from terrestrial networks. Leveraging its space development capabilities cultivated over more than 50 years, NEC will undertake system Demonstration.

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

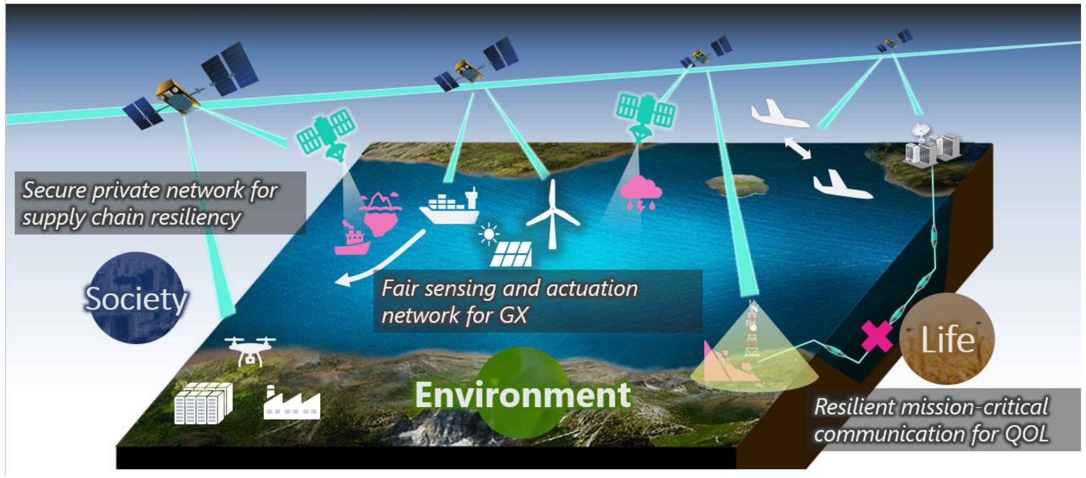
December 2024 ~ March 2031 (7 years)

Point of Contact for international communication

E-mail : info@space.jp.nec.com

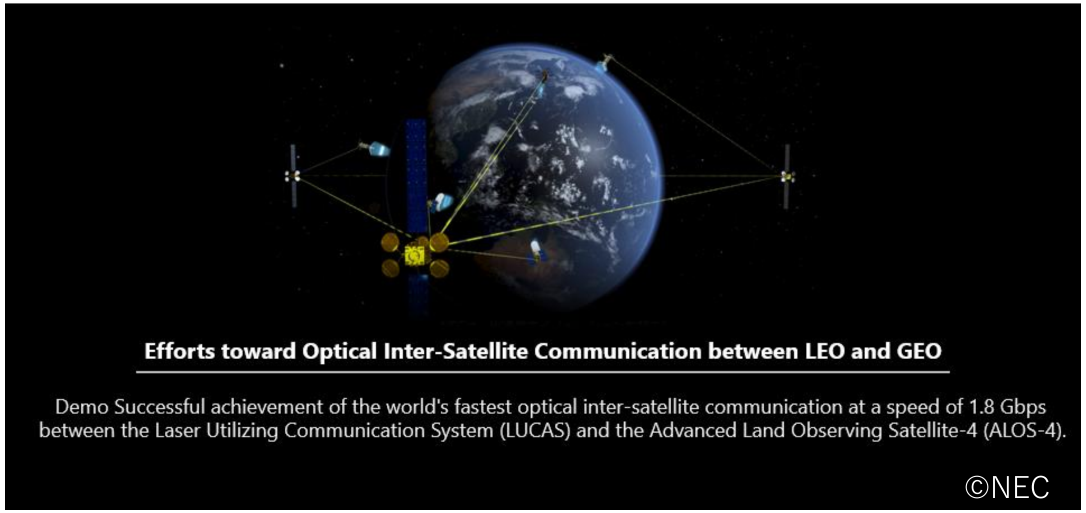
SDI business considering by NEC

As part of its activities to realize NEC 2030VISION, NEC has promoted a plan to build "Space Digital Infrastructure" (SDI) by establishing optical communication networks in space.



©NEC

NEC's efforts toward a World-view of space optical network



Development of High-Efficiency and Mass-Production Technologies for CIGS Thin-Film Solar Cells for Space Applications

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Idemitsu Kosan Co.,Ltd.

Overview

"Contributing to the Space Industry Supply Chain Through the Commercialization of Space-Grade CIGS Solar Cells"

We aim to establish mass-production technologies that will enable the commercialization of lightweight, high-efficiency, and highly reliable space-grade CIGS solar cells.

Through this project, we will advance the following technology development activities in stages:

1) Development of lightweight, high-efficiency CIGS solar cells for space applications, and related process technology.
2) Construction and launch of a bench manufacturing plant based on these process technologies developed in this project.
3) Demonstration of continuous production using the bench manufacturing plant.

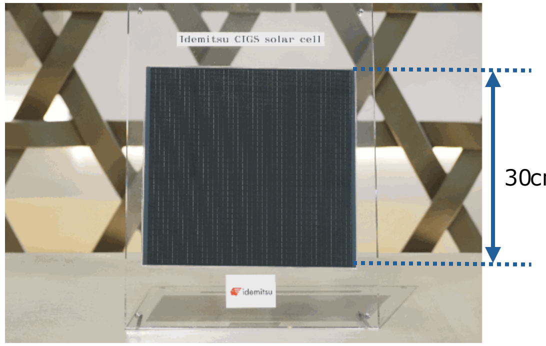
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

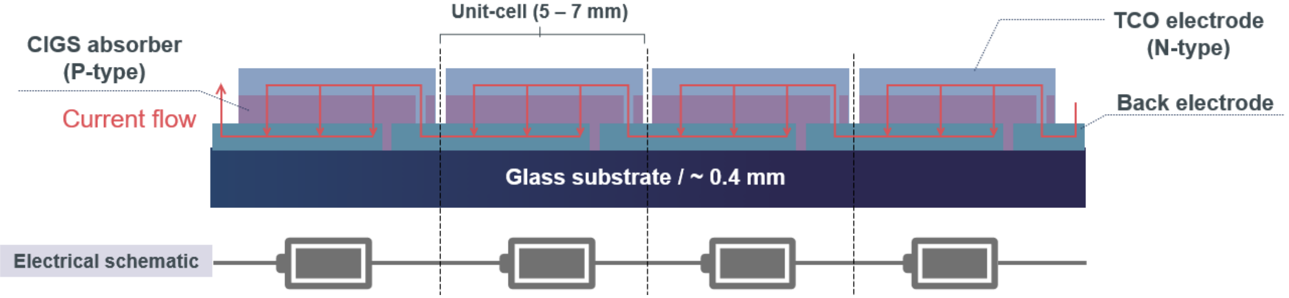
06/2026 to 05/2030 Year (4 years)

Point of Contact for international communication

・E-mail : CIGS-customer@idemitsu.com



CIGS Solar Cell Appearance



CIGS Solar cell Cross-sectional image

Image of a CIGS Solar Cell Mass Production Technology Verification Facility

Development of a Japan-made Loop Heat Pipe (LHP) for Space Applications

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

WEL Research Co., Ltd., Nagoya University

Overview

From "Custom-built" to "Catalog-based"

We will deliver space-grade LHPs to customers worldwide. This approach reduces lead time and cost and streamlines the thermal design workflow through the following developments:

1) **Standardized core components** (evaporator, condenser, reservoir) enabling modular, mission-tailored configurations;
2) **A comprehensive design package** (design guides, performance evaluation tools, representative performance data) to accelerate component selection and thermal layout; and
3) **International-standard** development and testing processes to ensure consistent quality and a reliable global supply of high-quality LHPs.

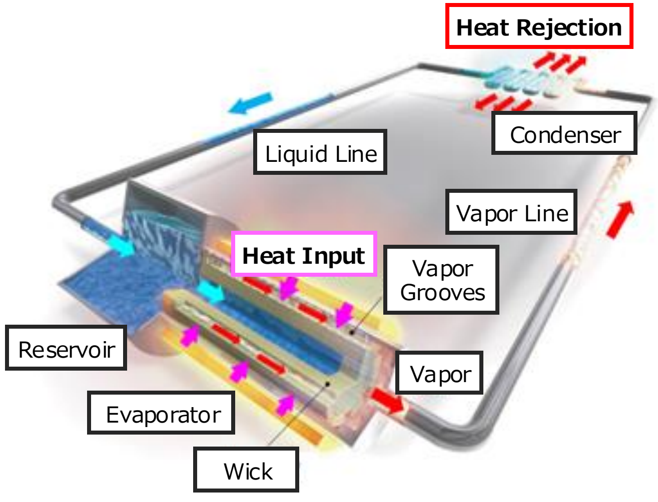
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

June 2025 to September 2029 (4 years)

Point of Contact for international communication

• Watanabe / Matsumoto ・E-mail: wel_info@wel.co.jp



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Key Features of LHP

- Pump-free fluid circulation
- Long-distance heat transport
- Flexible routing/layout

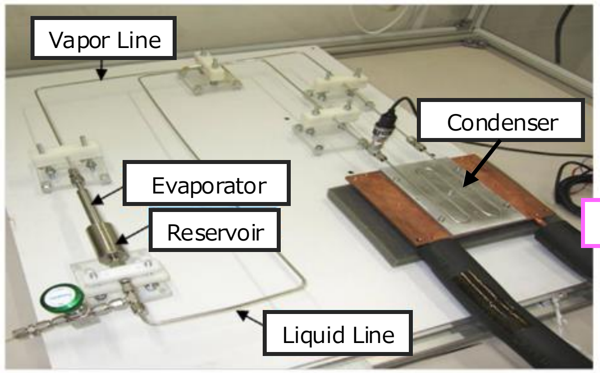
Benefits of Standardizing LHP Components

- Reduced lead time and cost
- Consistent quality
- Simplified spec definition

LHP Design Support

- Design guides & tools
- Upfront performance prediction
- Thermal-analysis tool integration

LHP Operation:
Heat Input → Heat Transport → Heat Rejection



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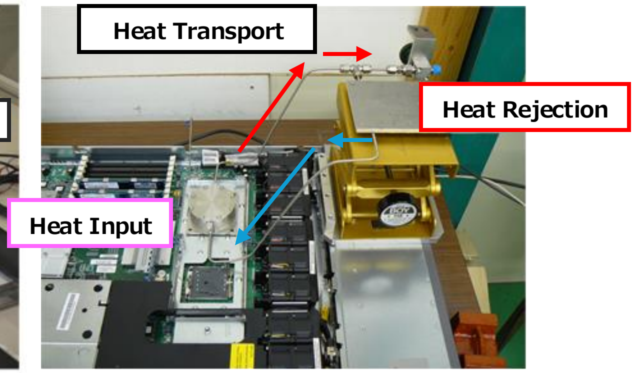

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LHP (Prototype / Application Example)

Development of a New Lightweight, Low-Cost, High-Performance Lithium-Ion Battery for Satellites

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Osamu Oda, Senior Managing Director and CTO, NU-Rei Co., Ltd.
Masaru Hori, Specially Appointed Professor, Center for Low-Temperature Plasma Science, Nagoya University

Overview

"Breaking Through the Graphite Barrier"—Next-Generation Lithium-Ion Batteries Are Changing Society

We produce super-nanographene using low-temperature plasma technology. Our goal is to foster innovation in lithium-ion batteries, bridge materials science and energy, and expand services in aerospace, robotics, and mobility.

Key Achievements

・Low-temperature plasma technology enabled the successful large-scale formation of super-nanographene film

・Achieves a capacity 5× greater than traditional graphite anodes (Theoretical capacity of graphite: 371 mAh/g)

Impact & Advantages

This technology will allow for the realization of the worldwide aim of 500 Wh/kg energy density by 2030 and is anticipated to provide significant performance enhancements in areas that demand high-performance batteries, like electric vehicles and space missions.

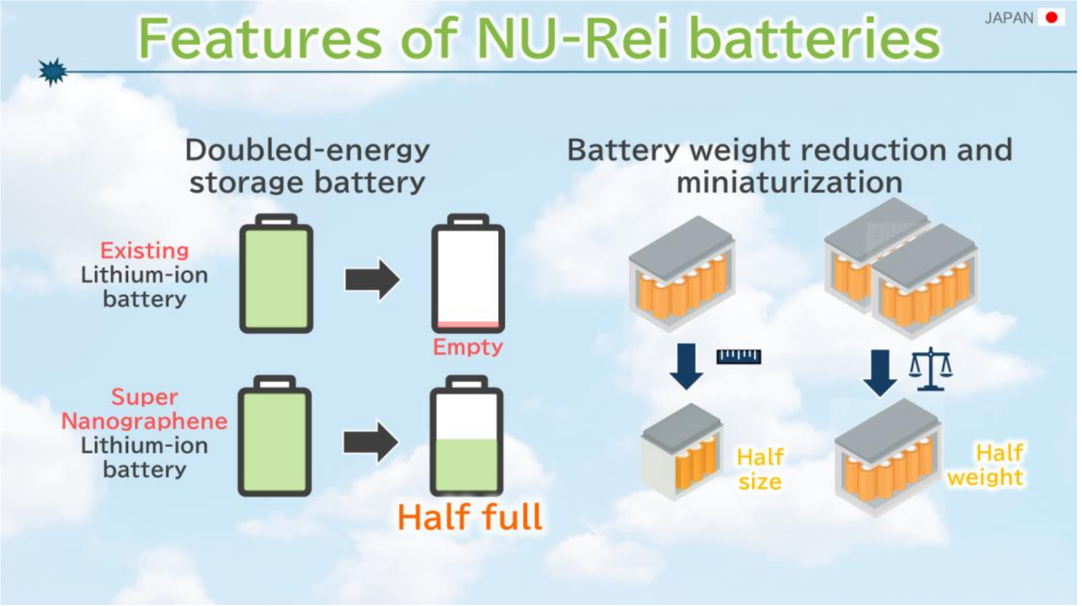
Implementation period (planned)

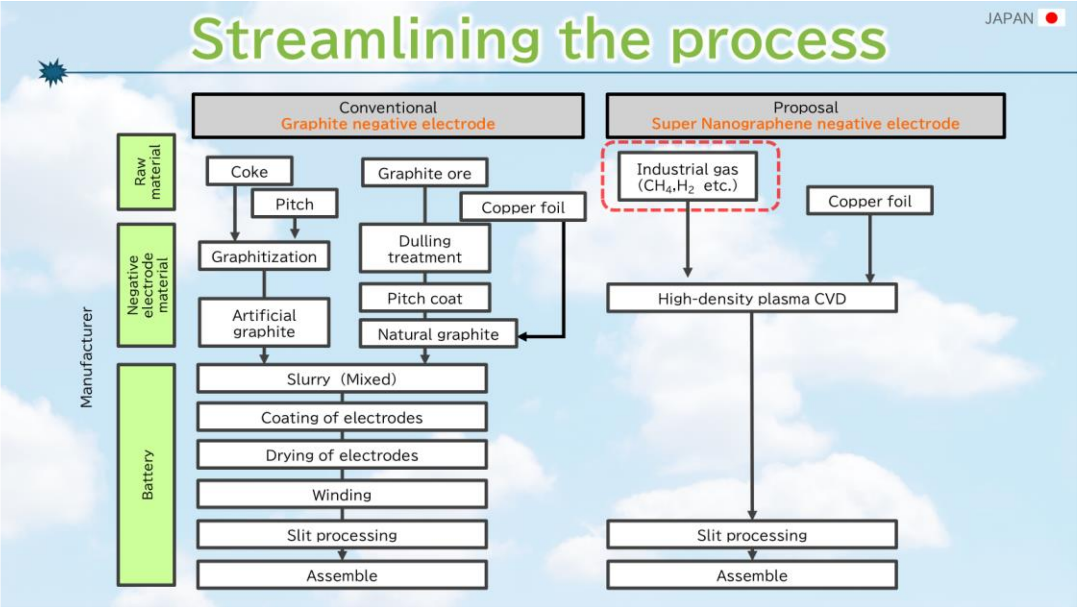
※Varies depending on stage gate evaluation, etc.

April 4, 2025 – March 31, 2030 (5 years)

Point of Contact for international communication

Management Division keiei.kanri@nu-rei.co.jp





Development of an ultra-lightweight CFRP telescope with a CFRP primary mirror

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Composite Tailors Co., Ltd.

Overview

Contributing to the construction of optical satellite constellations

・We are developing and demonstrating a telescope whose primary mirror and support structures are made of CFRP. We will build a supply chain that provides telescope systems to constellation satellite system manufacturers.

・Compared to glass primary mirrors, CFRP primary mirrors can be manufactured in significantly less time, making it possible to manufacture 50 to 100 telescopes per year, which will make a significant contribution to the construction of optical satellite constellations.

・Ultra-lightweight, zero-thermal expansion CFRP optical systems can be widely applied to space optical systems such as laser communication antennas and Earth observation scanners, and will also contribute to the construction of optical communication wireless networks.

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

・April 2025 to March 2031 (6 years)

Point of Contact for international communication

・E-mail : sales-web@composite-tailors.com

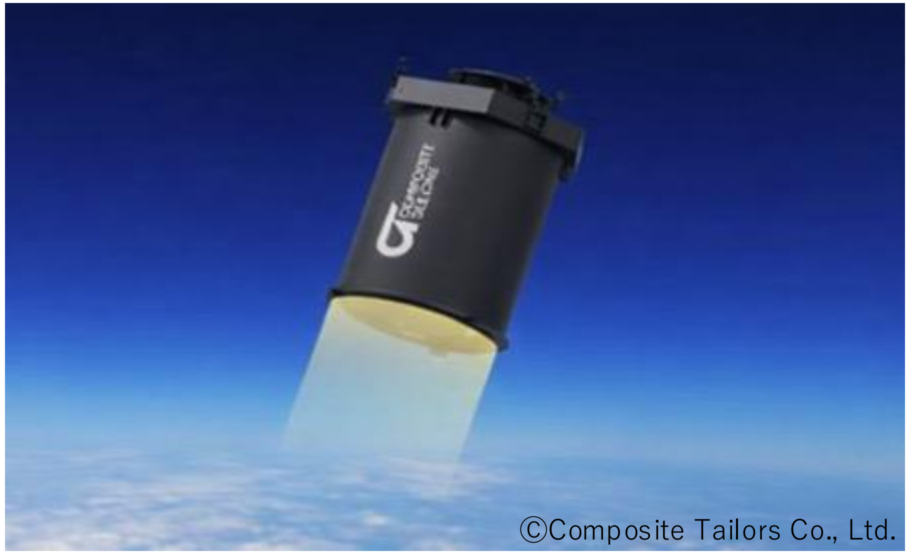


Image of the Completed CFRP Telescope

Aperture Diameter	Φ400 mm
Wavefront Accuracy	45 nm RMS (Total Transmitted Wavefront)
Ground Resolution	< 0.8 m (Assuming 500 km altitude)
Field of View	1 degree, 9.5 km or more
Optical System	Ritchey–Chrétien with correction lens
Focal Length	3.6 m, F/9
Telescope Dimensions	Φ550 × H900 mm
Telescope Mass	15 kg

Development Specifications in Phase 1

Advantages Of a CFRP Telescope

・**Lightweight:** Approximately one-third the weight of lightweighted glass.

・**Short Lead Time:** Production time is approximately two weeks—significantly shorter than that of telescopes using glass primary mirrors.

・**Mass Production:** Capable of manufacturing 50–100 units per year.

Development of Domestic Solar Cells, Cover Glass, and Solar Arrays

SPACE STRATEGY FUND

Implementing agency name
※Bold: Representative organization, Regular: Collaborative organization

Mitsubishi Electric Corporation, PXP Corporation

Overview

Enhancing the domestic satellite supply chain through cost reduction and supply capability improvement

We will collaborate with domestic suppliers to develop low-cost, mass-producible solar cells, also verify the applicability of ground-based glass for space use and aim for mass production of low-cost solar array.

1) **Develop cost-effective solar cell production technology** through collaboration with domestic suppliers using perovskite and CIGS solar cells. Additionally, **deploy high-efficiency perovskite/CIGS tandem solar cells for space applications** by leveraging the high radiation resistance of CIGS;
2) **Verify the adaptability and resistance of cover glass** developed using domestic ground-based glass manufacturing technology to the space environment**;** and
3) Conduct design and verification of space environment resistance for solar arrays using newly developed solar cells and cover glass, while also **developing scalable production technology to meet increased demand**.

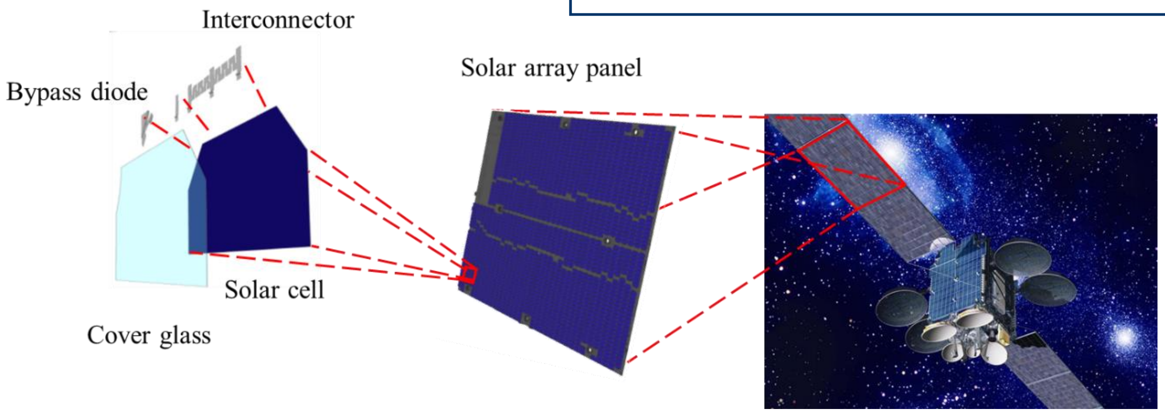
Implementation period (planned)
※Varies depending on stage gate evaluation, etc.

April 2025 to March 2031 (6 years)

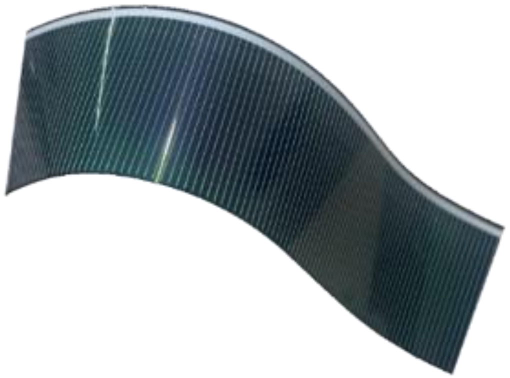
Point of Contact for international communication

Mitsubishi Electric Corporation (http://www.mitsubishielectric.com/bu/space/)
PXP Corporation (https://pxpco.jp/)

MITSUBISHI ELECTRIC Changes for the Better × PXP



Configuration of solar array



CIGS solar cells

CIGS : An abbreviation for compound semiconductor materials primarily composed of copper (Cu), indium (In), gallium (Ga), and selenium (Se). It is used as a material for solar cells.

Feasibility Study on Shared Satellite Architectures and Standardized, Streamlined Development Processes among Satellite Manufacturers

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

INDUSTRIAL-X Inc., Mitsubishi Electric Corporation, NEC Corporation

Overview

Building a foundation for faster and scalable production of high-quality satellites

We will study how satellite architectures and development processes can be standardized and streamlined across satellite manufacturers to strengthen Japan's satellite supply chain.

1) **standardization of satellite architectures**;

2) **development process transformation** through model-based systems engineering (**MBSE**), AI, and other advanced digital technologies; and

3) a **shared data platform** that enables more efficient data collaboration across companies.

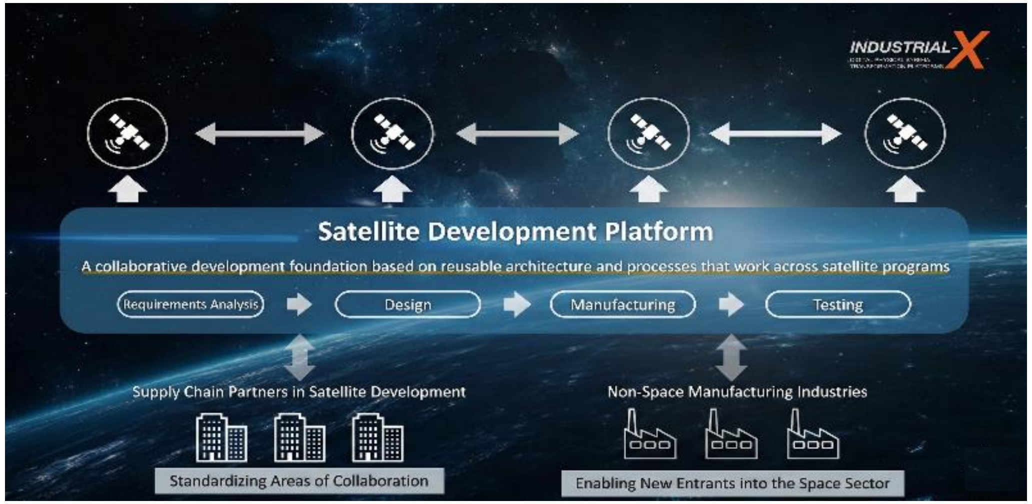
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

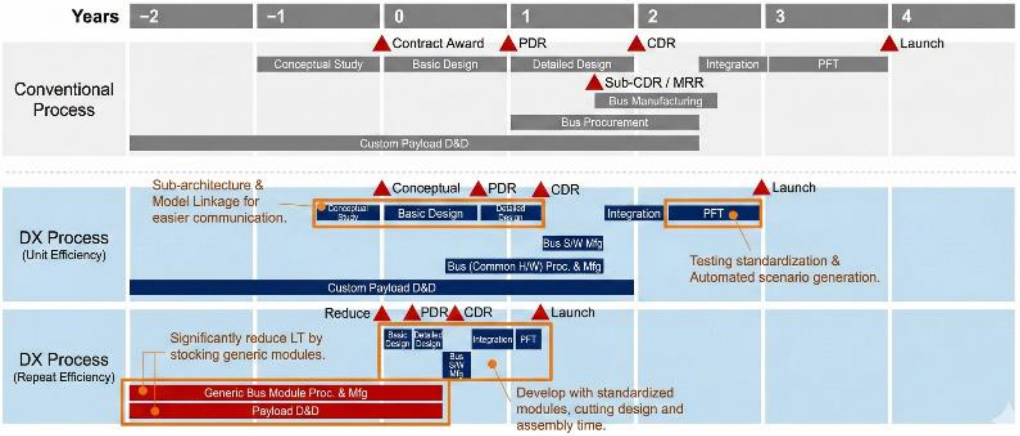
April 2025 to June 2026 (1 year)

Point of Contact for international communication

E-mail : marketing@industrial-x.jp



Target Future State after This Study



Conceptual Image of Development Process Efficiency

Initiative and Feasibility Study on Organizing Space Environment Testing Challenges and Promoting the Use of COTS Parts in Satellites

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Advanced Satellite Systems Technology Center(ASTEC)

Overview

1) Issues in Space Environment Testing

As the number of domestically produced satellites is expected to increase, a shortage of environmental testing facilities in Japan (e.g., Fig 1) is anticipated. Understanding the status of facility availability, such as "when and to what extent the facilities will be insufficient," will indicate the direction for infrastructure development necessary to promote space utilization in Japan in the future.

We will assess the status and issues of testing facilities and prepare draft activity plan for feasible solutions and system proposals, including areas of collaboration among industry, government, and academia.

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Fig 1 (Left): Small Satellite Vibration Test Facility (JAXA Tsukuba Space Center)
(Right): Space Chamber for Small Satellites (JAXA Tsukuba Space Center)

2) "Initiatives to Promote the Use of COTS Parts in Satellites "

The objective of this activity is to promote the application of COTS(Commercial Off-The-Shelf) parts in satellites in order to enhance flexibility and competitiveness of Japan's space industry. We will initiate the development of **a) Technical guideline and b) Contractual guideline** (including non-disclosure agreements and memorandums) for COTS parts utilization in satellites, and identify **c) other related challenges**. Through these activities, we seek to gather and incorporate the views from the industrial stakeholders, including users and manufacturers of COTS parts, through constructive discussions and dialogue.

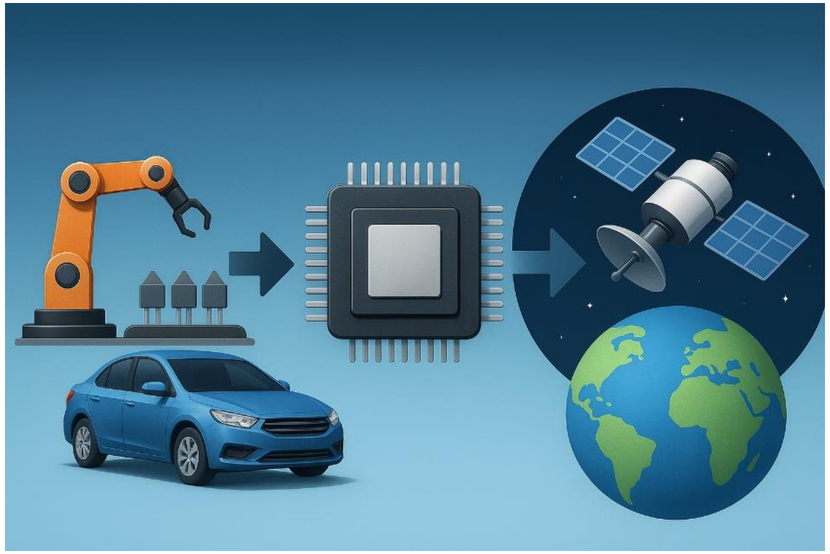


Fig 2: Conceptual Diagram to promote the Use of COTS Parts in Satellites (generated by ChatGPT)

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

- May 2025 to July 2026 (1 year)

Point of Contact for international communication

- ASTEC Space Strategy Fund (COTS/Environmental Testing) Desk ・E-mail: ssf_1@astec.or.jp

SSF 1st Phase: Feasibility Study of Overseas Demonstration of Satellite DataUtilization System

Development and validation of a digital platform for the aquaculture industry : Data Platform for Marine Spatial Planning and Ocean Monitoring

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

UMITRON K.K

Overview

Data Platform to Accelerate Aquaculture/Blue Economy Development

The two core system functions serve as key data infrastructure for the public/private sector players in the aquaculture industry worldwide:

1. **Aquaculture Potential Map System :**
   By combining various data source and identify suitable locations for potential aquaculture sites. This will streamline the resource-consuming process to assess and secure marine/inland farm sites. and it contributes to de-risking investments.
2. **Ocean Monitoring Platform:**
   Provide insights for risk alert of the change in the ocean environment, monitoring the growth of the seaweed, estimation of seaweed farms' CO_2 absorption for blue carbon, by integrating and analyzing environmental data, satellite image data, operational data from the farms ,etc.

Implementation period (planned)

April 2025 to March 2027 (2 years)

Point of Contact for international communication

Junichi Taniguchi (Global Business Lead)　E-mail : glb-biz@umitron.com

Aquaculture Potential Map System for site selection/marine spatial planning

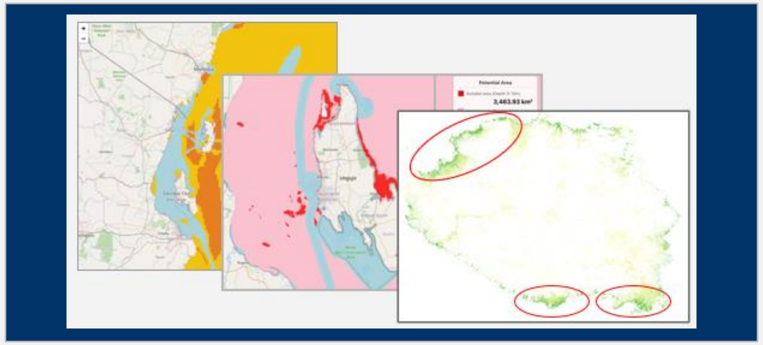
Identify visualize the suitable location to secure the farm sites with high potential and validate marine spatial planning. The platform supports accelerating decision making for investment in the the aquaculture industry

Environmental Data

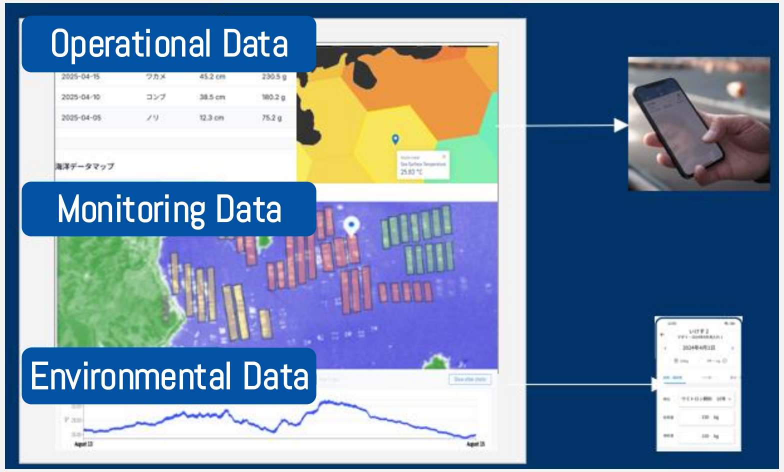
Socio-Economic Data

Biological Data

Local Data



Ocean Monitoring Platform



- Provide data and insights for aquaculture farmers, local communities, etc.
- Data sharing with partner organizations (e.g. public sector, farm data management app, seaweed-based carbon credit creation, etc.)

SSF 1st Phase: Feasibility Study of Overseas Demonstration of Satellite Data Utilization System

Development of the Dark Vessel Identification System "Smart Tasking 2.0" for IUU Fishing Countermeasures

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Ocean solution technology Co.,Ltd.
Meta Systems Laboratories, Inc.

Overview

Detecting Dark Vessels with Smart Tasking 2.0

- Multi-Satellite Optimization & Vessel Identification

Multiple satellite datasets are integrated with AIS, VMS and our IoT device **Triton's Spear (TS3)** to assign vessel IDs and perform differential analysis, **enabling the identification of unidentified vessels as suspicious.**

- Monitoring Vessel Behavior Using Satellites and AI

Using vessel track data collected by our IoT device, **Triton's Spear (TS3)**, we establish an **AI-based fishing operation estimation capability** to understand ground truth of vessel activities, thereby enabling the **identification and analysis of suspicious behavior** such as illegal fishing and transshipment.

- Detection & Intelligence Service

AI-driven analysis of **satellite remote sensing data** enables the **detection of dark vessels and IUU fishing within national EEZs** and supports **information sharing with government authorities.**

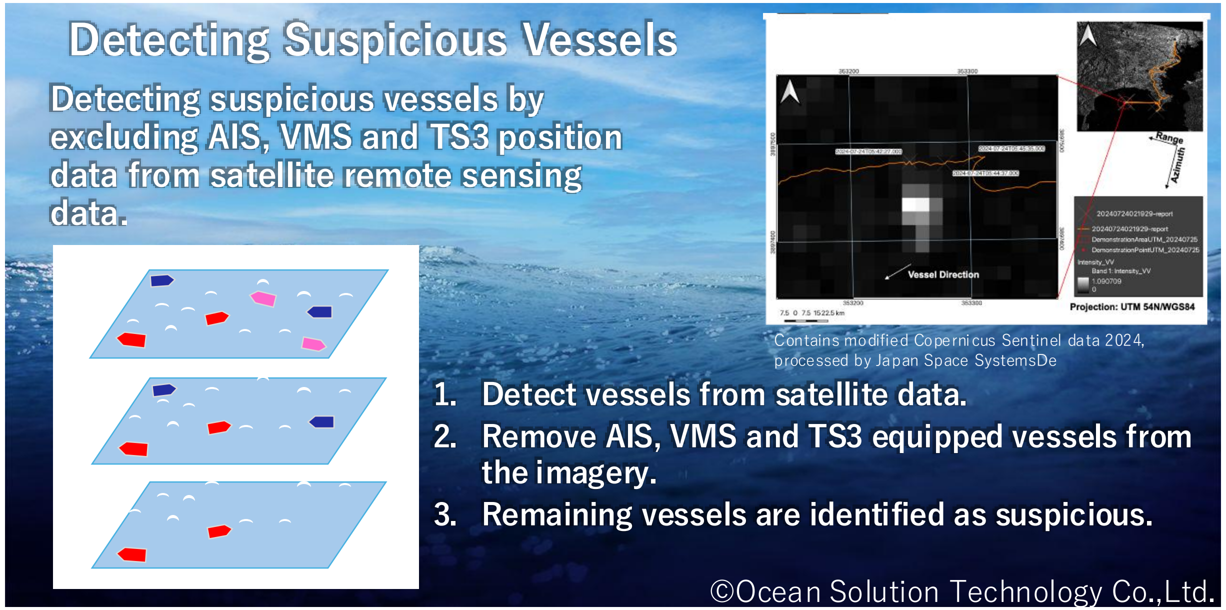
Implementation period (planned)

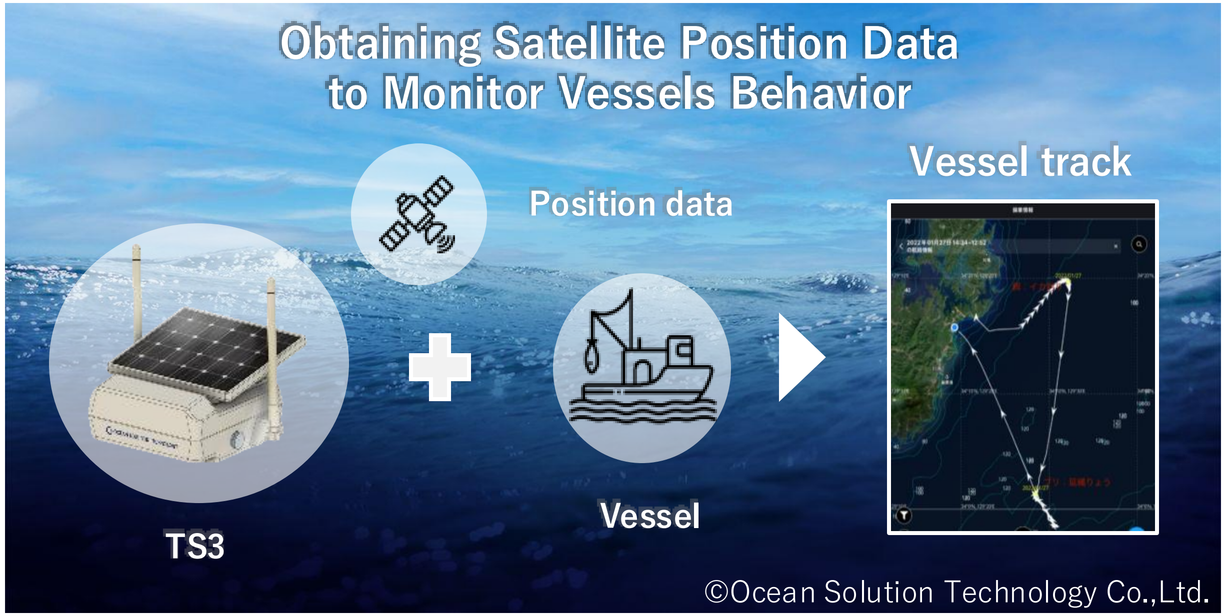
※Varies depending on stage gate evaluation, etc.

April 2025 to March 2027 (2years)

Point of Contact for international communication

E-mail： info@ocean5.co.jp





GFIA Global Flood disaster Instant Analysis 3D

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Pacific Consultants Co. Ltd., Gaia Vision Inc.

Overview

A Cutting-Edge Digital Approach to Visualizing Disaster Hazards, Risks and Impact Analysis

- Our solution utilizes satellite images and global open data, applying advanced satellite image analytics and hydraulic simulation to deliver three key outputs: **1) Flood Extent, 2) Flood Damage, and3) Causes of Floods.**
- Through this service, flood conditions, the **affected population**, the **number of damaged buildings**, **estimated economic losses**, and other damage conditions, as well as the **estimation and identification of disaster causes**, can be rapidly and accurately assessed from remote and off-site locations during the initial phase of a disaster

Implementation period (planned)

Phase 1 (By March 2026): Development of Core Components

Complete development of functions regarding flooded area, damaged impact analysis and disaster factors.

Phase 2 (From April 2026): Core Service Launch

Launch core functions and conduct verifications and fine-tuning.

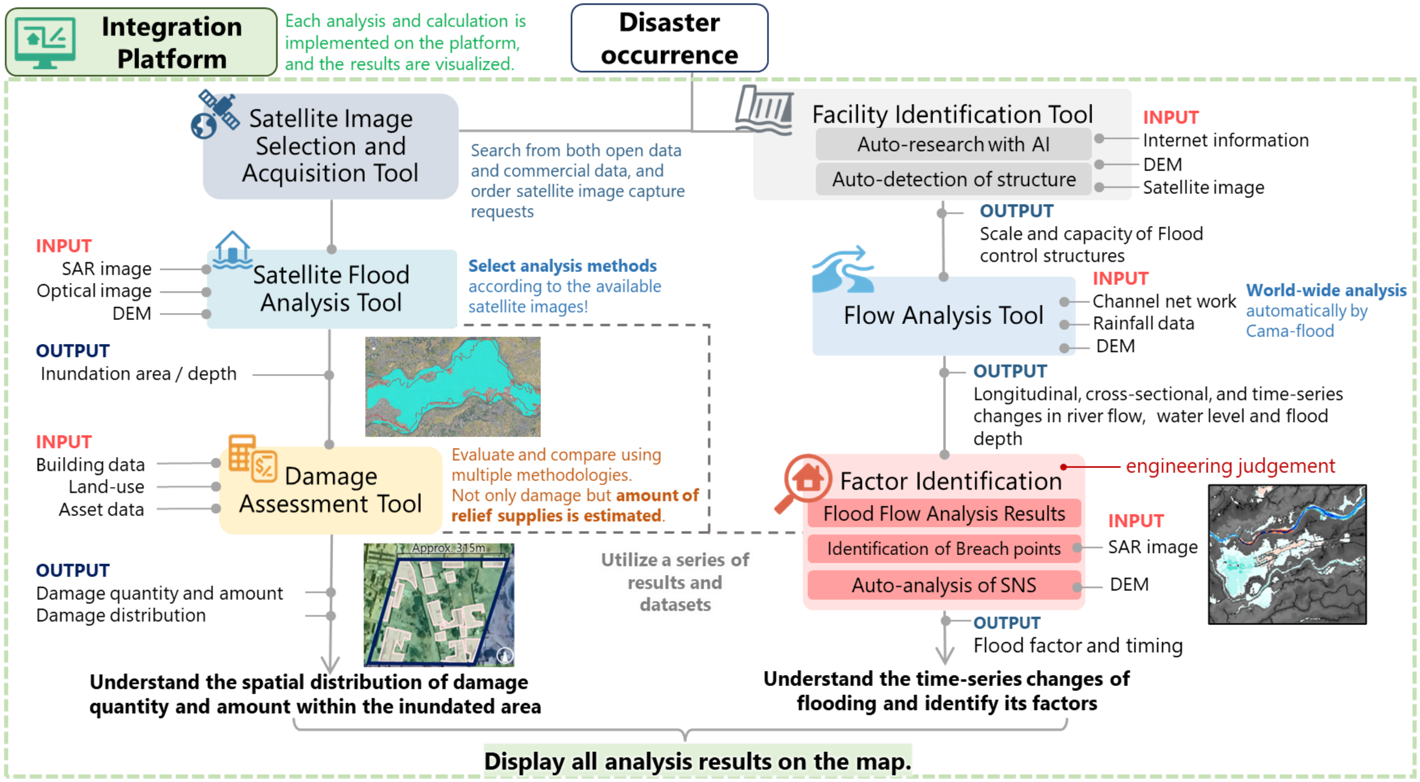
Phase 3 (From 2027): Service Enhancement

Begin development of the enhanced/next-generation service

Point of Contact for international communication

[Yuasa or Sakamoto]　E-mail : gfdia3d@tk.pacific.co.jp

Implementation anywhere in the world within two weeks



Key Technology and Outputs

The Service we Provide

Exploration of Resources in the Lunar Shallow Subsurface using a Terahertz Wave Remote Sensing Satellite

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

University of Science Tokyo, University of Tokyo, NICT, University of Hokkaido, Osaka Metropolitan University, ispace, inc., Taisei Corporation, Deloitte Tohmatsu LLC,

Overview

To estimate promising regions rich in resources such as water ice that may exist in the shallow lunar subsurface.

To extract information from the shallow subsurface just below the lunar surface, where the probability of water ice existence is higher and extraction is easier compared to the surface, by using Terahertz (THz) wave remote sensing technology. To achieve miniaturization and weight reduction of the sensor by utilizing high-frequency THz waves.

① Deploy an optimized satellite sensor system into orbit**, developed through integrated efforts including the launch lander, to receive radiation from the shallow lunar subsurface over a wide area from orbit.

② Accurately determine the brightness temperature** using advanced analysis algorithms combined with data from other explorations and ground-based experiments.

③ Aim to derive the Apparent Dielectric Permittivity (ABP)** of the shallow subsurface soil using the ratio of vertical and horizontal polarization.

Implementation period (planned)

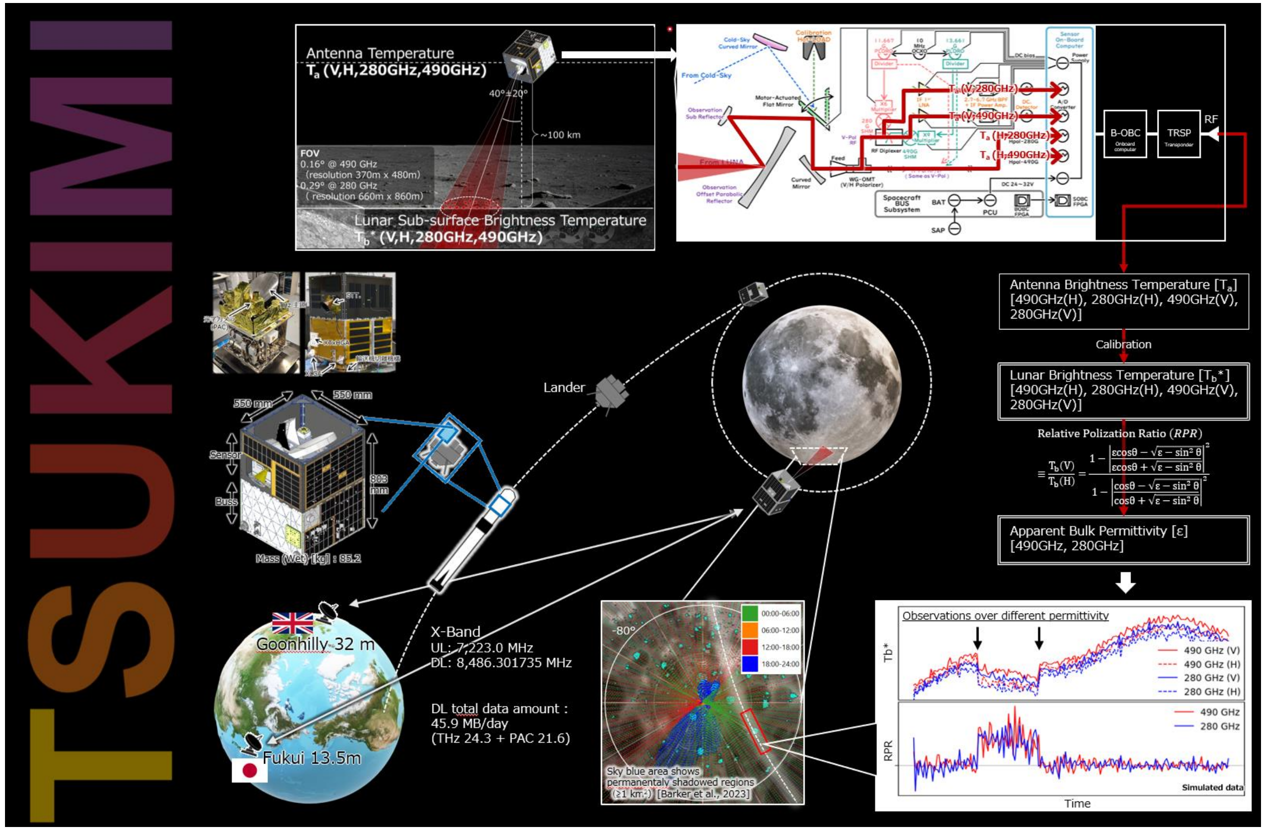
※Varies depending on stage gate evaluation, etc.

June 2025 – March 2030 (4 years)

Point of Contact for international communication

- Division, General Affairs and Media Group, University of Science Tokyo
- E-mail : media@adm.isct.ac.jp

Overview of Lunar Shallow Subsurface Resource Exploration



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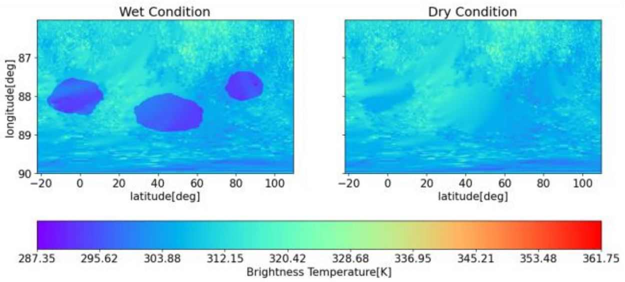
4D Visualization Complemented by Simulator



Forward Calculation Simulation

Example of Observation Simulation
Left: Observed brightness temperature when water ice is present in the Permanently Shadowed Regions (PSRs) of the lunar south pole.
Right : Case where it is not present.

©Yu Aoki(Institute of Science Tokyo)

Development of a Commercial Cargo Resupply Vehicle for U.S. Commercial Space Stations, and Development of a Next-Generation Proximity Communication System

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Japan LEO Shachu, Inc., Mitsubishi Electric Corporation

Overview

Japan LEO Shachu aims to contribute to the creation of a new ecosystem in low Earth orbit (LEO) by leveraging Japan's strengths.

- In the post-ISS era, we aim to provide commercial cargo resupply services that support both the utilization and construction of space infrastructure for U.S. Commercial LEO Destinations (CLD).
- We aim to develop a commercial cargo resupply vehicle by leveraging Japan's experience in the development of the cargo resupply vehicles (HTV and HTV-X) for ISS.
- We aim to develop a comprehensive framework for Japan's low Earth orbit activities, built around four core elements: the Japan Module as a successor to ISS Japanese Experiment Module (Kibo), space environment utilization, cargo resupply, and astronaut activities.

Implementation period (planned) ※Varies depending on stage gate evaluation, etc.

April 2025 to March 2030 (5 years)

Point of Contact for international communication

・E-mail : contact@japan-leo-shachu.com

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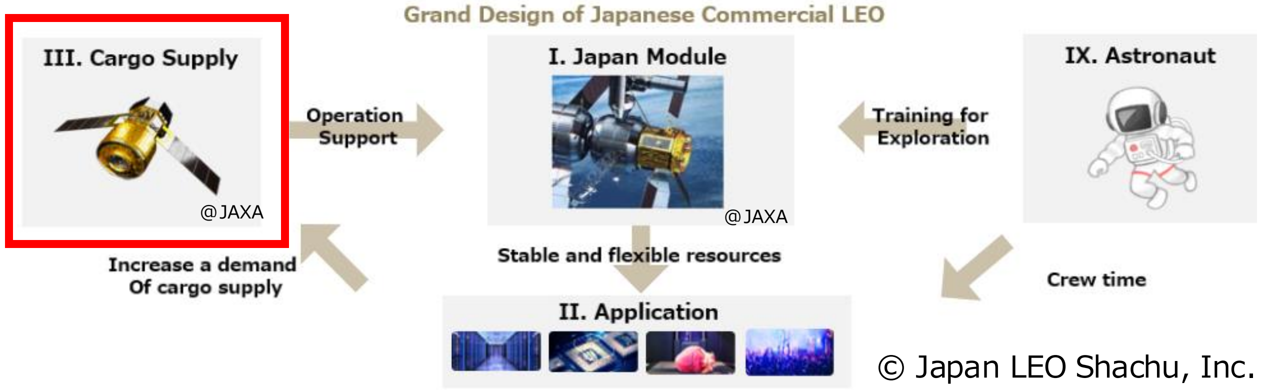

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Development of an Active Mechanism Verification System for an Automated Docking System

SPACE STRATEGY FUND

Implementing agency name

※**Bold: Representative organization**, Regular: Collaborative organization

IHI Aerospace Co., Ltd.

Overview

Promotion of commercialization through the acquisition of Japan's unique automatic docking mechanism verification system technology

1) The automated docking system(see right figure) is **an essential device for commercial space stations and cargo supply vehicles, which are expected to see increased use in the future**. Development is being led by JAXA.

2) **We will commercialize these JAXA-developed technologies and sell them to businesses both in Japan and overseas, making a significant contribution to the industrialization of manned space utilization by the private sector.**

3) By utilizing the Space Strategy Fund to acquire a verification system **that can be autonomously used in Japan over the long term, we aim to shorten product lead times and reduce costs, thereby enabling us to provide more internationally competitive products.**

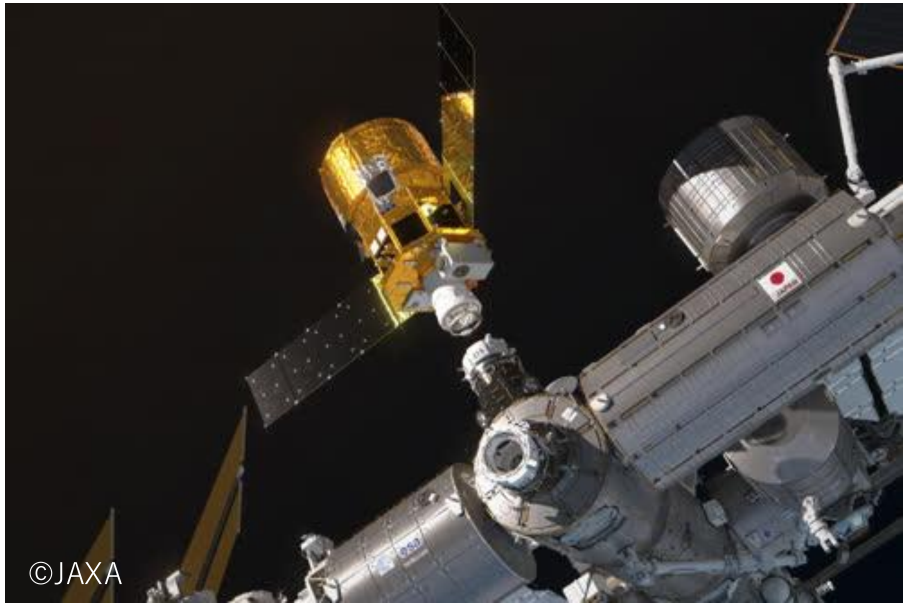
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

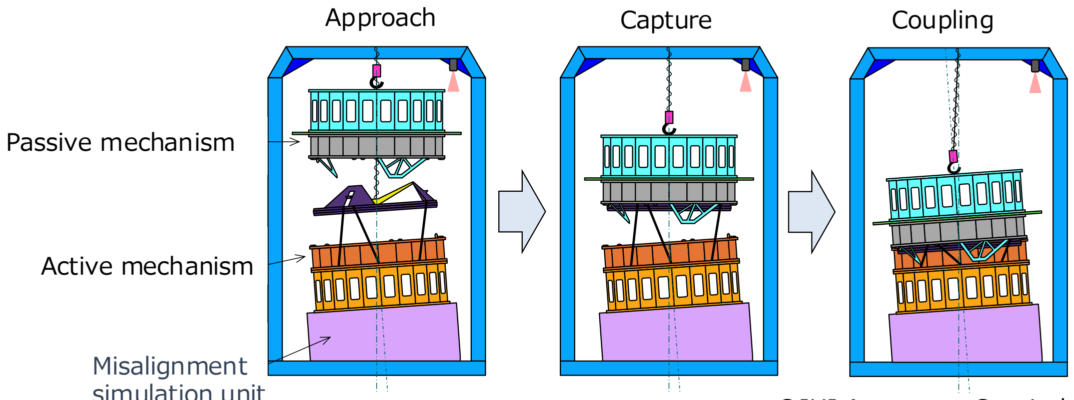
From March 2025　(5years)

Point of Contact for international communication

HP : https://www.ihi.co.jp/ia/en/contact/index.html



HTV-X automatically docking with the space station(Reference Image)



©IHI Aerospace Co., Ltd.

Basic system design of LEO autonomous flying module

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Japan LEO Shachu, Inc.

Overview

Japan LEO Shachu aims to contribute to the creation of a new ecosystem in low Earth orbit (LEO) by leveraging Japan's strengths.

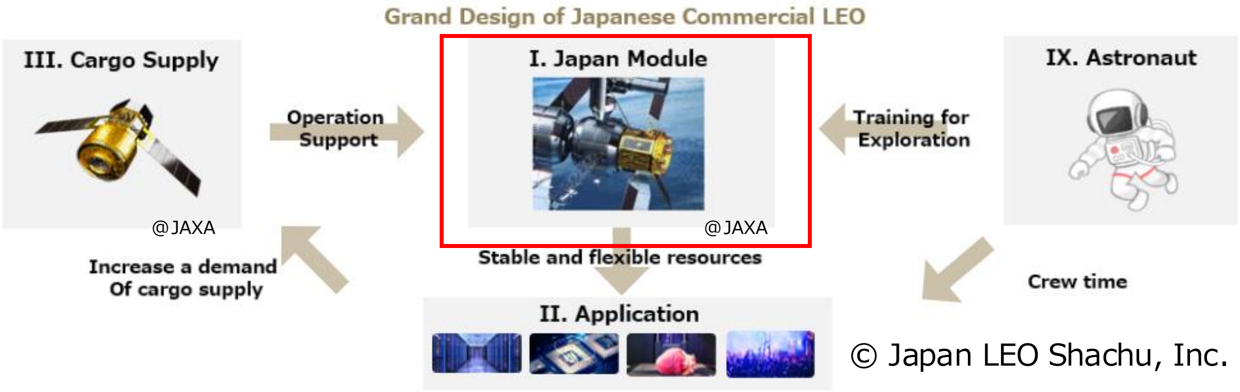
- Japan LEO Shachu is committed to the full-scale development of the "Japan Module," the successor to the Japanese Experiment Module "Kibo" on the International Space Station (ISS).
- This project aims to drive innovation across terrestrial industries such as life sciences, advanced materials, data processing, and entertainment by leveraging the unique characteristics of low Earth orbit—including microgravity, extreme environments, and human habitation—for scientific experiments and new business creation.
- By connecting each individual use case, Japan LEO Shachu seeks to build an ecosystem for low Earth orbit utilization centered on the Japan Module.
- Japan LEO Shachu aims to develop a comprehensive framework for Japan's low Earth orbit activities, built around four core elements: the Japan Module, space environment utilization, cargo resupply, and astronaut activities.

Implementation period (planned) ※Varies depending on stage gate evaluation, etc.

April 2025 to March 2030 (5 years)

Point of Contact for international communication

・E-mail : contact@japan-leo-shachu.com



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Development of a LEO Automated Cell / Crystal Experiment System

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Space BD Inc., Icomes Lab Co., Ltd.

Objectives / Expected Outcomes

Accelerating private-sector space utilization by overcoming challenges in space experiments and strengthening Japan's global competitiveness.

- **Solving Current Challenges:** This system will minimize the hurdles of space research such as high costs, long preparation periods, specialized hardware requirement, and the limited scope of experiments.
- **Accelerating Drug Discovery:** Enabling drug screening and crystallization condition screening in microgravity will help accelerating ground-based pharmaceutical research and development.
- **Strengthening Competitiveness:** Through these initiatives, we contribute the enhancing Japan's global competitiveness in healthcare and space industries.

Technology Development Outputs

- **Automation:** To reduce costs and ensure consistent experimental quality, we will automate most of experimental process, thereby minimizing the need for crew intervention.
- **Multi Sample:** This system enables of simultaneous multi-sample experiments and sampling at multi time points, leading to the realization of highly practical drug discovery experiments in space.
- **Remote Operation:** To empower users to lead their own space experiments, we will utilize lab equipment compatible with ground-based standards and allow remote control from Earth.

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

- January 2025-December 2029 (5 years)

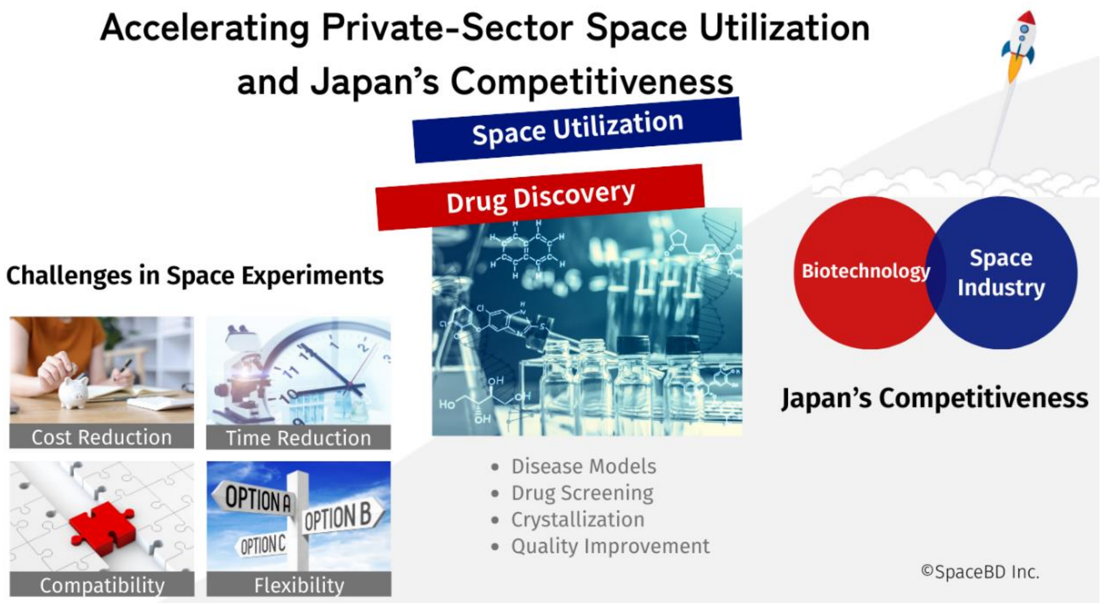
Implementation period (planned)

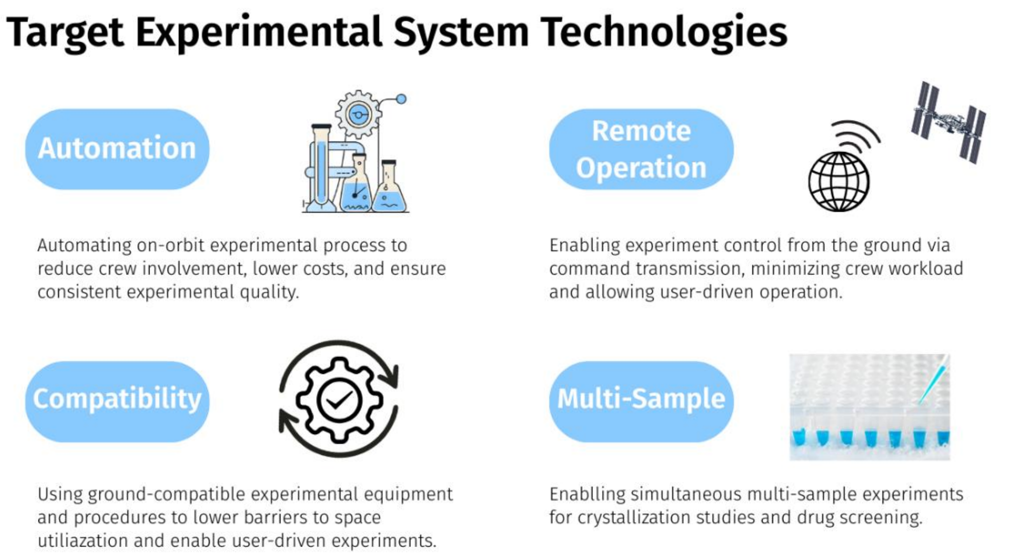
※Varies depending on stage gate evaluation, etc.

- Entrustment

Point of Contact for international communication

・E-mail : pr@space-bd.com





Development of a Lunar Navigation Demonstration Satellite and Core Subsystems

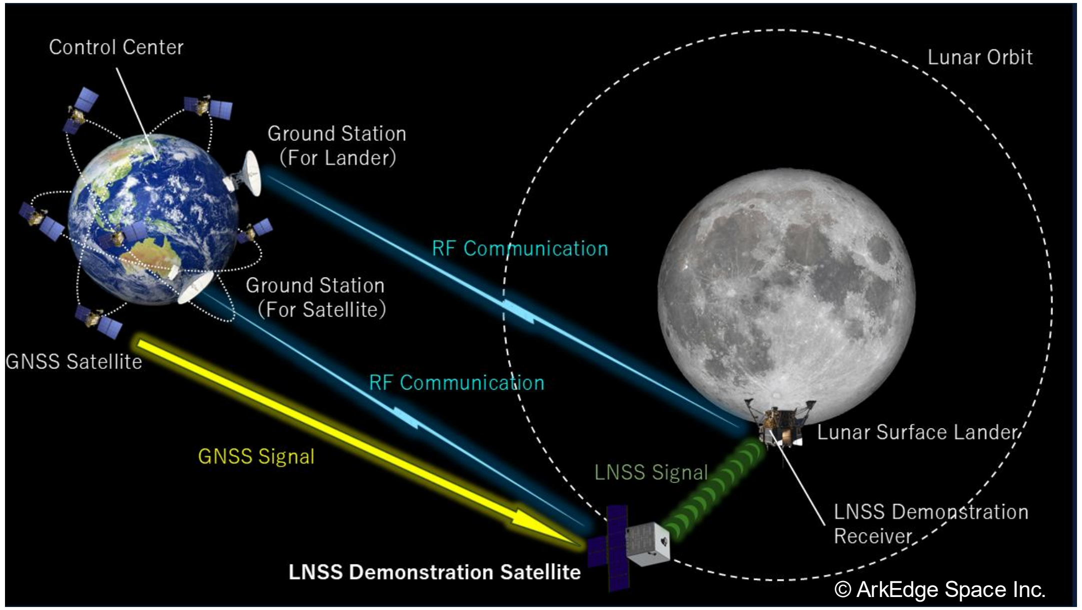
SPACE STRATEGY FUND

Implementing Organization (Bold: Lead organization / Regular: Partner)

ArkEdge Space Inc. (Lead Organization)
Mitsubishi Precision Co., Ltd., DST Digital Signal Technology, Inc., Chubu University
The University of Tokyo

Target Outcome (Impact)

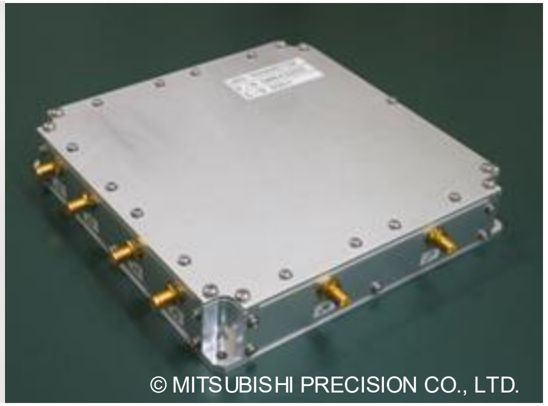
Development of a Navigation Payload and Demonstration Satellite
Toward Realizing Lunar Navigation Infrastructure for Future Lunar Activities
- As lunar missions accelerate under initiatives such as the Artemis program, human activity and economic expansion are extending to the Moon, enabling the emergence of a lunar industry ecosystem.
- Sustainable lunar operations require positioning infrastructure equivalent to GNSS on Earth. Standardization efforts are underway under the LunaNet framework led by NASA, ESA, and JAXA to ensure interoperability.
- This project advances the development of a LunaNet-compliant Lunar Navigation Satellite System (LNSS: Lunar Navigation Satellite System), strengthening Japan's presence in lunar exploration and infrastructure development.



Lunar Navigation Demonstration Mission Architecture

Technology Development (Outputs)

- Development of a navigation payload system capable of generating lunar positioning signals compliant with LunaNet standards.
- Development of an LNSS demonstration satellite to validate the navigation payload in lunar orbit.
- Evaluation framework for assessing mission results obtained through the LNSS lunar navigation demonstration mission.



Prototype Components of the Navigation Payload System
(Left: Time Keeping System, Right: LNSS Signal Transmitter)

Project Period (Planned) *

December 2024 – December 2028 (4 years)

Funding *subject to stage-gate evaluation

Commissioned Project

Media Contact

Public Relations: Takayuki Kawakatsu E-mail : ae-pr@arkedgespace.com

Development and Demonstration of a High Energy Density Regenerative Fuel Cell Systems

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Toyota Motor Corporation

Overview

Development and demonstration of a high energy density regenerative fuel cell (RFC) system

・Development of a high-pressure water electrolysis stack

Sealing and electrode retention technologies for high-pressure operation will be developed, enabling high-pressure storage of hydrogen and oxygen without the need for additional pressurization systems.

・Development of oxygen liquefaction and pressurization technologies

Liquefaction technologies for high-purity oxygen, as well as technologies for storing liquid oxygen and re-gasifying it for storage as high-pressure gas, will be developed.

・Development of hydrogen pressurization technologies

Hydrogen pressurization technologies using mechanical compressors and chemical pumps will be developed, while addressing contamination from sliding components and membrane durability under differential pressure.

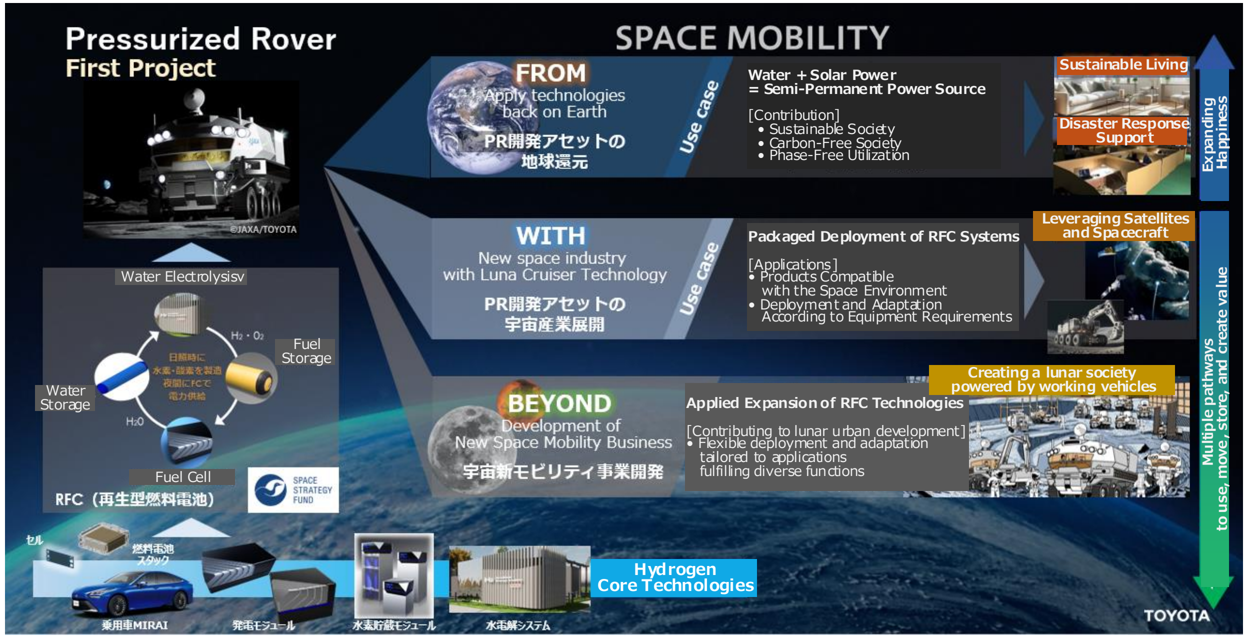
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

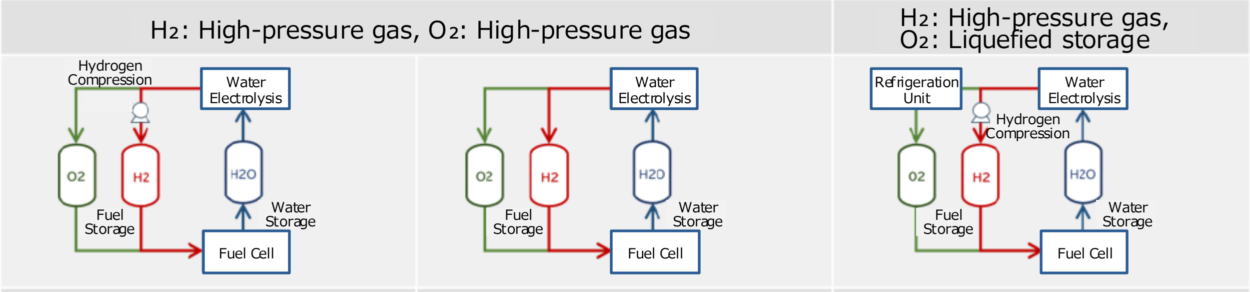
January 2025 to March 2028 (3 years)

Point of Contact for international communication

E-mail : lunarcruiser-ss@mega.tec.toyota.co.jp



Concept for Future Utilization of the RFC System



Example Configurations of the RFC System

Development of semipermanent generator composed of americium heater unit and thermoelectric conversion device

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

Japan Atomic Energy Agency (JAEA),
National Institute of Advanced Industrial Science and Technology (AIST)

Overview

"Am-RTG: Compact generator running over 100 years without maintenance for lunar surface and deep space exploration"

- ✓ Am-241 separated from plutonium as heat source (half-life 432y)
- ✓ By domestic resources and technologies
- ✓ Utilization on the earth (polar regions, sea bottom etc.) as well as in the outer space

Development items under this program

1) Fabrication of Am pellets and encapsulation by remote handling
2) Heater unit design (shielding, heat transfer, mechanical strength) and prototyping
3) Evaluation of risk during transportation
4) Development of thermoelectric conversion device suitable for Am-RHU (components, neutron-resistance)
5) Conceptual design of facility for achieving practical scale

➡ *Demonstration of assembling a prototype unit*

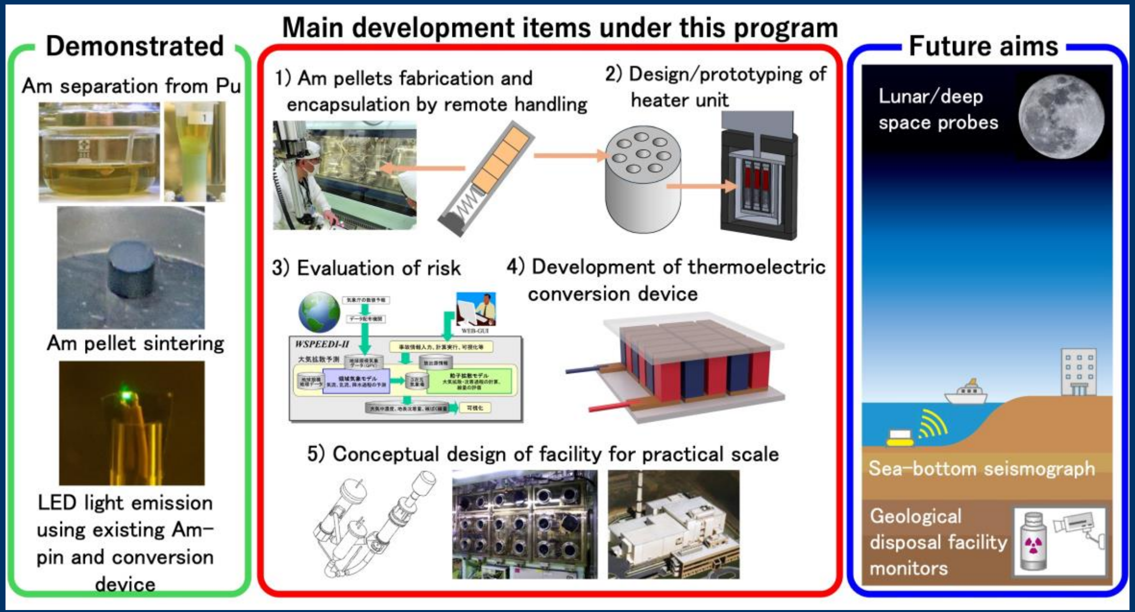
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

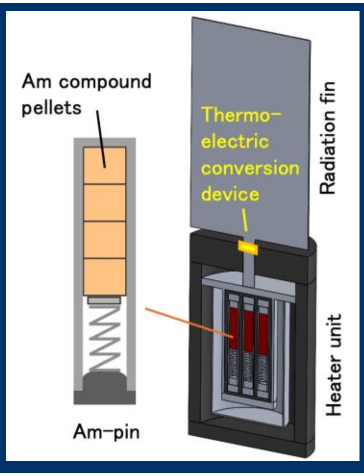
March 2025 to February 2029 (4 years)

Point of Contact for international communication

[Masahide TAKANO]　E-mail : takano.masahide@jaea.go.jp



Images for development items



- ■ Am source:
  Plutonium stocked in JAEA
- ■ Am loading amount:
  1.25 TBq (10g)/pin, max. 8 pins/unit (10 TBq)
- ■ Thermal and electrical output:
  8 W_{th}/unit and 0.5 W_e/unit by 10 TBq
- ■ Dimensions and weight:
  <20 cm both diameter and height, <4 kg

Schematic image and expected specification of Am semipermanent generator

Demonstration of deployable aeroshell technology for Earth atmospheric entry and its application to Mars landers

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

The Next-generation Space system Technology Research Association (NeSTRA)
Project Name : ***Mars Touch***

Overview

FEATHER (Flight demonstration into Earth's Atmosphere of inflatable aeroshell Technology for low-HEating Re-entry)

We will demonstrate the deceleration and thermal protection performance of a deployable aeroshell (approximately 20 kg, 3.0 m in diameter) through a re-entry flight from low Earth orbit.

(scheduled for early 2028)

FANG (Flexible and ANchoring EDL system for Martian Ground)

Building on the vehicle developed above, we will develop a low-cost, micro Mars lander (approximately 20-kg class) and its onboard instruments, and complete ground-based verification. (scheduled for late 2030)

Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

February 2025 to January 2031 (6 years)

Point of Contact for international communication

・E-mail : mt_b@nestra.space

Image of a re-entry demonstration from low Earth orbit (FEATHER)

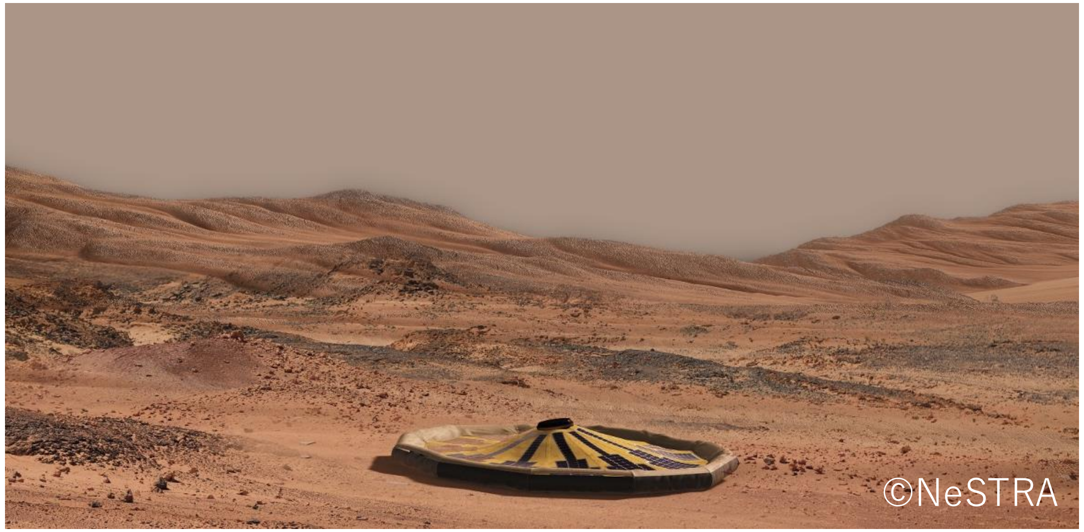


Image of a Mars landing (FANG)

NAOJ Space Innovation Center Initiative

SPACE STRATEGY FUND

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

National Astronomical Observatory of Japan(NAOJ), National Institutes of Natural Sciences, Inter-University Research Institute Corporation

Overview

From technology for observing space to technology for exploring space

- The NAOJ will establish a shared-use hub to support space companies including newly entering the space industry. Leveraging the technological expertise, personnel, and facilities cultivated through the development of ground-based and space telescopes—such as the Subaru Telescope, the ALMA Telescope, and the solar observation satellite Hinode—this hub will form a new cluster in the space.
- Astronomical observation technologies include those with high affinity for the space development sector. By applying these technologies to society, we contribute to strengthening Japan's international competitiveness, expanding new space markets, and solving global social challenges.

Implementation period (planned)

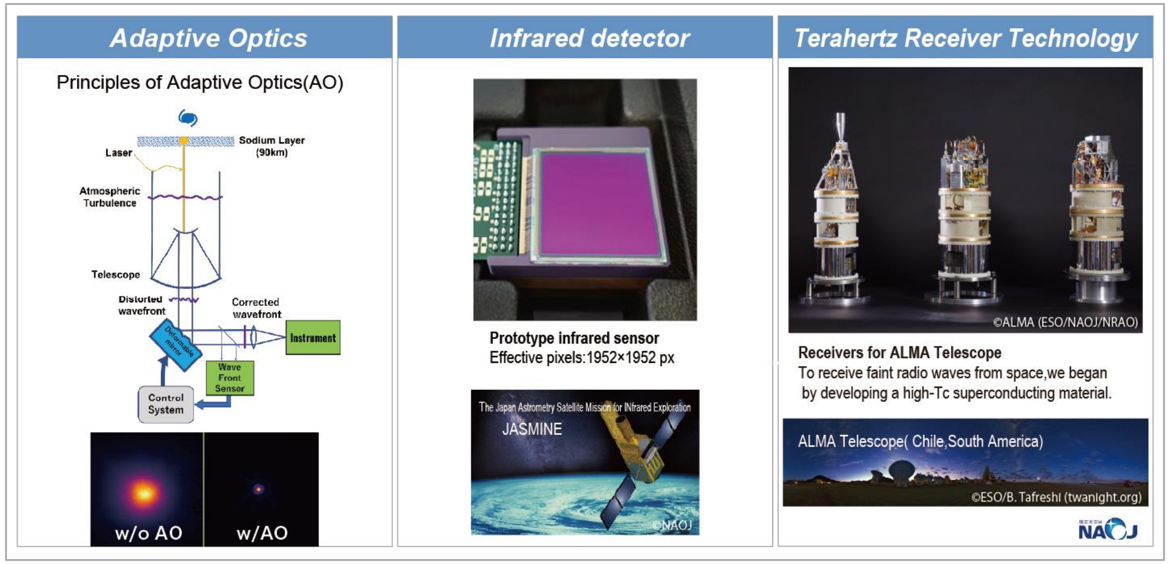
※Varies depending on stage gate evaluation, etc.

May 2025 to March 2033 (8 years)

Point of Contact for international communication

[Contact us] Please access this URL or QR code.
https://forms.office.com/r/RWqApf8wsk

Space Innovation Center Development Environment



Space observation technologies applicable to space development

Center for Space Resources and Innovation (CSRI) for Lunar Development

Implementing agency name

※Bold: Representative organization, Regular: Collaborative organization

The University of Tokyo, Keio University, Gakushuin University, Takasago Thermal Engineering Co., Ltd., Kurita Water Industries, Ltd., Yokogawa Electric Corporation, KEYCOM Corporation, Soil and Rock Engineering Co., Ltd., Tasuku Co., Ltd., Midtown Co., Ltd. (Supporting Partner: Sumitomo Metal Mining Co., Ltd.)

Overview

Development of space resources on asteroids and the Moon

- We will develop technologies for space resource utilization on asteroids and the Moon, contributing to Artemis and collaborating with firms such as Karman+.
- With partners such as the University of Adelaide, Colorado School of Mines, and the University of Arizona, UTokyo will establish the **Center for Space Resources and Innovation (CSRI)** as a global hub for new industries.
- By enrolling working professionals as doctoral students, we will foster talent linking academia and industry, building a new space industry ecosystem.

Key Technical Developments

1) **Integrated resource utilization modules will be developed**, spanning exploration through utilization and directly linked to global business.
2) **Our hub will provide lunar, asteroid, and satellite simulants** to attract non-space companies and broaden the industry base.
3) **We will train experts in system design and space law**, strengthening Japan's leadership in space resource strategy.

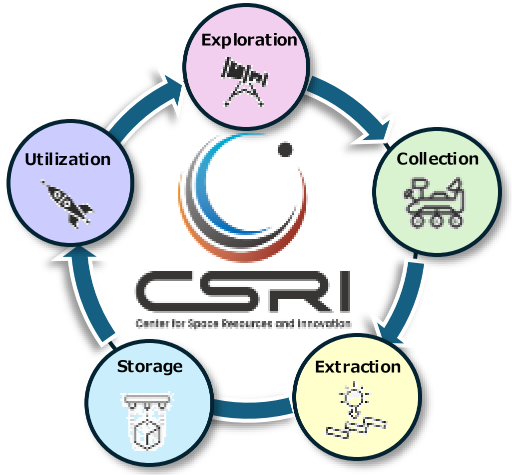
Implementation period (planned)

※Varies depending on stage gate evaluation, etc.

- May 2025 – Dec 2032 (7.5 years)

Point of Contact for international communication

- Prof. Hideaki Miyamoto – hm@sys.t.u-tokyo.ac.jp



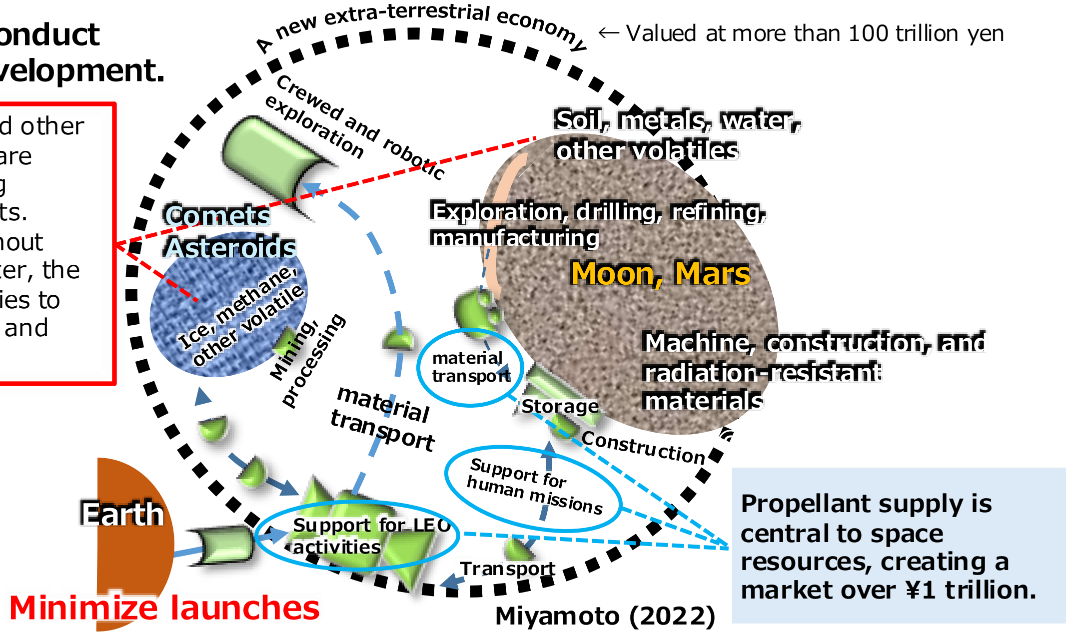
Continuous Development from Exploration to Utilization

Large-Scale Production of Simulants for the Moon, Mars, and Asteroids.

For details and inquiries, please contact us.

CSRI will conduct technology development.

- Water and other volatiles are promising propellants.
- Even without lunar water, the tech applies to asteroids and business.



Propellant supply is central to space resources, creating a market over ¥1 trillion.

Near-Future Applications of Extraterrestrial Resources and Technology Goals

SSF 1st Phase: SX Research and Development Site

Building a Hub for Space Instrumentation Development and Human Resource Cultivation to Industrialize Lunar Exploration and Utilization

SPACE STRATEGY FUND

Implementing agency name ※Bold: Representative organization, Regular: Collaborative organization

Ritsumeikan University, The University of Tokyo; Shimadzu Corporation; University of Aizu; Okayama University; Keio University; National Institute of Maritime, Port and Aviation Technology; and Yokohama National University

Overview

Developing technologies to reproduce lunar/Martian surface environments and cultivating human resources to support the space industry

- Contributing to Japan's leadership in lunar surface and subsurface exploration and equipment development for future Moon and Mars infrastructure.
- Establishing an "open and accessible" hub originating in Kansai that drives lunar exploration industrialization and fosters a diverse range of players.
- Strengthening space education and outreach, and providing one-stop support for developing space professionals to enhance Japan's global competitiveness.

Specifics of Technology Development (Output)

- Bringing together industry, academia, government, and local communities to **establish Japan's "Dusty Testing Facilities,"** integrating space development with geotechnical engineering and leveraging our proven space-equipment track record.
- **Developing surface and subsurface exploration technologies**—including a core sampler, a borehole probe, and a regolith TG-DTA—**for lunar surface development.**
- **Serving as a hub that promotes industrial clustering and human resource development** by providing research environments and development know-how to companies, universities, and engineers, including those in non-space sectors.

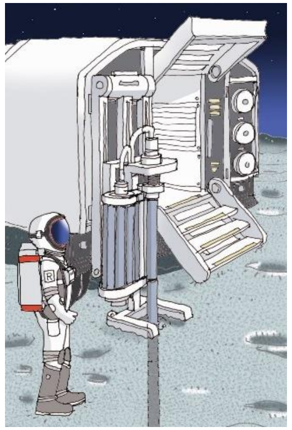
Implementation period (planned) ※Varies depending on stage gate evaluation, etc.

- From April 2025 to March 2032 (for seven years)

Point of Contact for international communication

Office of Public Relations r-koho@st.ritsumei.ac.jp

Realized through the integration of space development and geotechnical engineering, leveraging our proven track record in space-equipment development.

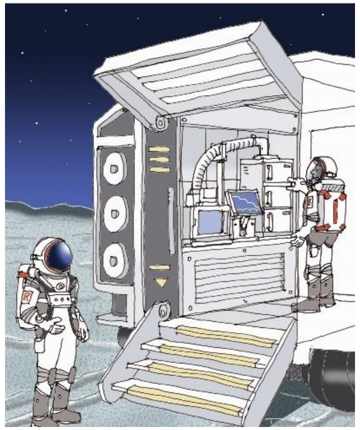


01 Core Sampler

Space coring technology capable of excavating to depths of approx. 10 meters and fully automatically acquiring core samples.

02 Borehole Probe

Technologies to:
(i) characterizing regolith properties in the vertical direction, and
(ii) obtaining broader geological and geotechnical information, while observing borehole wall surfaces.



03 Regolith TG-DTA

A technology for identifying volatile species in samples and measuring their abundances, used for evaluating water resources contained in regolith.

Developing a Unique Shared Facility Tailored to the Lunar Surface Environment.

04 Development of Lunar/Martian Surface Dusty Environment Reproduction Technology

Dusty Testing Chamber

Enabling
- Thermal–vacuum testing in dusty environments
- Terramechanics testing in dusty environments
- Dust-mitigation testing for electrostatically lofted dust
- Testing for Mars surface deployment

Regolith Analysis Laboratory
- Geotechnical Testing Equipment Suite
- Chemical Analysis Equipment Suite

Simulated Lunar Environment Field
- Highly realistic regolith simulant
- Three types of indoor and outdoor experimental demonstration fields replicating lunar environmental conditions (topography, soil mechanics, etc.)

Comprehensive Virtual Lunar-Surface Simulation Platform
- Simulators for terrain, sunlight, temperature, radiation, and geological environments
- Lunar terramechanics simulator
- Integrated environmental/terramechanics simulator