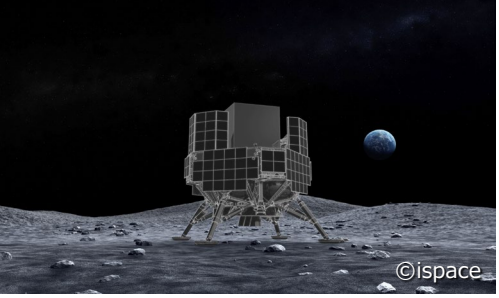


SBIR
Demonstration Project Compendium

The technologies of Japanese startups will change the future!

Cabinet Office

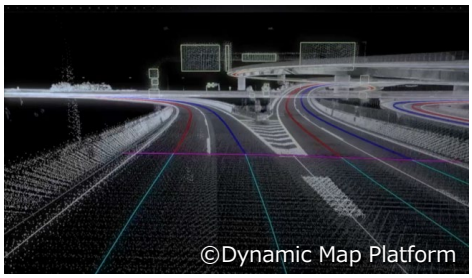
Ministry of Education, Culture, Sports, Science and Technology

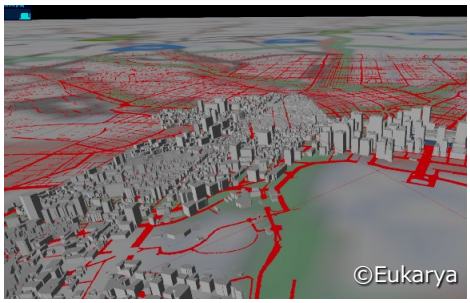
Ministry of Health, Labour and Welfare

Ministry of Agriculture, Forestry and Fisheries

Ministry of Economy, Trade and Industry

Ministry of Land, Infrastructure, Transport and Tourism





Second edition (March 2025)

Small/Startup Business Innovation Research

The SBIR Program is designed to encourage innovation creation in Japan through promoting R&D of startups and other small businesses and facilitating the implementation of their products in society. This material introduces projects engaged in large-scale technology development and demonstration in Phase 3 of the SBIR Program.

Table of Contents

The forward-looking statements included in this material are based on estimates and expectations at the time this material was made, and actual results may differ materially from the forward-looking statements herein.

Ministry of Education, Culture, Sports, Science and Technology

Solicitation Topics

- Development and Demonstration of Private Rockets
- Development and Demonstration of Technologies Needed for Reducing Space Debris
- Demonstration of Nuclear Fusion Technologies for Prototype Fusion Reactors, Etc.
- Demonstration of Earthquake and Disaster Risk Reduction Technologies That Address Administrative Needs for Disaster Response, Etc.

Technology Development and Flight Demonstration of the Orbital Class Launch Vehicle ZERO

Interstellar Technologies Inc.

Large-scale technology demonstration (TRL 5, first half): October 2023–September 2024

Overview of Large-Scale Technology Demonstration

- This project involves technology development and flight demonstration of small rockets to provide internationally competitive space transportation services to satellite operators worldwide in the rapidly expanding small satellite launch market, while also contributing to expanding Japan's means of accessing space.
- Building on the knowledge gained from achieving Japan's first privately-led suborbital launch vehicle to reach outer space, Interstellar Technologies will develop a new liquid methane-fueled rocket engine to realize space transportation services that balance reliability and cost competitiveness.

[Demonstration site] Taiki, Hokkaido

[Technology's features and sophistication level]

- New development of an advanced engine using liquid methane as fuel
- A low-cost, high-launch-frequency rocket made possible by a private company

⇒Ultimately, will develop a space transportation rocket with high launch frequency, rapid responsiveness, and low costs

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Establish a position in the global space transportation services market (projected to reach 325 billion yen in 2030) with up to 40 launches per year
- Contribute to strengthening the competitiveness of Japan's space industry and regional revitalization, leading to ripple effects for the domestic manufacturing industry

Development Schedule and Targets for Social Implementation

[Development targets]
- Low cost and high launch frequency/responsiveness
- Achieve capability to launch up to 800 kg to a low Earth orbit[1]

(1. Low Earth orbit (LEO): An Earth orbit classified by altitude)

- Subscale tests of each component (e.g., engine combustion tests), etc. — 2024:TRL5 and above
- Full-scale tests of each component, etc. — 2026:TRL6 and above
- Stage testing
- Testing of the entire rocket
- Manufacturing of prototype models and flight models
- Demonstration launch — 2027:TRL7 and above

Demonstration completed — End of March 2028

Developer's Message (Future Vision)

- Interstellar Technologies believes that private-sector rocket development is essential to strengthening Japan's international competitiveness in space transportation. In particular, we are confident that the new endeavors enabled by our private-sector rocket development (cost reduction, involvement of new suppliers, use of commercial components, etc.) can significantly enhance the competitiveness of Japan's entire space industry. The entire team at Interstellar Technologies is working as one on the development of ZERO with the goal of making space accessible to everyone in the future.

VP of launch vehicle, Satoshi Nakayama (upper right)

<Company Details>
- Company Website: https://www.istellartech.com/en
- Head Office: 149-7 Memu, Taiki-cho, Hiroo-gun, Hokkaido
- Contact: https://www.istellartech.com/contact

Commercial Small Satellite Launch Business via Suborbital Spaceplanes

SPACE WALKER, Inc.

Large-scale technology demonstration (TRL 5, first half): October 2023–September 2024

Overview of Large-Scale Technology Demonstration

▼Advanced features with a view to social implementation

Point 1	All-Japan industry, government, and academia collaboration	**Open innovation system**
Point 2	Reusable vehicle, reduce sea disposal, reduce to one-way fuel	**Sustainable space development**
Point 3	Clean fuel and reusable vehicle	**ECO ROCKET®**

▼Innovative technology features

Point 1	Air launch of small satellites into orbit	**Winged reusable rockets**
Point 2	World's first ultra-low-temperature liquid propellant composite material tank	**Lighter and smaller**
Point 3	Enabled by navigation, guidance, and control systems	**Flying via autopilot**

Small satellite launcher (RaiJin)

[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

- 2024: TRL 5 and above — • System definition • Basic design
- 2026: TRL 6 and above — • Detailed design
- 2027: TRL 7 and above — • Flight demonstration

Demonstration completed

End of March 2028

600km / LEO*1, SSO*2
310kg / Small satellite
50 launches / Year
Under 500 million yen / Launch

Commercial operations are planned to take place at Hokkaido Spaceport in Taiki, Hokkaido.

Developer's Message (Future Vision)

CEO Akihide Manabe

There is no doubt that the space transportation industry holds the key to Japan's future. With our mission, "Space travel is no longer a dream.", we are pushing technology boundaries to make future space travel as accessible as air travel today. We seek to create valuable technology for the future of humankind to power the future of the space economy and foster a society where space is for everyone.

CTO Koichi Yonemoto

Our suborbital spaceplanes have their origin in the winged vehicle HIMES*3 proposed in the 1980s by the late Dr. Makoto Nagatomo of the Institute of Space and Astronautical Science at the Ministry of Education, Science, Sports and Culture.
At this critical turning point in Japan's space transportation industry, we will accelerate our development work as a united team collaborating with industry, government, and academia.

*1. LEO: Acronym for low Earth orbit, which refers to an orbit up to 2,000 km in altitude. *2. SSO is the acronym for sun-synchronous orbit.
*3. HIMES was an experimental winged vehicle (fully reusable suborbital flight) developed by the Ministry of Education, Science, Sports and Culture's Institute of Space and Astronautical Science (now the Japan Aerospace Exploration Agency's Institute of Space and Astronautical Science) with the aim of achieving a single-stage-to-orbit vehicle.

<Company Details>
■ Company Website: https://space-walker.co.jp/en/
■ Head Office: 3rd Floor, 3-16-12 Shimbashi, Minato-ku, Tokyo (Shimbashi office)
■ Contact: pr@space-walker.co.jp

Development and Demonstration of a Reusable Space Transportation System for Small Satellite Launches

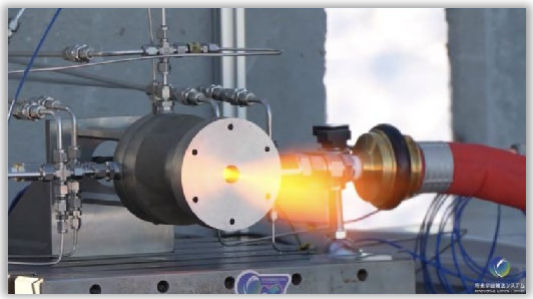
Innovative Space Carrier Inc.

Large-scale technology demonstration (TRL 5, first half): October 2023–September 2024

Overview of Large-Scale Technology Demonstration

- Innovative Space Carrier will develop a reusable space transportation system for launching satellites by building a collaborative system with business partners as a means to establish a globally competitive space transportation business in order to achieve its vision of "A world where people and cargo are delivered every day. We want to make such a world a reality in space."
- The company will develop a rocket to launch satellites in the 100 kg range, designed to be reusable and have upgradeable systems. In collaboration with partner companies, it will also address essential business considerations such as improving maintainability for reusable operations and examining insurance matters.
- After demonstration flights are conducted and the grant-supported project comes to an end, the company will work on overcoming challenges necessary for commercialization and accelerate social implementation.

[Combustion test] Taiki, Hokkaido

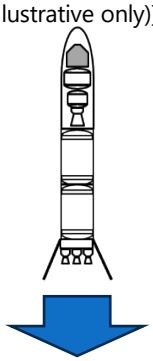


[Technology's features and sophistication level]

- Realization of agile development through the development platform P4SD (Platform for Space Development)
- Realization of upearly implementation and incremental grades in collaboration with co-creation partners

⇒Ultimately, will develop a reusable rocket for small satellite launches

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Aim to acquire a 14% share (50 billion yen) of Japan and the rest of Asia's small satellite launch market (projected to reach 350 billion yen in 2034)
- Enable development toward a manned space transportation system by raising demonstration reliability through reusable operations

Development Schedule and Targets for Social Implementation

[Development targets]
- 100 kg transport capacity
- Reuse of the first-stage booster more than 20 times
- Commercial-stage target cost of 500 million yen
- Incremental upgrade functionality

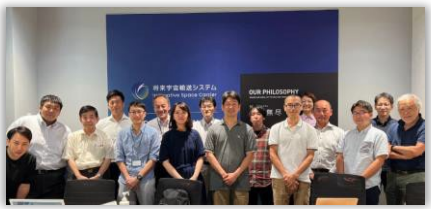
2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• System design • Front-loading considerations • Development of small test prototypes	• Detailed design • Front-loading considerations • Suborbital vehicle development	• Manufacture and testing of demonstration prototypes • Verification of orbital deployment capability • Examination of reusable operation

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Japan has been leading the world in research on reusable rockets, but it has not yet achieved a commercial space transportation service that is globally competitive. With an eye on the manned space transportation market, which is expected to expand in the future, Innovative Space Carrier aims for the early realization of satellite launch services using reusable rockets in collaboration with our co-creation partners.



Innovative Space Carrier Inc. CEO Kojiro Hatada (ninth from left)

<Company Details>
■ Company Website: https://innovative-space-carrier.co.jp/
■ Head Office: 5th Floor, Nihonbashi 1-chome Mitsui Building,1-4-1 Nihonbashi, Chuo-ku, Tokyo
■ Contact: info@innovative-space-carrier.co.jp

Development, Launch Demonstration, and Commercialization of Enhanced Rockets

SPACE ONE CO., LTD.

Large-scale technology demonstration (TRL 5, first half): October 2023–September 2024

Overview of Large-Scale Technology Demonstration

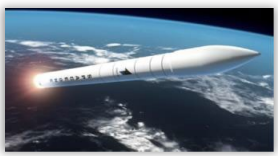
- By replacing the third stage of its current KAIROS rocket with a liquid stage using a methane engine, SPACE ONE will develop an enhanced KAIROS rocket with increased launch capabilities and aim for its swift service introduction.
- The company will conduct flight demonstrations for its Enhanced KAIROS rocket by improving the guidance and control system, which is necessary for the service introduction, manufacturing rocket airframes, preparing launch site facilities, and conducting other tasks needed for the flight demonstrations.

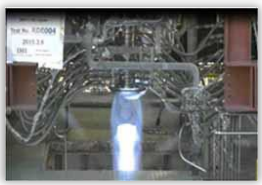
[Demonstration site]
Kushimoto and Nachikatsuura, Wakayama

[Technology's features and sophistication level]

- Introduce a competitive rocket to the market, utilizing research results of the highest global standards (specific impulse)
- Develop rockets with high usability by leveraging the rapid response and other advantages of the current KAIROS rockets and the company's dedicated launch site

[Outcome (illustrative only)]





(Source) Materials from the 50th Space Industry and Science and Technology Infrastructure Subcommittee on November 5, 2019

Development Schedule and Targets for Social Implementation

[Development targets]

- System design
- Launch facility preparation
- Guidance and control system improvement
- Test prototype manufacturing and launch

• Preliminary design review (PDR) equivalent	• Critical design review (CDR) equivalent	• Flight demonstration
2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- After completing the demonstration, the aim is to achieve an annual average of five launches over five years, targeting cumulative sales exceeding eight times the SBIR investment
- Contribute to the expansion of satellite data utilization businesses through provision of low-cost and highly flexible services

Developer's Message (Future Vision)

- The use of small satellites is growing worldwide, with new services built around satellite technology driving significant market expansion. User-friendly satellite launch services, however, remain scarce, creating promising business opportunities.
- Our KAIROS rocket aims to be a "Space Express Service" that transports small satellites into space. By adding an enhanced model to our lineup, we aim to further expand our satellite launch services.

Executive Vice President Sekino

<Company Details>
- Company Website: https://www.space-one.co.jp/
- Head Office: 6th Floor, Landmark Shiba-Koen, 1-2-6 Shiba-Koen, Minato-ku, Tokyo
- Contact: info@space-one.co.jp

On-Orbit SSA Mission with Rendezvous and Proximity Operations for 2 Large Satellite Debris Objects

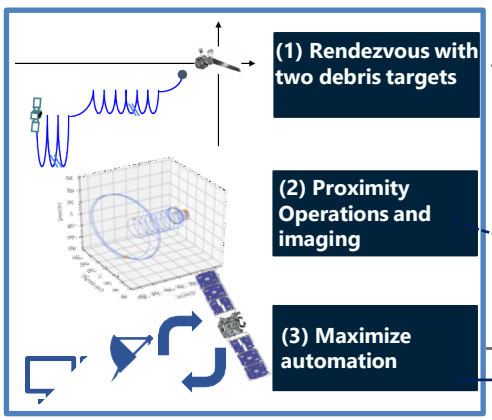
Astroscale Japan Inc.

Large-scale technology demonstration (TRL 5)/Phase 1: October 2023–December 2024

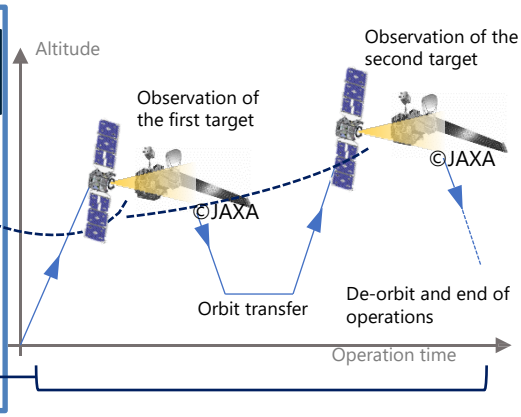
Overview of Large-Scale Technology Demonstration

- Astroscale will develop a servicer satellite to perform missions involving Rendezvous and Proximity Operations (RPO) as well as imaging, inspection, and diagnosis, for a future debris removal service targeting large satellite debris, which is expected to have a significant impact on improving the space environment.
- For the commercialization, Astroscale will develop the servicer satellite bus which is capable of adding electric propulsion and capture mechanism for safer and more reliable RPO for debris removal and other on-orbit services.
- In this demonstration, Astroscale will conduct RPO, imaging, inspection, and diagnosis missions towards two large debris targets.

[Core technology] To be developed in Sumida



[Outcome (illustrative only)]



[Technology's features and sophistication level]

Conducting safe and reliable RPO and missions to satellite debris is challenging due to limited prior information on the shape, attitude, and surface characteristics of the debris before a launch of our servicer satellite

Development of safe and reliable RPO technology for large satellite debris

Efficient and automated rendezvous with two target debris objects using electric propulsion for fuel efficiency

Development Schedule and Targets for Social Implementation

[Development targets/ new development]

1. Conduct mission and system design for RPO to two satellite debris objects in a relatively high-altitude low Earth orbit (LEO)
2. Computer vision and navigation guidance control technologies tailored to limited satellite debris information
3. Long-term orbital transfer operations using electric propulsion and maximizing automation operation

- Basic design
- Payload (navigation sensors)
- BreadBoard Model / Engineering Model

2024:TRL5 and above

- Detailed design
- Flight Model manufacturing
- Ground Testing
- Operational Preparation, etc.

2026:TRL6 and above

- Satellite launch
- On-orbit Demonstration
- Data Acquisition and Analysis, etc.

2027:TRL7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- After developing RPO technology for satellites, Astroscale aims to obtain satellite debris removal technology for stable provision of on-orbit services, including debris removal service
- Astroscale aims to obtain over a 10% share of the global on-orbit service market (accumulated market size from 2020 to 2030: 1.6 trillion yen)

Project members
(Photo: Development of the ELSA-d satellite)

Developer's Message (Future Vision)

- Astroscale aims to be a leader in the on-orbit services market, including debris removal services. The technologies to be acquired through this demonstration contain a variety of critical elements for achieving that, and we are all united in working toward success.

<Company Details>
- Company Website: https://astroscale.com/
- Head Office: Hulic Kinshicho Collabo Tree, 4-17-1 Kinshi, Sumida-ku, Tokyo
- Contact: https://astroscale.com/contact/

J-Startup J-Startup Impact

Development and Demonstration of Miniaturized Water Ion Thrusters and Water Hall-Effect Thrusters for Deorbit Maneuvers and Collision Avoidance in Satellites

Pale Blue Inc.

Large-scale technology demonstration (TRL 5):
October 2023–September 2025

Overview of Large-Scale Technology Demonstration

- Pale Blue will lead the development and demonstration of propulsion systems that can effectively perform both deorbit and collision avoidance maneuvers for satellites using a single device. The company aims to reduce space debris by deploying these systems across a wide array of satellites.
- Given the variety of satellite sizes (ranging from 10 to 500 kg) under consideration by various operators, Pale Blue will develop its "Miniaturized Water Ion Thruster," designed for 10+ kg-class satellites, and its "Water Hall-Effect Thruster," intended for use on 500 kg-class small satellites to deliver high performance. Both systems will undergo space-based operational demonstrations.

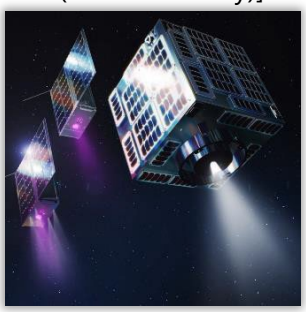
[Site of development] Kashiwa, Chiba

[Technology's features and sophistication level]

- Use of water as a propellant to improve cost efficiency, availability, and safety

⇒Pale Blue aims to develop an ion thruster for 10+ kg-class small satellites, and a Hall-effect thruster for high-performance propulsion on 500 kg-class small satellites, with both systems utilizing water as the propellant. These thrusters will be demonstrated in space to validate their performance and functionality.

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• System basic design • Completion of ground testing	• System detailed design • Completion of ground testing	• Launch • On-orbit demonstration

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Given the significant differences between the space environment and ground conditions, the track record of successful deliveries and flight heritage are crucial factors when satellites adopt propulsion systems.
- Building on the results of the in-orbit demonstrations conducted in this project, the goal is to rapidly bring these products to market, expand the company's share of the propulsion system market for satellites under 500 kg, and contribute to space debris mitigation through their implementation in small satellites.

Developer's Message (Future Vision)

- Pale Blue will contribute to space debris mitigation through the agile development of miniaturized water ion thrusters and water Hall-effect thrusters. This program will facilitate the rapid market entry of these products following in-orbit demonstrations and enable quick adoption by satellite constellation operators. We are confident that this will help realize our vision of creating mobility that is core to the space industry.

Pale Blue Inc.
Co-Founder & CEO
Jun Asakawa

<Company Details>
- Company Website: https://pale-blue.co.jp/
- Head Office: MITSUI LINK-Lab KASHIWANOHA 1 Room 101, 6-6-2 Kashiwanoha, Kashiwa-shi, Chiba
- Contact: https://pale-blue.co.jp/contact/

Development and Demonstration of a Device That Expedites Orbit Departure to Prevent the Creation of Debris from Satellites, Etc.

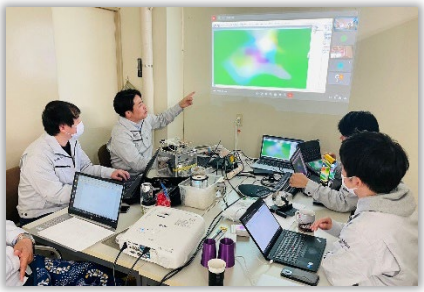
BULL Co., Ltd.

Large-scale technology demonstration (TRL 5): October 2023–June 2025

Overview of Large-Scale Technology Demonstration

- BULL will work on the development and demonstration of a Post-Mission Disposal (PMD) device designed to promote autonomous disposal. When the PMD device is pre-installed on spacecraft before launch, it deploys a flexible structure after the spacecraft's operational life ends. This structure primarily uses atmospheric drag as a braking force to slow down the spacecraft.
- As a result, the spacecraft's orbital lifetime is significantly shortened, which can prevent the creation of space debris in the future. Through this project, the goal is to first establish a position in the PMD device market for rockets, and to be recognized as the de facto standard model for preventing creation of debris.

[Site of development]
Utsunomiya, Tochigi

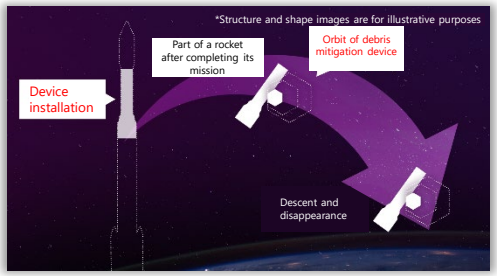


[Technology's features and sophistication level]

- Enables lightweight and early orbit departure while ensuring safety and reliability
- Realizes a simple, low-cost device that minimizes the burden on spacecraft

⇒Ultimately, will enable orbital departure for rocket upper stages of several hundred kilograms within a few years

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Aim to acquire sufficient market share as the de facto standard through device installation by Japanese, European, and U.S. operators in the global space debris and on-orbit service-related industries
- Through implementation of this PMD device, mitigate future space debris generation and contribute to strengthening the growth potential of the space industry

Development Schedule and Targets for Social Implementation

[Development targets]

- Ensure the orbital lifetime of rocket upper stages is within assumed international standards (5 years, etc.)
- Provide a simple product form that can be installed regardless of rocket interfaces

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Development environment setup • Coordination with spacecraft operators • Engineering model development	• Flight model development • Preparation for on-orbit demonstration	• On-orbit demonstration • Mass production model development

Demonstration completed: **End of March 2028**

Developer's Message (Future Vision)

- BULL will advance the development of devices to ensure future spacecraft do not become space debris, creating a new modern "norm" akin to airbags in the automotive industry.
- Involving local operators, we will position Utsunomiya, Tochigi as a space industry cluster and establish a framework for the stable supply of affordable, simple products.

BULL Co., Ltd. CEO Uto
(second from right in back row)

<Company Details>
■ Company Website: https://bull-space.com/
■ Head Office: 3rd Floor, Tochigi Prefecture Industrial Center, 3-1-4 Chuo, Utsunomiya-shi, Tochigi
■ Contact: info@bull-space.com

Demonstration of Low-Temperature Refining Technology for Beryllium

MiRESSO Co., Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- MiRESSO will conduct a large-scale technology demonstration of a new refining technology with reduced energy consumption and CO_2 emissions that achieves low temperatures below 300°C compared to the conventional high-temperature process of 2,000°C.
- With its combination of alkaline fusion technology and microwave heating, the new technology enables low-temperature refining and recycling of beryllium and many other mineral resources that are essential for fusion energy.

[Demonstration site]Hachinohe, Aomori

[Technology's features and sophistication level]

- New low-temperature refining technology combining alkaline fusion technology with microwave heating
- Reduction of the temperature of high-heat manufacturing processes through new technology

⇒Ultimately, achieve lower temperatures in conventional high-heat manufacturing and recycling processes, contributing to reduction of energy consumption and CO_2 emissions

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]
- Demonstration of refining via fusion with a bench-scale test machine
- Process demonstrations for each element using a pilot-scale test machine
- Demonstration of chain of processes using a pilot-scale test machine

Bench-scale	Pilot-scale	Pilot-scale demonstration	Demonstration completed
◆ Bench-scale improvement testing • Solubility • Impurity removal rate • Recovery rate	◆ Pilot-scale improvement testing • Solubility • Impurity removal rate • Recovery rate	◆ Pilot-scale demonstration • Comprehensive process demonstration • Improved product recovery rate	
2024: TRL 5 and above	2025: TRL 6 and above	2027: TRL 7 and above	End of March 2028

[Post-social implementation immediate targets]

- Aim for 25% global beryllium market share by achieving annual output of 100 tons through establishment of mass production plants by around 2030, given that the current global production of beryllium is 300 tons per year
- Contribute to the social implementation of fusion energy through stable provision of beryllium

Developer's Message (Future Vision)

- MiRESSO will contribute to the realization of fusion energy by achieving stable and appropriately-priced supply of beryllium, for which there is currently a bottleneck due to limited production and high prices.
- Given the high versatility of our technology, its demonstration and subsequent social implementation, starting with beryllium, will also contribute to CO_2 reduction in high-heat manufacturing and recycling processes in Japan's manufacturing sector, which has high CO_2 emissions.

MiRESSO Co., Ltd. CEO Nakamichi (center)

<Company Details>
- Company Website: https://miresso.co.jp
- Head Office: 59-383 Shimokubo, Misawa, Misawa-shi, Aomori
- Contact: info@miresso.co.jp

Development of High-Temperature Superconductor for Fusion Energy

Helical Fusion Co., Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Pioneering next-generation superconductors for fusion energy, MRI systems, and more. By utilizing high-temperature superconducting (HTS) wires, the company is advancing conductor development to achieve high current densities and complex three-dimensional designs.
- These breakthroughs will enable stronger magnetic fields and more compact systems, surpassing conventional materials and accelerating the practical realization of fusion energy.

[Demonstration site]
National Institute for Fusion Science (Gifu, Japan)

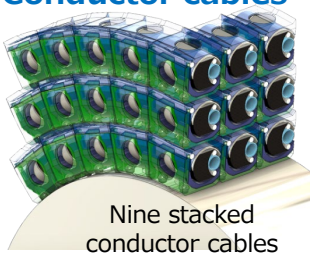
[Technology's features and sophistication level]

- High current density, enabling compact system designs
- Flexible for non-planar shapes, supporting diverse applications

⇒Developing superconductors tailored for fusion machines and versatile industry use

[Outcome (illustrative only)]

Conductor cables



Nine stacked conductor cables

[Post-social implementation immediate targets]

- Target application to the world's first steady-state fusion device
- Aim for 40% share in the global fusion market, projected to reach several billion$ by 2040

Development Schedule and Targets for Social Implementation

[Development targets]
- High current density
- Withstand strong electromagnetic forces
- Ensure 3D structural integrity
- Prevent quench

High current demonstration
- Demonstrate the cable operational with 40kA at 8T magnetic fields

2024: TRL 5 and above

Large-scale complexity demonstration
- Demonstrate the ability to form 3D twisted shapes while showcasing its cooling efficiency and quench prevention capabilities

2026: TRL 6 and above

Large-scale high current demonstration
- High-current demonstration under steady-state and repetitive operation conditions

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- To realize fusion energy, compact HTS conductors capable of generating strong magnetic fields are essential. Equally important is their adaptability to non-planar shapes for broader industrial applications.
- As a leader in the global development race, our project is dedicated to advancing demonstrations and fast-tracking the practical use of HTS conductors.

Helical Fusion founding members

<Company Details>
- Company Website: https://www.helicalfusion.com/
- Head Office: 6th Floor, N&E Building, 1-12-4 Ginza, Chuo-ku, Tokyo
- Contact: contact@helicalfusion.com

Innovative LiSMIC Unit for Extracting Lithium Scattered Around the World

LiSTie Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Through early social demonstration of the world's first ultra-high-purity lithium extraction technology (Li Separation Method by Ionic Conductor (LiSMIC)), LiSTie will help solve energy issues by recycling and circulating lithium resources needed for EVs.
- LiSTie will develop a container-type LiSMIC unit equipped with multiple lithium separation membranes (ionic conductors), and thereby help to resolve global social challenges.

[Demonstration site]
Kashiwa-no-ha, Chiba

Establish a set of equipment to acquire the data necessary for the design and manufacture of the LiSMIC unit.

[Technology's features and sophistication level]

- A device capable of extracting only lithium in a single pass

- Broad applications such as industrial wastewater, battery recycling, salt lakes, ores, seawater, etc.

⇒ Ultimately, develop the world's first container-type lithium extraction device with high purity and low cost

[Outcome (illustrative only)]

Container-type LiSMIC unit

Development Schedule and Targets for Social Implementation

[Development targets]

- Complete stack with layered membranes
- Complete container-sized unit
- Achieve bench-scale demonstration
- Conduct demonstration with process cost of 3 USD/kg

(Stack development)	(Unit development)	(Establish first unit specifications)
• Establish stack structure • Increase size of membranes • Obtain engineering data	• Establish unit structure • Bench-scale demonstration • Verify material balance	• Pre-implementation in industrial wastewater • Establish operational and maintenance conditions • Improve extraction performance
2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Aim to reach the lithium production market, which accounts for a 10% share of the global lithium market (about 2 trillion yen in 2020), with sales of 12 billion yen and operating profit of 500 million yen in 2032
- In the future, extract lithium from seawater, which contains an almost inexhaustible supply, and contribute to the spread of EVs and the realization of fusion reactors

Developer's Message (Future Vision)

- As demand for lithium rapidly increases, LiSTie's highly-efficient lithium extraction technology is gaining attention as a globally in-demand technology.
- Lithium is not only essential for EV batteries but also for producing fuel for fusion reactors hoped to generate next-generation energy. Our goal is to create a future where children can live peacefully without concerns about energy shortages.

In September 2024, a development base was set up in Kashiwa-no-ha, Chiba. With about 10 employees and many supporters, the LiSMIC unit development is progressing.

<Company Details>
- Company Website: https://listie.co.jp/
- Head Office: 1302-8 Nozuki, Obuchi, Rokkasho-mura, Kamikita-gun, Aomori
- Contact: info@listie.co.jp

Innovative Blanket System Development Project for Fusion Power Plants

Kyoto Fusioneering Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Kyoto Fusioneering will conduct functionality demonstrations in practical environments of SiC composite material modules, which are central to the fusion blanket system, and develop a liquid blanket system combining SiC composite materials and liquid metal LiPb. The company will also verify engineering feasibility and acquire fundamental data necessary for fusion plant design.
- The company will gradually scale engineering modules and develop manufacturing methods with promise for future mass production.

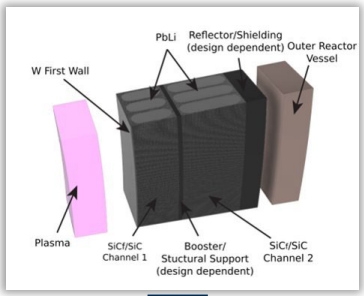
[Demonstration site]
Kyoto Research Centre (KRC), Kumiyama, Kyoto

[Technology's features and sophistication level]

- Development of a liquid blanket with high efficiency
- Production of low-activation, heat-resistant, high-strength ceramic composite materials using engineering production method from a lab-based environment

⇒ Ultimately, develop a 900°C liquid blanket system

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Aim to take a share of the target system market (300 billion yen in the late 2030s) within the global market for fusion experimental plants and DEMO plants
- This development is expected to result in orders placed through our company to domestic companies, with an estimated market impact reaching several hundred billion yen

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop liquid blanket system
- Build supply chain

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Reproduce testing going from a lab-based environment to other development environments • Conduct flow testing under high-temperature liquid metal environments	• Conduct liquid metal flow testing of SiC composite material specimens under magnetic field environments	• Demonstrate production potential for SiC composite material blankets at near full-scale level

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- To make usable energy from fusion, humanity's dream technology, Kyoto Fusioneering will create "ceramic composite material technology," a dream technology that balances various outstanding properties, through the "high-temperature liquid blanket integrated demonstration system," which pools Japan's technologies.
- Through this, we will contribute to addressing climate change challenges through the realization of fusion energy, helping expand Japanese technology globally, and achieving business success.

CEO Konishi (last on right in right photo)
Team Leader Ogawa (last on left in left photo)

<Company Details>
- Company Website: https://kyotofusioneering.com/
- Head Office: Distribution A Building, AW1-S, Tokyo Ryutsu Center, 6-1-1 Heiwajima, Ota-ku, Tokyo
- Contact: media@kyotofusioneering.com

Project to Build Disaster Risk Reduction Systems Using Advanced Digital Technologies to Meet Local Government Needs

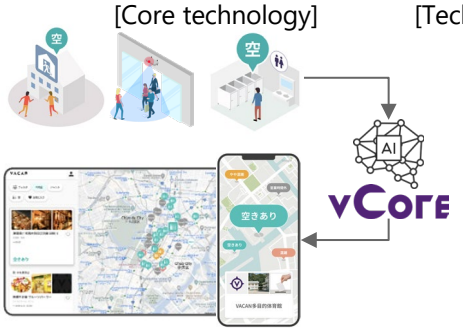
Vacan, Inc.

Large-scale technology demonstration:
December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- Vacan will conduct a demonstration aimed at ensuring that necessary support reaches people and places in need through reduction of the burden on local government staff and operators by digitizing evacuation center operations, and tracking and visualizing the locations and conditions of disaster victims.

[Core technology]



Consolidate evacuation center check-in function, name roster and supplies management functions, and various supplies and lifeline-related information into our "vCore" integrated proprietary platform, and output through appropriate interfaces tailored to both administrators and residents

[Technology's features and sophistication level]

- Evacuation center check-in system utilizing My Number, supplies management system, electronic bulletin board system for evacuation center operators, and public facility reservation system
- Map-based interface enabling residents to confirm real-time updates on the locations and availability of evacuation centers, as well as lifeline-related information

⇒Ultimately, develop products that can be utilized in both normal times and emergencies, and build a framework where both local governments and residents can use familiar services during disasters, which streamlines operations and enables swift evacuation actions and support for living during evacuations

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Aim to acquire 7.9% (48.3 billion yen) share of the digital transformation (DX)-related solution service market for public demand and social infrastructure, with a total market size of 614.5 billion yen
- Through the social implementation of these systems, establish a framework for managing name rosters and supplies in evacuation centers based on common standards during disasters, as well as facilitate information sharing between administrators and residents, thereby contributing to faster initial responses and reduced workload burdens

Development Schedule and Targets for Social Implementation

[Development targets]

- Digitize evacuee name rosters
- Develop a supplies management system
- Build an evacuation center operation and management system
- Visualize wide-area flow of people
- Expand information dissemination channels, including digital signage

Develop evacuation center operation-related systems	Small-scale demonstration	Large-scale demonstration
2024: TRL 5 and above	2025: TRL 6 and above	2027: TRL 7 and above
• Develop functions respectively aimed at local governments and residents for managing evacuation center operations and disseminating information	• Verify and demonstrate within a single municipality's evacuation centers using prototypes of developed services and products • Prototype improvement	• Expand the scope of demonstration to multiple local governments and evacuation centers in order to utilize verification and demonstration to improve services and products for social implementation

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Japan has extremely high risks for various disasters, as well as limited human resources at local governments, the cornerstone of disaster response. Amidst this, many disaster measures still rely on analog methods and independent systems across municipalities, so there is a need for automation and streamlining through digital technologies.
- During the recent Noto Peninsula earthquake, Vacan witnessed first-hand the local evacuation center staff's management with ingenuity and dedication. This reinforced our belief in the potential for smoother information sharing and workload reduction through the introduction of more convenient, clearer systems.
- By combining the technologies of our company and our partners, we will work toward reducing the operational burden on local governments, unifying information infrastructure, and delivering clear, real-time information to residents for the social implementation of stronger disaster response capabilities.

CEO Kawano

Executive Officer Igarashi

<Company Details>
- Company Website: https://corp.vacan.com/company/
- Head Office: 3rd Floor, Hanzomon PREX South, 2-5-1 Kojimachi, Chiyoda-ku, Tokyo
- Contact: contact@vacancorp.com / 03-6327-5533

Ministry of Health, Labour and Welfare

Solicitation Topics

- Development and Demonstration of Medical AI Technologies Aligned with Healthcare Needs for Implementing AI Hospitals
- Development of an AI System for Early Detection of Individuals at High Risk for Diseases Using Real-World Data, and Verification of Social Implementation of Preventive Intervention

Development and Demonstration of Medical AI Technologies Aligned with Healthcare Needs for Implementing AI Hospitals

Large-scale technology demonstration: FY2023–FY2026

Sanamedi, Inc. (Representative)
LIFE QUEST Inc.; ZenmuTech, Inc.; TXP Medical Co., Ltd.; ARCS Inc.; INTEP, Inc.; Xenoma Inc.; Epigno Co., Ltd.; Plusmedi Corp.; Ai-BrainScience Inc.; PGV Inc.; Arblet Inc.; PRECISION, Inc.

Overview of Large-Scale Technology Demonstration

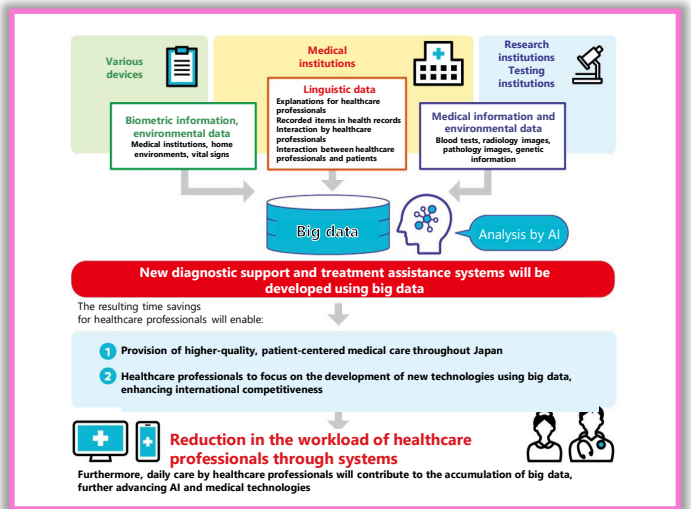
- Based on the achievements of AI hospitals in the second phase of the SIP program and the BRIDGE program, 13 startups are collaborating with medical institutions to accelerate the development of services tailored to healthcare needs (providing advanced, optimized medical services and reducing the burden on healthcare professionals). The partners will also conduct demonstrations of a "medical AI platform," which provides centralized access to developed medical AI services. Furthermore, to promote the adoption of AI hospital systems throughout Japan as a complete package, governance functions will be established to ensure the provision of reliable services and encourage their use.

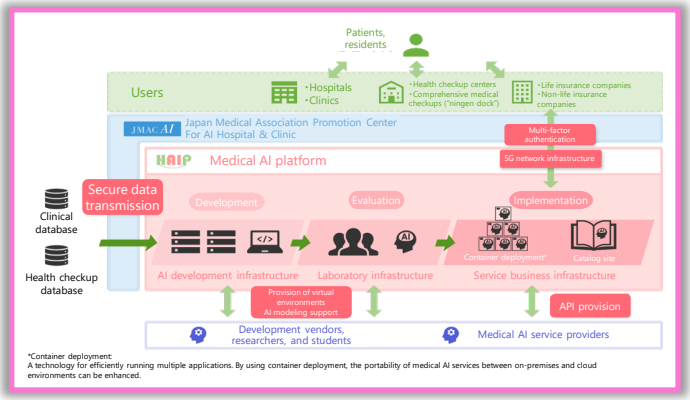
[Technology's features and sophistication level]

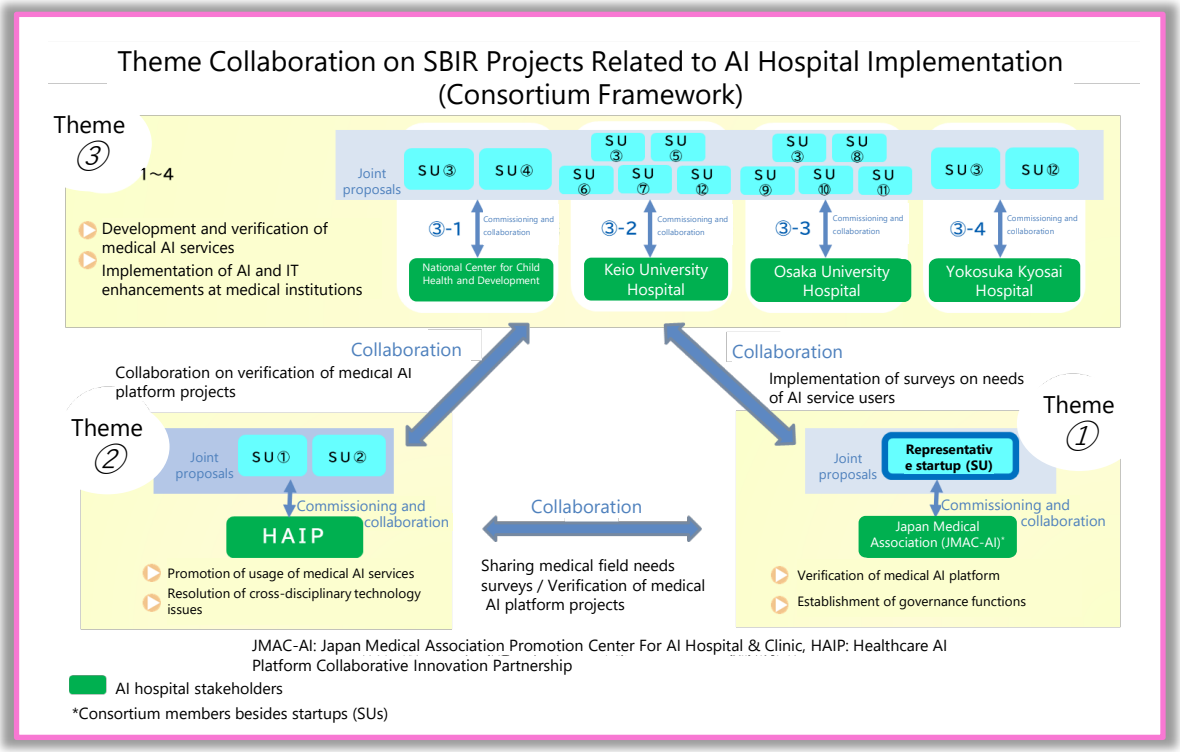
- Building of a medical AI platform with high benefits to the public in order to promote the development and utilization of medical AI, IT, and other such services
- Scheme in which SIP phase 2 AI hospital stakeholders provide support to startups from service development to nationwide spread and expansion

[Demonstration site]

[Outcome (illustrative only)]







Theme	R&D content
Theme ①	Verification of the medical AI platform and establishment of governance functions
Theme ②	Practical implementation of safe, secure, affordably-priced network security services; practical implementation of the first AI service providing one-stop solutions for software as a medical device (SaMD) and non-SaMD development to evaluation and social implementation; resolution of non-IT challenges; and building of an ecosystem
Theme ③-1	Development of diagnosis and treatment support AI reflecting terminology and diseases specific to pediatric and perinatal care; and development of automation of processes in assisted reproductive technology
Theme ③-2	Development and social implementation of a cloud-based rehabilitation medical information platform; development and social implementation of AI shift-planning functions for medical personnel; social implementation of postal-based ECG testing using E-skin ECG; development and social implementation of emergency medical workflow improvement tools; and implementation of advanced hospital-specific customizable AI medical questionnaires
Theme ③-3	Digital transformation (DX) encompassing hospital reception to medical information collection and utilization; and development of AI systems and devices for cognitive function and frailty assessment
Theme ③-4	Establishment of AI medical questionnaire-linked EHR systems innovating urban community-based healthcare; and building of automated document management systems for large hospitals using a large language model (LLM)

Development Schedule and Targets for Social Implementation

- Verification of medical AI platform / Establishment of governance functions / Development and verification of medical AI services / Implementation of AI and IT enhancements at medical institutions / Promotion of usage of medical AI services / Resolution of cross-disciplinary technology issues

2024: TRL 6 and above

2025: TRL 7 and above

Demonstration completed

End of March 2027

Developer's Message (Future Vision)

■ By adopting a consortium structure, we will strongly promote the development and dissemination of AI medical services tailored to the needs of medical institutions, and contribute to the realization of high-quality healthcare and the reduction of burdens on healthcare professionals.

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■Contact: info@sanamedi.jp

Establishment of Governance for the Implementation of the Medical AI Platform

Sanamedi, Inc. (Representative)

Large-scale technology demonstration: FY2023–FY2025

Overview of Large-Scale Technology Demonstration

- Sanamedi will demonstrate technology for establishing the governance framework necessary to implement the medical AI platform, which will serve as the foundation for widely providing services and products from startups with advanced IT and AI technologies in the medical field.
- We will establish rules and regulations required of stakeholders so that governance will function, build a commercialization support scheme for startups, and realize a provision framework that ensures the public can access higher-quality medical care.

[Demonstration site] From the Japan Medical Association Promotion Center For AI Hospital & Clinic (JMAC-AI) website

[Technology's features and sophistication level]

- Buildup of governance with high benefits to the public in collaboration with JMAC-AI
- Provision of seamless support for startups in considering business strategy

[Outcome (illustrative only)]

⇒Ultimately, develop a consortium structure scheme to connect medical AI users and providers

[Post-social implementation immediate targets]

- The market size for AI in domestic healthcare is projected to grow over sevenfold, from about 120 million USD in 2020 to 890 million USD in 2027, and the social implementation of AI hospitals will greatly contribute to this

Development Schedule and Targets for Social Implementation

[Development targets]

- Formulate rules and regulations
- Build commercialization support schemes
- Establish an environment for trial use
- Build the consortium structure

2023: TRL 6 and above	2024: TRL 7 and above	2025: TRL 8 and above
• Formulate rules and regulations • Verify technology of trial operations • Medical institution needs survey • Medical AI platform survey	• Renew rules and regulations • Establish trial operation environments • Global benchmark survey	• Build the consortium structure

Demonstration completed

End of March 2026

Developer's Message (Future Vision)

- By adopting a consortium structure, we will strongly promote the development and dissemination of AI medical services tailored to the needs of medical institutions, and contribute to the realization of high-quality healthcare and the reduction of burdens on healthcare professionals.

Sanamedi, Inc. CEO
Takahiro Uchida

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Implementation of Network Security Services Aimed at Digital Health Innovation Aligned with Healthcare Setting Needs, Construction of an AI Platform for One-Stop Development and Implementation of SaMD and Non-SaMD[1]

LIFE QUEST Inc. (Joint Proposal ①)

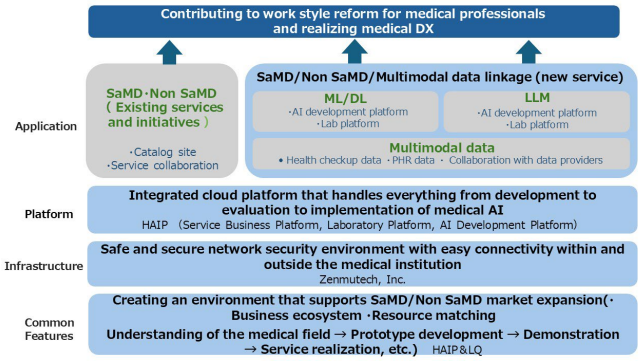
(1. The application theme is summarized.)

Large-scale technology demonstration: FY2023–FY2026

Overview of Large-Scale Technology Demonstration

- In collaboration with the Healthcare AI Platform Collaborative Innovation Partnership (HAIP), LIFE QUEST Inc. will develop AI services utilizing multimodal data obtained from third parties based on use cases in order to create digital health innovations aligned with healthcare setting needs. The project involves creating containerized prototype AI within a lab-based environment, thereby establishing an environment enabling rapid evaluation across multiple locations.
- The project will plan and develop SaMD and non-SaMD tailored to the needs of medical settings, utilize the service platform under development by HAIP, and demonstrate and socially implement a one-stop system for delivery to various stakeholders.

[Overall activities (illustrative only)]

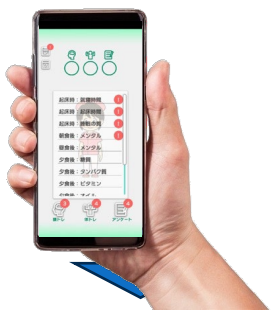


[Technology's features and sophistication level]

Practical implementation of safe, secure, and reasonably-priced network security services through collaboration with HAIP

Practical implementation of the first-ever AI services enabling a one-stop system for the SaMD/non-SaMD development, evaluation, and social implementation process

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]
- Evaluation of network service infrastructure aligned with medical settings
- Integrated infrastructure for the SaMD/non-SaMD development, evaluation, and implementation process

TRL5
(Trial and demonstration)
Demonstration
Start spec decisions and development of prototype, as well as recruitment of experts

TRL6
(Completion and evaluation)
Complete prototype and prototype evaluation

TRL7
(Infrastructure implementation)
Validate usage after integrating the services into the service business infrastructure

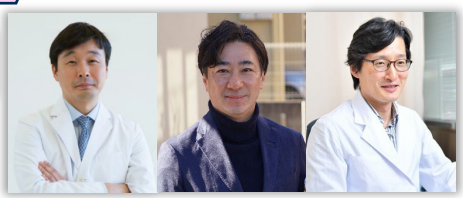
Demonstration completed

[Post-social implementation immediate targets]

- The global digital health market is huge (projected to reach 1,039 billion USD by 2028), but the Japanese market is forecasted to remain below about 330 billion yen in 2025.
- The aim is to acquire a 1% domestic market share equivalent to 2 billion yen.

Developer's Message (Future Vision)

- As a startup founded by a physician, LIFE QUEST will develop and socially implement numerous AI services to meet the needs of medical settings with the aim of helping Japan be a driving force of digital health.



From left: Representative Director and CEO Ryozo Saito (MD), Director Hirotsugu Takahashi, and Director Reo Hamaguchi

<Company Details>
- Company Website:https://www.life-q.jp
- Head Office: 9th Floor, 6-6-21 Minami-Aoyama, Minato-ku, Tokyo
- Contact: PR manager Hirotsugu Takahashi (takahashi@life-q.jp)

Practical Implementation of Safe, Secure, and Reasonably-Priced Network Security Services

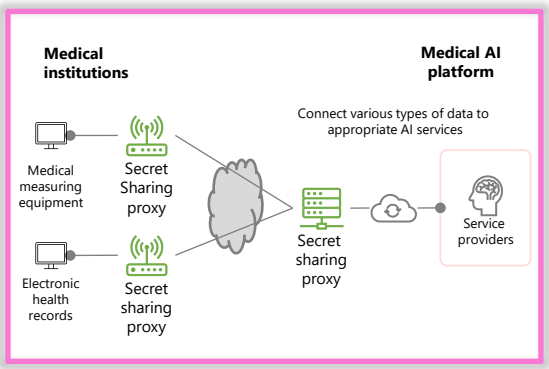
ZenmuTech, Inc. (Joint Proposal ②)

Large-scale technology demonstration: FY2023–FY2025

Overview of Large-Scale Technology Demonstration

- ZenmuTech will conduct technology demonstration to establish a network security environment that ensures safe and secure data transmission even over general network connections.
- The company will realize a file transmission service and application leveraging secret sharing (AONT) technology to enhance the safety of data during transmission.

[Core technology]
(Demonstration planned to take place in Setagaya, Tokyo)

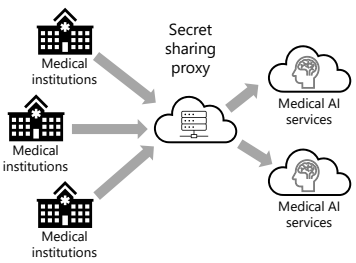


[Technology's features and sophistication level]

- Encryption of transmitted data using secret sharing (AONT) technology
- Realization of safe and secure data transmission without the use of dedicated connections

⇒ Ultimately, develop a safe and secure file transmission service protected by secret sharing technology

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Achieve secure transmission functionality through proxy + secret sharing
- Enhance security without requiring changes to existing systems
- Enable transmission of terabyte-scale data

2023: TRL 3	2024: TRL 4–5	2025: TRL 6-7
• Network system specification design	• System development to embed secret-sharing functionality into proxies • Demonstration testing of basic functionalities	• Implementation of demonstration by medical institutions • Improve apps/services

Demonstration completed

End of March 2026

[Post-social implementation immediate targets]

- Aim to gain 5% share (340 million yen) of the user-to-user file transfer service market (projected to be 6.7 billion yen in 2026)
- As a foundational technology for medical AI services, realize secure data transmission over general network connections and contribute to the spread of medical AI services

Developer's Message (Future Vision)

- The promotion of medical AI services requires safe and secure network/cloud environments. However, realizing this through specialized equipment is not feasible for practical use by various medical institutions and nursing care facilities. Therefore, the aim is to provide a low-cost, safe, and secure data transmission service accessible to various institutions.
- This will promote the use of medical AI services and contribute to further developments in healthcare.

ZenmuTech, Inc. CTO
Kunii

<Company Details>
- Company Website: https://zenmutech.com
- Head Office: THE HUB Ginza OCT 804, 8-17-5 Ginza, Chuo-ku, Tokyo
- Contact: shimpei.kunii@zenmutech.com

Pediatric Emergency Medical Support AI System

TXP Medical Co., Ltd. (Joint Proposal ③)

Large-scale technology demonstration: FY2023–FY2025

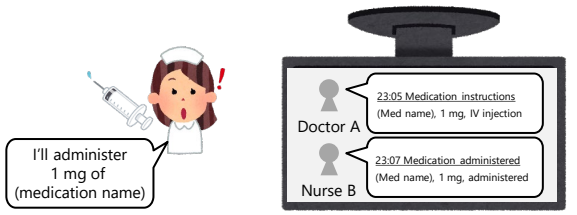
Overview of Large-Scale Technology Demonstration

- TXP Medical will develop a diagnosis and treatment support system using the LLM capable of understanding pediatric and perinatal-specific language (such as distinguishing between the English word "touch" and the Japanese word "tacchi" (stand)). This will reduce the burden of logging health records for medical treatment (such as by enabling voice recording and data structuring in treatment/observation rooms).
- TXP Medical will build a medical data platform to integrate and store the above data and structured electronic health records. The company aims to horizontally roll this out to other pediatric emergency facilities while contributing to clinical research on rare pediatric diseases.

[Technology's features and sophistication level]

- Language support specialized for pediatric and perinatal fields
- Pediatric medical data infrastructure for multi-facility collaboration

[Demonstration site (illustrative only)]
Partner: National Center for Child Health and Development (Tokyo)



- Automatically records speech related to treatment (with data structuring)
- Support for child-specific phrases

Development Schedule and Targets for Social Implementation

- Development of LLM diagnosis and treatment support system/medical data platform
- Conduct trial use and functionality enhancement in medical settings

FY2024: TRL 4–5

- Accumulate data through the system
- Apply in clinical research
- Conduct planning for rollout to other facilities

2025: TRL 6–9

Demonstration completed

End of March 2026

[Post-social implementation immediate targets]

- Horizontal rollout to 39 pediatric and perinatal emergency medical institutions throughout Japan
- Increase practical data use examples in the project, such as clinical research and trials related to pediatric diseases

Developer's Message (Future Vision)

- Pediatric emergency medicine involves a large amount of information derived from doctors' observations, making it particularly suited to AI systems. In addition, since pediatric patients' conditions change more quickly than adults, doctors' judgments are crucial. We are aiming for a system that saves children's lives by supporting medical professionals involved in pediatric and perinatal emergency care, and contributing to clinical research on rare diseases.

TXP Medical Co., Ltd.
Chief Executive Officer (MD)
Tomohiro Sonoo

<Company Details>
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■Head Office: 706 H1O Kanda, 41-1 Kanda-Higashimatsushita-cho, Chiyoda-ku, Tokyo
■Contact: txp_marketing@txpmedical.com

AI Prediction of Medical Resource Utilization for Patients Who Need Emergency Transport

TXP Medical Co., Ltd. (Joint Proposal ③)

Large-scale technology demonstration: April 2024–March 2026

Overview of Large-Scale Technology Demonstration

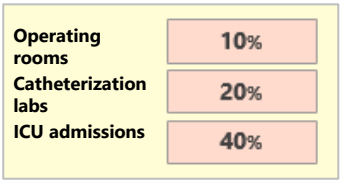
- Using emergency medical databases (DB), TXP Medical will develop AI to predict necessary medical resources based on the conditions of emergency patients.
  The aim is to streamline the process for matching emergency patients to hospitals.
- TXP Medical will build a system to automate registrations to disease registries by using the above DB and LLM.
  This will reduce the burden of research data collection.

[Technology's features and sophistication level]

- Prediction of required medical resources based on patient medical complaints
- Streamlining of disease registry registration using an LLM

[Demonstration site(illustrative only)] Partner: Keio University Hospital (Tokyo)

Usable for emergency calls from ambulance teams received at emergency outpatient departments
The above is an illustrative image and does not show an actual partner



Predict necessary facilities from patient information provided by emergency transport teams

Development Schedule and Targets for Social Implementation

- Establish an emergency medical data collection environment
- Define requirements for AI development
- Advance development of predictive AI

FY2024: TRL 4–5

- Trials in medical settings
- Feedback, accuracy improvement
- Verification of AI effectiveness and commercialization considerations

2025: TRL 6–9

Demonstration completed

End of March 2026

[Post-social implementation immediate targets]

- Aim to improve acceptance rates at emergency medical institutions through predictive AI (current national average: 65%)
- For example, if the AI is rolled out to 200 facilities and leads to a 15% increase in acceptance rates, this would expedite patient/hospital matching by up to 540,000 cases yearly

Developer's Message (Future Vision)

- In recent years, the increasing number of patients requiring emergency transport has become a nationwide issue, and matching patients with hospitals is becoming more difficult each year. By predicting the medical resources patients need from limited information, efficient utilization of these resources can be achieved. This system will facilitate rapid emergency medical response and help achieve the provision of better medical services.

TXP Medical Co., Ltd.
Chief Executive Officer (MD)
Tomohiro Sonoo

<Company Details>
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- Head Office: 706 H1O Kanda, 41-1 Kanda-Higashimatsushita-cho, Chiyoda-ku, Tokyo
- Contact: txp_marketing@txpmedical.com

Automated Medical Document Creation System Using LLM
(LLM: Large language model)

TXP Medical Co., Ltd. (Joint Proposal ③)

Large-scale technology demonstration: April 2024–March 2026

Overview of Large-Scale Technology Demonstration

- TXP Medical will develop an AI system that generates medical documents such as referral letters and discharge summaries using data from electronic health records.
  This will reduce the burden of documentation work, which takes up significant time for healthcare professionals, allowing them to focus on core duties.
- The company will explore other potential applications of the LLM beyond the two mentioned forms (disease registry registration, etc.).

[Technology's features and sophistication level]

- Fine-tuning of the LLM tailored to document-specific characteristics
- High-accuracy, affordably-priced system in an on-premise environment

[Demonstration site (illustrative only)] Partner:Yokosuka Kyosai Hospital (Kanagawa Prefecture)

Collection of various patient information, such as text and test values, from electronic health records

AI generation of referral letters and discharge summaries

Development Schedule and Targets for Social Implementation

- Fine-tune LLM for referral letters and discharge summaries
- Create prototype of the automated medical document generation program

FY2024: TRL 4–5

- Improve LLM accuracy
- Expand scope of target documents
- Conduct planning for rollout to other facilities

2025: TRL 6–9

Demonstration completed

End of March 2026

[Post-social implementation immediate targets]

- Large hospitals create 50,000 to 100,000 referral letters and discharge summaries per year
- This product reduces approximately 30,000 hours spent writing the documents mentioned above, and aims to become the standard tool in large hospitals with more than 500 beds

Developer's Message (Future Vision)

- Document creation is one of the tasks that places the highest burden on medical professionals at hospitals. Automating document creation is an urgent issue to enable healthcare professionals to focus on medical tasks that leverage their high expertise. The major advancements in LLMs in recent years present a key to solving this challenge. TXP Medical will create a low-cost system that ensures patient information security and is scalable nationwide.

TXP Medical Co., Ltd.
Chief Executive Officer (MD)
Tomohiro Sonoo

<Company Details>
■Company Website: https://txpmedical.jp/
■Head Office: 706 H1O Kanda, 41-1 Kanda-Higashimatsushita-cho, Chiyoda-ku, Tokyo
■Contact: txp_marketing@txpmedical.com

AI-Supported Emergency Outpatient Health Records & Digitalization of Clinical Trials

TXP Medical Co., Ltd. (Joint Proposal ③)

Large-scale technology demonstration: April 2024–March 2026

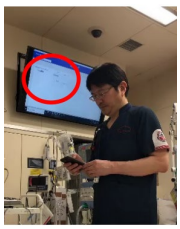
Overview of Large-Scale Technology Demonstration

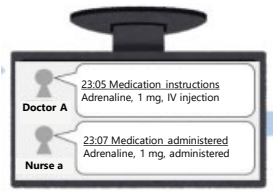
- This technology makes voice recordings of treatment performed in emergency and critical care centers and converts them into structured text. Information is entered into electronic health records in a format that facilitates reuse for medical research, thereby reducing the burden on healthcare professionals.
- Structured data is efficiently collected from various hospital data sources, including electronic health records.
  By linking this data to clinical research databases (electronic data capture (EDC)), the labor and costs of clinical trials are reduced.

[Technology's features and sophistication level]

- Hands-free voice input and structuring of treatment details
- Collection of in-hospital patient data and linkage to external clinical trial EDC

[Demonstration site (illustrative only)] Osaka University Hospital (Osaka Prefecture)


Voice input of treatment details



Information sharing on large screen

Electronic health record department system


Accurate recording of verbal instructions including recording times

Development Schedule and Targets for Social Implementation

- Build prototype for AI-supported emergency outpatient health records
- Develop patient data collection system and clinical trial worksheet prototype

FY2024: TRL 4–5

- Conduct trial use in medical settings, accumulate data, and improve accuracy through feedback
- Conduct trial use in clinical research projects

2025: TRL 6–9

Demonstration completed

End of March 2026

[Post-social implementation immediate targets]

- Promote adoption of product at large facilities such as emergency and critical care centers
- Aim to create an environment where drug waste and shortages are eliminated by reducing labor and costs of clinical trials

Developer's Message (Future Vision)

- Treatment often requires both hands in emergency settings, making voice input optimal due to its immediacy.
- For clinical trials, using our specialized input support and data structuring technologies significantly reduces necessary labor, eliminating the need for dual entry of regular health record data and trial-specific data. This project contributes not only to emergency care but also to the efficiency of clinical trials, helping to achieve better medical environments.


TXP Medical Co., Ltd.
Chief Executive Officer (MD)
Tomohiro Sonoo

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■Contact: txp_marketing@txpmedical.com

Development of Automation in Assisted Reproductive Technology Processes

ARCS Inc. (Joint Proposal ④)

Large-scale technology demonstration: FY2023–FY2026

Overview of Large-Scale Technology Demonstration

- This project will achieve task support or automation of decision-making and operational processes in assisted reproductive technology (ART) using AI and robotics.
- The project will collect clinical data with partner medical institutions and develop a data platform and AI models.

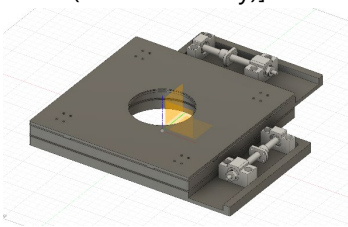
[Core technology]
Planned demonstration at a medical institution in Tokyo

[Technology's features and sophistication level]

- AI-based evaluation of the quality of reproductive cells
- Automation of advanced procedures using robotics

⇒ Ultimately, improve the success rate (blastocyst formation rate) and contribute to higher pregnancyrates

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Target a 10% market share (1 trillion yen) in the global ART market (projected to reach about 10 trillion yen in 2032)
- The social implementation of this automation system will address the global shortage of embryologists and help people who want to have children

Development Schedule and Targets for Social Implementation

[Development targets]
- Collect clinical data (1,000 cases)
- Clinical evaluation trial effectiveness: 70% or higher
- Develop analysis system
- Optimize usability

2024: TRL 5 and above	First half of 2026: TRL 6 and above	Second half of 2026: TRL 7 and above
• Data collection • Prototype development • Product detailed design	• Mass production design • AI system evaluation	• Effectiveness verification of mass production system

Demonstration completed

End of March 2027

Developer's Message (Future Vision)

- According to a WHO report, infertility is a universal challenge faced across the world, regardless of national income levels. Global efforts are underway to find solutions for infertility issues, recognized as a central task for achieving SDG goals 3 and 5.
- By utilizing its product, ARCS aims to support (and automate) the work of doctors and embryologists, thereby improving pregnancy rates and reducing the burden on patients.

ARCS Inc. CEO Tanase (left)

<Company Details>
■Company Website: https://www.arcs-inc.jp/
■Head Office: 2F-C, Shibuya Dogenzaka Tokyu Building, 1-10-8 Dogenzaka, Shibuya-ku, Tokyo
■Contact: info@arcs-inc.jp

Development and Social Implementation of a Cloud-Based Rehabilitation Medical Information Platform

INTEP, Inc. (Joint Proposal ⑤)

Large-scale technology demonstration: FY2023–FY2025

Overview of Core Technology

- The technology enables efficient recording of rehabilitation-related quantitative structured data via means such as tablet input, voice input, and device linkage.
- Since it is cloud-based, it enables data linkage between different facilities, such as for before and after patient transfers.

[Demonstration site] Keio University Hospital

[Technology's features and sophistication level]

- Achieve structuring of data that is challenging in the rehabilitation field and enable data accumulation
- Enable accumulation of data aligned with patients' journeys

⇒ Ultimately, build datasets that can support AI analysis

[Outcome (illustrative only)]

- Establishment of "rehabilitation digitalization" operation centered on hospital settings
- Generation of AI analysis solutions for multiple types of new rehabilitation data

[Post-social implementation immediate targets]

- Targeting Japan's 7.4 billion yen market (FY2028 (FY ending March 2029)), aim to achieve a 40% share in the core market while considering market entry by future competitors despite the present absence of competing products, as well as first-mover advantages and product competitiveness

Development Schedule and Targets for Social Implementation

[Development targets]

- Study building a network operable within the secure network environment of a university hospital
- Implement actual accumulation of rehabilitation medical data at a university hospital

2023: TRL 7	2024: TRL 8	2025: TRL 8
• Study building a network operable in the secure network environment of a cloud-based information platform system for rehabilitation medical data	• Implement actual accumulation of rehabilitation medical data using the cloud-based information platform system at a university hospital	• Verify the contributions of the usage of the implemented system and accumulated rehabilitation medical data to medical settings and hospital management

Demonstration completed

End of March 2026

Developer's Message (Future Vision)

- INTEP aims for a world where anyone who faces a medical issue can receive optimal rehabilitation medical care that is backed up by data, enabling maximum recovery and the quickest possible return to society.
- Our goal is a world where rehabilitation-related healthcare professionals can secure more time to focus on patients without being burdened by complex indirect tasks.

CEO Michiyuki Kawakami (right)
CTO Fuminari Kaneko (left)

<Company Details>
■ Company Website: https://www.intep.co.jp/
■ Head Office: #301, Hayashi Heim, 5-12-5 Higashi-Oi, Shinagawa-ku, Tokyo
■ Contact: kawakami@intep.co.jp

Social Implementation of Mail-In ECG Monitoring Service for Heart Disease Prevention

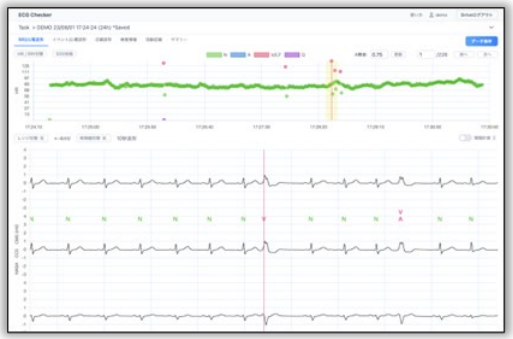
Xenoma Inc. (Joint Proposal ⑥)

Large-scale technology demonstration: FY2023–FY2026

Overview of Large-Scale Technology Demonstration

- The technology will lower the workload of medical professionals and improve testing accuracy through AI-assisted arrhythmia analysis in ambulatory ECG monitoring for arrhythmia that is critical for heart disease prevention.
- It will establish a feasible method for existing medical information systems to enhance linkage with electronic health records and improve inefficient operations such as fax and mail-based applications.

[Demonstration site] Keio University Hospital

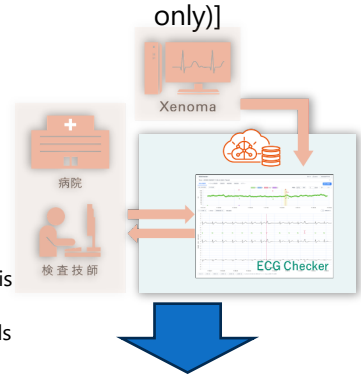


[Technology's features and sophistication level]

- Support healthcare professionals with AI that will analyze 100,000 heartbeats per day with high accuracy
- Develop a highly secure system leveraging cloud technology

⇒ Ultimately, reduce workloads for heartbeat analysis to 1/10 the current level, eliminate inefficient paper-based processes, and reduce the workloads of healthcare professionals

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

2024	2025	2026
• Acquire ECG data • Study medical information system	• Acquire ECG data • Develop AI analysis prototype • Develop system prototype	• Finalize and introduce AI analysis • Finalize and introduce system
• High-precision AI (99.5%) • Develop cloud-based management system		• Establish electronic health record integration method

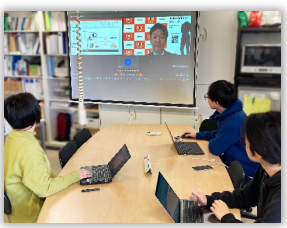
Demonstration completed

[Post-social implementation immediate targets]

- Aim to acquire a 22.6% share (55.4 billion yen) of the domestic testing market (245 billion yen in 2036)
- Reduce the workload of healthcare professionals to 1/10 the current level
- Improve heart disease prevention to lower cardiovascular medical costs, which currently account for 20% of total medical expenses

Developer's Message (Future Vision)

- Cardiovascular (heart) diseases account for 19.3% of Japan's medical expenses. Despite an increasing number of patients, the amount of ambulatory ECG monitoring, which is critical for prevention, has remained level over the past decade due to the large workload placed on healthcare professionals by such monitoring. Mail-in monitoring is a groundbreaking innovation that not only reduces the burden on healthcare professionals but also eases the burden of hospital visits for patients. Through this demonstration, Xenoma will confirm the safety of conventional aspects that are barriers to implementation, aiming to realize a safe and secure system.



Xenoma CEO Amimori (center) and e-skin ECG analysis team members

<Company Details>
■ Company Website: https://xenoma.com
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■ Contact: info@xenoma.com

Development and Social Implementation of AI-Driven Shift Creation for Healthcare Professionals

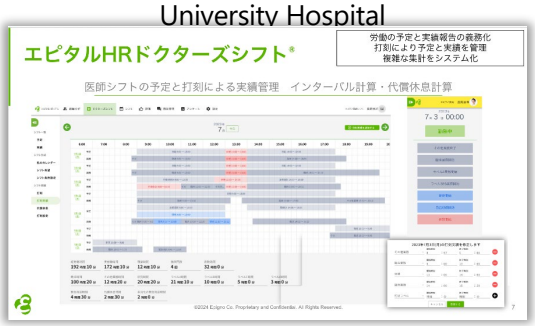
Epigno Co., Ltd. (Joint Proposal ⑦)

Large-scale technology demonstration: FY2023–FY2025

Overview of Demonstration

- This demonstration will implement "Epital HR" doctor shifts, which enable labor management in compliance with work style reforms for doctors.
- It will implement Epital HR across the entire medical institution to achieve people analytics through digitally-enhanced workforce information, optimized shift schedules, fair evaluations, and tools such as pulse surveys.

[Operation demonstration] Keio University Hospital



[Technology's features and sophistication level]

- Provision of health care-specialized HR solutions for in-house employment of healthcare professionals
- Patent-pending for shift creation and setting conditions

⇒ Ultimately, develop management software tailored to medical settings that enables people analytics.

[Outcome (illustrative only)]

Impact on hospital management

Reduced staff turnover

Development Schedule and Targets for Social Implementation

[Development targets]

- Refinement of doctor shifts
- Compliance with legal system for doctors' overtime work
- Reduction of labor for paperwork and time spent on shift creation
- Integration with attendance management
- Expansion of functions
- Social implementation

2023: TRL 5 and above	2024: TRL 6 and above	2025: TRL 7 and above
• Create doctor shifts • Comply with regulations • Integration with attendance management • Keio University Hospital	• Enhance doctor shifts • Form a sales team • Expansion of functions • Roll out to collaborating hospitals	• Evolve algorithm • Analyze accumulated data • People analytics • Refine UI

Demonstration completed

End of March 2026

[Post-social implementation immediate targets]

- Aim for introduction at 45 out of 450 major hospitals (10%), targeting annual sales of about 300 million yen.
- Cross-selling is anticipated for Epital HR, and total revenue contribution impact is projected to be 420 million yen per year.

Developer's Message (Future Vision)

- Epigno wants to help resolve the exhaustion of healthcare professionals, maintain and improve the quality of medical care, and alleviate burdens in medical settings!
- We also want to spread the introduction of AI to advance and help manage digital transformation of hospital operations management!

Epigno Co., Ltd. CMO Shiga (second from left)

<Company Details>
■Company Website: https://epigno.jp/
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■Contact: contact@epigno.jp

Digital Transformation (DX) for the Process from Hospital Reception to Medical Information Collection and Utilization

Plusmedi Corp. (Joint Proposal ⑧)

Large-scale technology demonstration: FY2023–FY2025

Overview of Large-Scale Technology Demonstration

- This project will provide patients with a smartphone app for outpatient support with the following functions:
  - Remote check-in function (beacon/location/time-based, etc.)
  - Function for viewing outpatient basic forms on the smartphone app
- The project will also form a support team, promote app usage, and accumulate operational know-how

[Demonstration site]
Osaka University Hospital (Suita, Osaka)

[Technology's features and sophistication level]

- Remote check-in function (beacon/location/time-based, etc.)
- Function for viewing outpatient basic forms on the smartphone app

⇒ Ultimately, the above functions will be linked with the originally developed outpatient support app "wellcne," aiming to streamline outpatient visits like an electronic toll collection system

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

A) Implement and operate the smartphone app "wellcne"

B) Reception equipment DX
- Conduct implementation and verification to enable provision of standard functions to other companies

2023: TRL 1–2
A) Introduce wellcne
B) Reception equipment DX
- Confirm basic principles
- Confirm applicability
- Product development planning

2024: TRL 3–4
A) Operate wellcne
B) Reception equipment DX
- Develop and confirm performance of all developed components
- Create a demonstration system integrating everything
- Demonstration in a test environment
- Demonstration through implementation at Osaka University Hospital

2025: TRL 5
A) Operate wellcne
B) Reception equipment DX
- Product production and sales

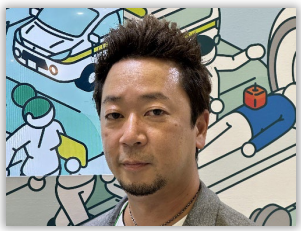
End of March 2026 Demonstration completed

[Post-social implementation immediate targets]

- Set a three-year goal to introduce the system to about 200 facilities, targeting four core hospitals in each prefecture nationwide
- Aim for a top market share of over 60% in the target segment by the fifth year

Developer's Message (Future Vision)

- Due to the impact of COVID-19, outpatient environments for patients were heavily restricted, resulting in prolonged inconveniences. Consequently, the challenges of advancing medical DX were brought to the forefront. Plusmedi will provide an app supporting "smart," comfortable outpatient visits for patients. We also tackle daily new challenges aimed at improving operational efficiency and addressing the issues faced by healthcare professionals, thereby contributing to the medical and healthcare industries.



Plusmedi Corp. CEO Nagata

<Company Details>
- Company Website: https://plus-medi-corp.com/
- Head Office: 6th Floor, Jimbocho Center Building, 2-5-11 Kanda-Jimbocho, Chiyoda-ku, Tokyo
- Contact: info@plus-medi-corp.com

Development of Eye-Tracking Data Analysis AI for Detecting Mild Cognitive Impairment

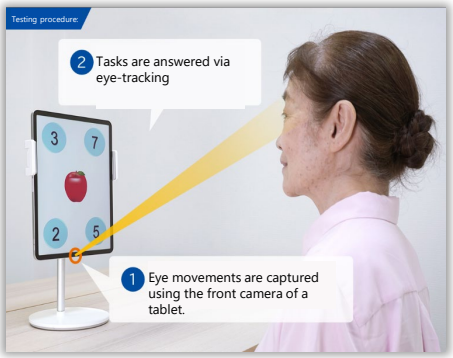
Ai-BrainScience Inc. (Joint Proposal ⑨)

Large-scale technology demonstration: April 2023–September 2026

Overview of Proposed Project

- Using an eye tracking-based cognitive assessment (ETCA) method, a clinical study will be conducted to collect more than 200 cases of eye-tracking data and neuropsychological test data.
- Based on the data collected from the clinical study, the project will focus on improving the eye-tracking accuracy of ETCA, developing AI aimed at detecting mild cognitive impairment, and developing new cognitive function assessment visuals, with the goal of practical implementation on the medical AI platform.

[Overview of the ETCA method]

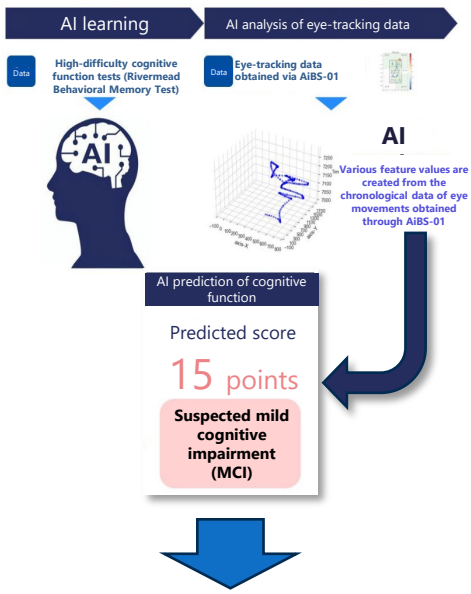


[Technology's features and sophistication level]

- Improvement research:
  - Enhancement of eye-tracking technology through calibration improvements, etc.
  - Development of new cognitive function assessment visuals to reduce learning effects
- Application research:
  - Development of an eye-tracking data analysis AI capable of detecting mild cognitive impairment with 80% accuracy

⇒Aim for the AI to be implemented as a medical device program

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Incorporate the improved accuracy version of ETCA into the medical AI platform
- Implement new task visuals into the app
- Achieve 80% accuracy for the AI

2024	2025	2026
• Conduct planning • Develop new visuals	• Start data collection • Assess validity and improve new visuals • Develop AI	• Continue data collection • Improve eye-tracking accuracy • Continue AI development

Demonstration completed

[Post-social implementation immediate targets]

- Domestic market size: **About 4.5 billion yen**
- Aim to launch the AI by 2030 and achieve a 30% market share by 2035

Developer's Message (Future Vision)

- Through the digital transformation of cognitive function assessment, we aim to create a society where everyone can benefit from the advantages of early diagnosis and treatment of dementia.

Director and Head, Business Development Department

Manager, Business Development Department

<Company Details>
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■Contact: info@ai-brainscience.co.jp

Development of an EEG-Based Dementia Diagnosis Support Program

PGV Inc. (Joint Proposal ⑩)

Large-scale technology demonstration: FY2023–FY2025

Overview of Large-Scale Technology Demonstration

■ This project will develop a medical device program (SaMD) that provides diagnosis support information to physicians by analyzing EEG data obtained from brainwave tests and presenting classification results for dementia, including mild cognitive impairment (MCI).

[Technology's features and sophistication level]

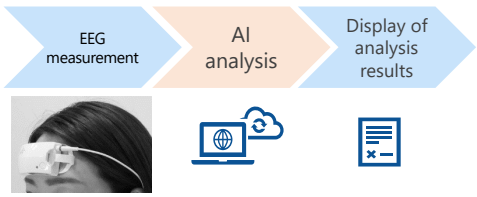
■ Utilization of an AI program with higher classification accuracy compared to conventional cognitive function tests

■ Use of a patch-type EEG device that is easy for non-specialist physicians to use and capable of high-accuracy brainwave measurement

⇒Ultimately, develop the medical device program (SaMD), obtain approval under the Pharmaceuticals and Medical Devices Act, and bring it to market

[Outcome (illustrative only)]

Presentation of analysis results for helping to diagnose dementia for non-specialist physicians



Development Schedule and Targets for Social Implementation

[Development targets]

- Verify the classification accuracy of the EEG AI through conducting prospective clinical trials

■ Prepare for and start clinical trials in FY2024
■ After clinical trials completion, submit for approval under the Pharmaceuticals and Medical Devices Act and achieve TRL 7

[Post-social implementation immediate targets]

■ After launch, establish a strong position (market share of 10% or more) in Japan's simplified dementia diagnosis support market (total annual tests: 1 million)

Developer's Message (Future Vision)

■ In Japan with its aging society, strengthening the framework for dementia diagnosis and treatment is a critical social issue.
■ Non-specialist physicians (general doctors) will be able to use this highly-reliable, labor-saving medical device program to assess the risk of dementia in patients suspected of having the condition. In cases of positive results, patients will be referred to dementia specialists, enabling efficient collaboration between non-specialist and specialist physicians.
■ This initiative will contribute to establishing a healthcare system that enables early intervention and treatment in the field of dementia.

<Company Details>
■ Company Website: https://www.pgv.co.jp/
■ Head Office: 2-15-5 Nihonbashi, Chuo-ku, Tokyo
■ Contact: admin@pgv.co.jp

Development of a Quantitative Frailty Evaluation System

Arblet Inc. (Joint Proposal ⑪)

Technology demonstration: FY2023–FY2026

Overview of Technology Demonstration

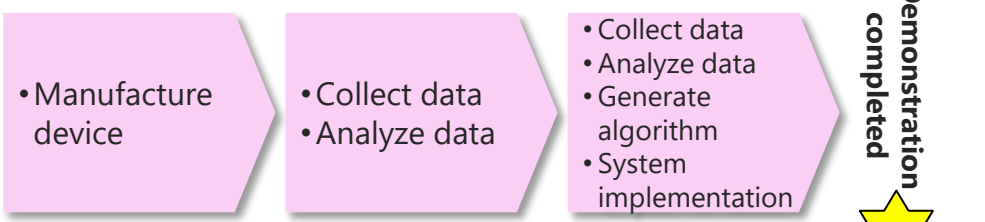
- Frailty affects the prognosis of elderly patients undergoing surgery, and its impact on prognosis varies depending on the surgical procedure. Although it is essential to conduct preoperative frailty evaluation, it requires skilled medical resources, such as physical therapists, and it is a problem that current standards like the CHS criteria lack quantitative measures.
- Using biometric information measurement devices and a cloud system, this demonstration will establish quantitative indicators for frailty evaluation of elderly people and develop a frailty evaluation system that can be easily utilized in medical settings.

[Technology's features and sophistication level]

- The progression of frailty and cognitive decline is known to be reflected in the vital responses to physical activity. This system enables the collection of information in daily life without burdening elderly people.
- By analyzing vital responses based on physical activities and continuous changes in vital signs, the system identifies indicators that reflect frailty in elderly people, with the aim of their utilization as new digital biomarkers that contribute to prediction of prognosis and treatment effects.

Development Schedule and Targets for Social Implementation

[Development targets]
- Measure geriatric internal medicine data of elderly patients
- Identify and generate algorithm for quantitative frailty indicators



FY2023

FY2024

FY2025: TRL 7 and above

End of March 2027

[Post-social implementation immediate targets]

- Aim for use as test indicators for predicting prognosis and determining treatment strategies for elderly people with conditions requiring surgery
- Also aim to leverage the system to prevent the need for future nursing care as frailty is reversible and interventions are expected to improve prognosis

Developer's Message (Future Vision)

- The Arblet system for biometric information collection and analysis uses waveform component information, such as frequency data captured by sensors embedded in the device, and is optimized for analysis for exploratory research and development of new algorithms. Because it is designed to help implement research findings into products, the system will be simple to use for clinical applications following the demonstration.
- In order to leverage the power of technology to help make it easier to live (by extending healthy lifespans to promote long and happy lives) in our society with a declining birthrate and aging population and to make our society sustainable (by alleviating labor shortages and reducing medical costs), we will share our research findings and solutions from Japan to the world.

<Company Details>
- Company Website: https://www.arblet.com/
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- Contact: contact@arblet.com

R&D: Sharing Central Hospitals' Electronic Medical Records and AI-Based Medical Questionnaires via Electronic Health Records (EHRs) ain the Era of Region-Based Patient Examinations

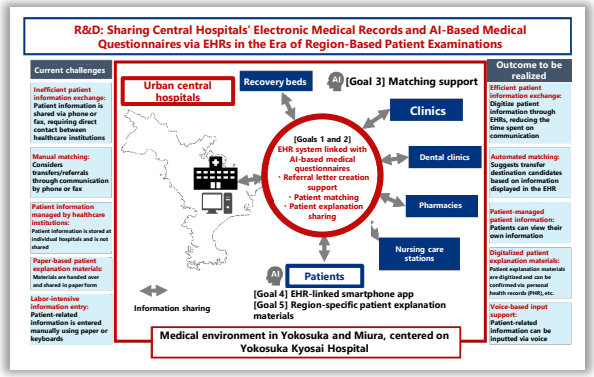
PRECISION, Inc.(Joint Proposal ⑫)

Large-scale technology demonstration: FY2023–FY2026

Overview

- Through AI-driven digital technology, this project will promote the sharing of information within regional medical alliances and improve operational efficiency in hospitals, aiming for the optimal utilization of limited resources.
- Specifically, by developing an EHR system linked with AI-based medical questionnaires, this project will strengthen the regional medical alliance centered around the Yokosuka and Miura areas, and contribute to the creation of a sustainable healthcare system.

[Overall research (illustrative only)]



[Technology's features and sophistication level]

- Develop an EHR system linked with AI-based medical questionnaires
- Enable information sharing and efficient management of patient data

⇒Ultimately, strengthen collaboration among alliance hospitals and enhance safe medical care through workload reduction and information sharing

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Create video explanation and patient explanation materials
- Develop/test/implement EHR system linked with AI-based medical questionnaires

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
Confirm linked items	Develop the EHR system linked to AI-based medical questionnaires	Release the EHR system linked to AI-based medical questionnaires
Create a title list for patient explanation materials	Create patient explanation materials	
Conduct on-site hearings and consider collaboration methods	Create the EHR app linked to AI-based medical questionnaires	Social implementation as part of regional medical care

Demonstration completed

End of March 2027

[Post-social implementation immediate targets]

- Aim to acquire a 7.8% share (260 million yen) within the domestic PHR market (2030 size: 3.3 billion yen)
- By introducing this EHR system linked to AI-based medical questionnaires, reduce the workload of healthcare professionals and increase their time dedicated to their core work

Developer's Message (Future Vision)

- PRECISION's goal is to free medical staff from routine tasks and enable them to spend more time directly engaging with patients.
- We want to help streamline information sharing to strengthen collaboration among medical teams, leading to provision of better medical services to patients, while also improving the quality and operational efficiency of services within the regional medical alliance as a whole.

PRECISION logo

<Company Details>
■Company Website: https://www.premedi.co.jp/
■Head Office: 7th Floor, MA Building, 4-2-5 Hongo, Bunkyo-ku, Tokyo
■Contact: https://www.premedi.co.jp/contact-cds/

R&D: AI-Based Medical Questionnaires with Specialized Customized Support for Advanced Hospitals

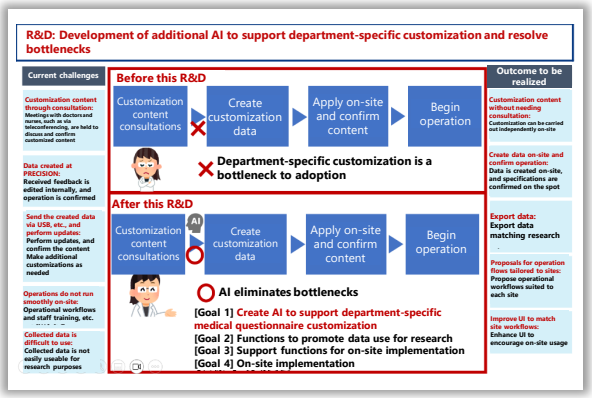
PRECISION, Inc.(Joint Proposal ⑫)

Large-scale technology demonstration: FY2023–FY2026

Overview

- This R&D project aims to evolve an AI-based medical questionnaire system with a view to secondary use for research purposes in university hospitals as a whole, without being limited to specific departments.
- Specifically, the goal is to conduct R&D of an AI system that can be easily customized under the guidance of specialists, thereby expanding its application and enabling use across multiple departments.

[Overall research (illustrative only)]



[Technology's features and sophistication level]

- Implementation of AI-based electronic medical questionnaire creation features
- Transfer data from AI-based medical questionnaire system to electronic health records

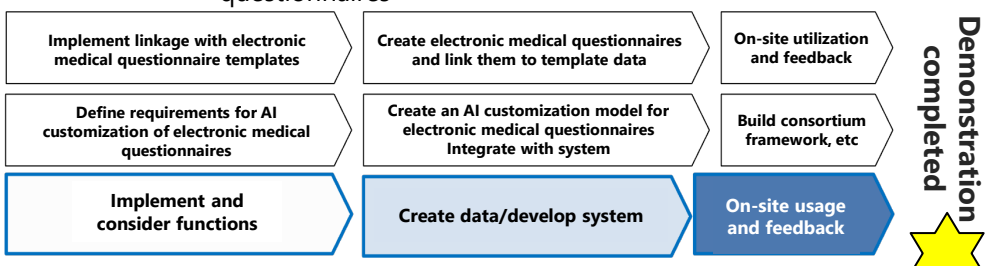
⇒Implement linkage, including data transfer to electronic health records, to reduce on-site workload

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

[Development targets]
- Implement linkage with electronic medical questionnaire templates
- Implement AI customization function for electronic medical questionnaires



2024: TRL 5 and above

2025: TRL 6 and above

2026: TRL 7 and above

- Aim to acquire a 40% share (380 million yen) of the domestic PHR market (projected to reach 760 million yen in 2030)
- It is anticipated that creating easily customizable electronic medical questionnaires will facilitate rollout across specialized fields and to other hospitals

Developer's Message (Future Vision)

- Through this project, PRECISION aims to promote workstyle reforms for healthcare professionals at university hospitals and other medical institutions, improve operational efficiency, and significantly enhance the quality of research data collection, by developing and commercializing AI customization functions for electronic medical questionnaires.

PRECISION logo

<Company Details>
■Company Website: https://www.premedi.co.jp/
■Head Office: 7th Floor, MA Building, 4-2-5 Hongo, Bunkyo-ku, Tokyo
■Contact: https://www.premedi.co.jp/contact-cds/

Ministry of Health, Labour and Welfare

Development of an AI System for Early Detection of Individuals at High Risk for Diseases Using Real-World Data, and Verification of Social Implementation of Preventive Intervention

Small/Startup Business Innovation Research

Development and Implementation of an Early Detection System for the Risk of Requiring Nursing Care Using Infrastructure Data Such as Electricity Usage, as Well as Development and Implementation of a Health Check Algorithm Using Purchasing Data, Etc.

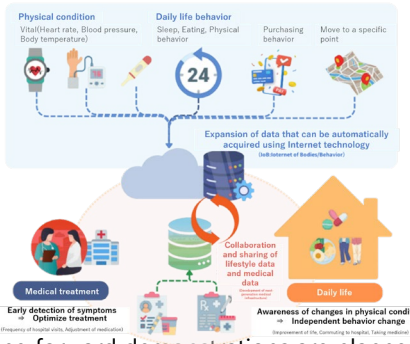
Regional Data Core Inc. (Representative startup)

Large-scale technology demonstration: January 2024–March 2028

Overview of Large-Scale Technology Demonstration

- The project involves a technology demonstration regarding the creation of a data linkage information infrastructure that connects local governments, residents, and hospitals, as well as the development of AI-based tools using this data to screen for cardiovascular diseases, strokes, and risk factors for requiring nursing care.
- Utilizing the demonstrated technology, the system will enable local governments, citizens, etc. to easily understand disease risks and provide dementia and frailty prevention programs. It will also help encourage health promotion and realize a society of health and longevity.

[Society to be achieved through demonstration]



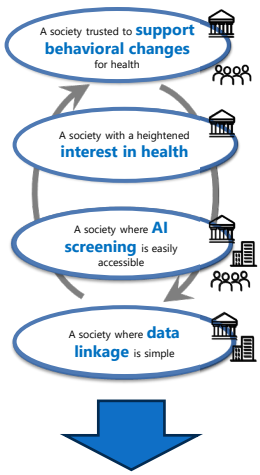
Going forward demonstrations are planned for multiple municipalities, including Nobeoka, Miyazaki

[Technology's features and sophistication level]

- Strict anonymization and management of medical information based on the Next-Generation Medical Infrastructure Act
- AI development using advanced data such as electricity, voice, gait, and purchase data
- Implementation of dementia and frailty prevention programs based on scientific evidence

⇒Ultimately, develop a series of services supporting the entire process from risk prediction to preventive intervention (PHR management, prevention programs, etc.)

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

2023: TRL 5 and above	2025: TRL 6 and above	2027: TRL 7 and above
• Develop data infrastructure • Develop AI screening	• System implementation of demonstrated technologies • Social implementation of developed systems	
• Collect health data • Collect life log data • Develop AI • Develop prevention programs • Exploratory observational study	• Demonstrate PHR app • Demonstrate prevention programs • Improve AI accuracy	• Business application of information infrastructure • Expand sales of various systems and programs • Nationwide deployment of prevention programs

Demonstration completed

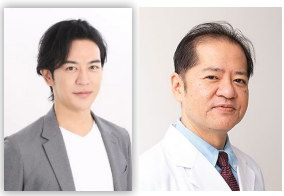
End of March 2028

[Post-social implementation immediate targets]

- Aim to acquire a 2.46% share (20 billion yen) of the market for areas that overlap with this project (estimated to reach 813 billion yen in 2035) in the domestic market for healthcare and eldercare besides domestic and overseas public insurance

Developer's Message (Future Vision)

- In Japan, where the birth rate decline and population aging are advancing at one of the fastest rates globally, this project aims to create new value in health, prevention, and medical care by accelerating efforts in healthcare AI/analytics through building a computational society that maximizes the effective use of limited medical and human resources.
- Through these efforts, our company contributes to realizing a society where all people, from children to the elderly, can lead healthier and more fulfilling lives.



Regional Data Core Inc.
CEO Ryosuke Kobayashi
CTO Kunihiro Nishimura

<Company Details>
- Company Website: https://www.r-dc.co.jp/
- Head Office: Within the National Cerebral and Cardiovascular Center at 6-1 Kishibe-Shimmachi, Suita-shi, Osaka
- Contact: Representative Director and CEO Ryosuke Kobayashi, kobayashirysk@r-dc.co.jp

Development and Implementation of AI for Early Detection of the Risk of Needing Nursing Care by Using Voice Data

Taiyo Life Aging Society Institute Co., Ltd.

Large-scale technology demonstration: 2023–2027

Overview of Large-Scale Technology Demonstration

- This demonstration will help develop and implement a screening AI capable of easily measuring mild cognitive impairment (MCI), depressive tendencies, and fatigue levels through about 40 seconds of any kind of speech input via a device such as a smartphone.
- Alongside the demonstration, accuracy improvement and development of the service conducted at SMK Corporation will undergo scientific evaluation performed by the National Cerebral and Cardiovascular Center.
- This will help achieve early detection of MCI, a precursor to dementia, and lead people to treatments within an aging society.

[Demonstration (illustrative only)]

- A demonstration targeting Taiyo Life's customers and employees.
- Improve accuracy by conducting speech analysis using speech engines and AI models.
- Make improvements based on the demonstration results.

Repeatedly implement the above processes towards social implementation.

[Technology's features and sophistication level]

- Development is underway for this speech recognition technology that analyzes diseases and conditions after extracting over 10 million voice feature metrics—characteristic of emotional and physical states—including acoustic features (frequency), prosodic features, and linguistic features, from about 40 seconds of any kind of speech

⇒ Ultimately, develop a service for early detection of MCI, a precursor to dementia

[Outcome (illustrative only)]

Collect voice data

Analysis for accuracy improvement

Demonstration and improvement towards social implementation

[Post-social implementation immediate targets]

- By providing this service, aim to generate consulting revenue on the scale of about 10 million yen annually, primarily targeting dementia insurance policyholders of Taiyo Life Insurance Company

Development Schedule and Targets for Social Implementation

[Development targets]

- Improve detection accuracy (MCI: 85%, depressive tendencies: 80%, and fatigue: 85%)
- Develop service that can be mass-deployed

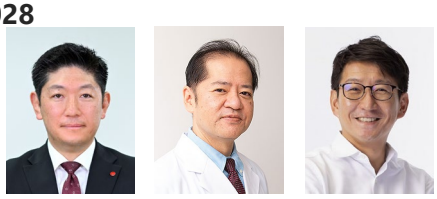
2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Collect voice data • Improve accuracy using collected data • Conduct trial service for a subset of users	• Collect voice data and further improve accuracy • Conduct trial service assuming real-world service level	• Leverage data collected during trials to further improve accuracy • Launch improved service version

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- The healthy life expectancy of Japanese people is shorter than their average lifespan, with MCI being one of the causes. We aim to provide a service that leverages voice data and AI to help realize a society of health and longevity.



(From left) Taiyo Life Aging Society Institute President Hidenari Takahashi, National Cerebral and Cardiovascular Center Director Kunihiro Nishimura, and SMK Corporation General Manager Shuji Igawa

<Company Details>
- Company Website: https://www.taiyo-institute.co.jp/
- Head Office: 2-11-2 Nihonbashi, Chuo-ku, Tokyo
- Contact: contact.rd@taiyo-institute.co.jp

Development of a Monitoring System for Wandering by Dementia Patients Using Gait Data

Noel, Inc.

Large-scale technology demonstration: January 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Noel, Inc. will conduct a technology demonstration related to algorithm development to detect characteristics of dementia patients using 3D gait analysis technology with cameras.
- This will help realize a dementia-friendly society through a system that provides insights based on gait using demonstrated technology.

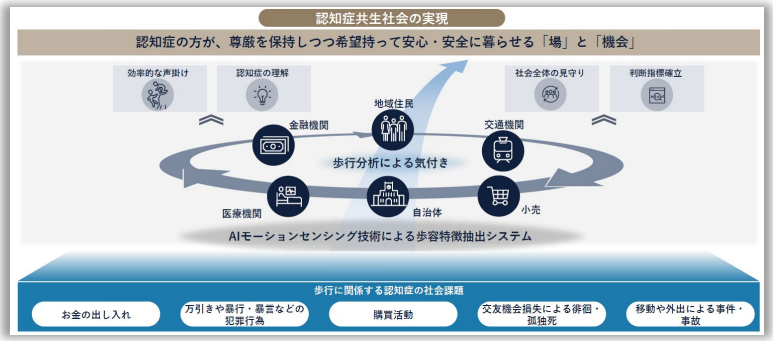
[Core technology development]
Data collection demonstration planned for a facility in Kuwana, Mie and elsewhere

[Technology's features and sophistication level]

- Algorithm for detecting gait characteristics of dementia and mild cognitive impairment using gait data
- 3D skeletal estimation technology via cameras

⇒ Ultimately, develop a monitoring system for wandering by dementia patients using gait data

[Society to be achieved through implementation]



[Post-social implementation immediate targets]

- Aim to build a system that detects characteristics of dementia patients at an early stage with low invasiveness and high privacy protection for personal information data, contributing to the realization of a dementia-friendly society where other people speak with patients and notice their symptoms at an early stage

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop AI model for characteristic detection
- Develop applications for social implementation
- Conduct service trials in real-world environment

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above	End of March 2028
• Acquire gait data • AI motion sensing analysis • App development • Validate in simulated environment	• Validate in real-world environment • Conduct field test in real-world environment	• Conduct field test and partial service implementation in real-world environment	Demonstration completed

Developer's Message (Future Vision)

- By implementing this system in society, Noel envisions that identifying the characteristics of people with dementia will lead those nearby to take action, such as speaking to them. We are aiming for our technology to greatly contribute to realizing a dementia-friendly society through provision of places and opportunities for all people with a connection to dementia to live safely with peace of mind.

<Company Details>
■Company Website: https://www.noel-ltd.com/
■Head Office: 7th Floor, Utoku Building, 1-28-26 Meieki-minami, Nakamura-ku, Nagoya-shi, Aichi
■Contact: 052-526-8801 (info@noel-ltd.com)

Ministry of Health, Labour and Welfare

Development of an AI System for Early Detection of Individuals at High Risk for Diseases Using Real-World Data, and Verification of Social Implementation of Preventive Intervention

Small/Startup Business Innovation Research

Development and Implementation of AI Prediction Models for Requiring Nursing Care and Primary Risk Factors, Such as Stroke and Cardiovascular Diseases

Mediest Co., Ltd.

Large-scale technology demonstration: January 2024–March 2028

Overview of Large-Scale Technology Demonstration

■ This demonstration is advancing development of an AI system for early detection of individuals at high risk for diseases using real-world data, and verification of social implementation of preventive intervention.

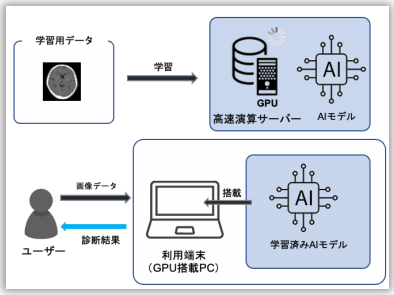
[Technology's features and sophistication level]

■ Utilization of real-world data: Building of a database by linking electronic medical health records (information on diagnosis, treatment, examination, and prescriptions) and health checkup data from regional and core hospitals, covering two million people, enabling secondary use under the Next-Generation Medical Infrastructure Act.

■ Utilization of the Next-Generation Medical Infrastructure Act: Realization of screening AI with unprecedented high accuracy by linking health checkup and nursing care data held by local governments with existing hospital medical data on an individual basis while protecting personal information.

■ Advanced AI technology: Development of an explainable AI model that can visualize decision-making rationale by leveraging experience in developing AI models using ECG and head CT images. This will provide a tool that local government staff and medical professionals can easily understand and utilize.

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets] • Implement AI model

- FY2024: TRL 5 and above — Make initial design of AI model using small data, and then train the initial model
- FY2025: TRL 6 and above — Retrain and improve the accuracy of the AI model using integrated big data from local governments and hospitals
- FY2027: TRL 7 and above — Build the AI model API and integrate into BI tool, and then start social implementation

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

■ Aim to introduce a BI tool targeting local governments (1,718 municipalities) and hospitals (8,372 facilities) nationwide
Through this, aim to achieve annual sales of 2.52 billion yen and a 5% share of the domestic market

Collaboration with Consortium Partner Company

■ Mediest collaborates with Integrated Clinical Care Informatics, Inc. for data sharing.
The company also integrates the AI models it implements with user-friendly BI tools for local government staff and medical professionals via APIs.

Representative's Message (Future Vision)

■ Through this project, Mediest Co., Ltd. aims to realize early detection and preventive intervention for cardiovascular diseases, strokes, and people at risk of needing nursing care, contributing to the extension of healthy lifespans in local communities.

Mediest Co., Ltd. CTO
Hidetoshi Matsuo

Mediest Co., Ltd. CEO
Makoto Nishimori

<Company Details> Development and contracted analysis of medical AI software
■ Company Website: https://mediest.jp
■ Head Office: 7-5-2 Kusunoki-cho, Chuo-ku, Kobe-shi, Hyogo
■ Contact: 090-8284-2635

Sophistication and Secure Use of Individual Life Course Data

Integrated Clinical Care Informatics, Inc.

Large-scale technology demonstration: March 2023–March 2028

Overview of Large-Scale Technology Demonstration

■ Based on the Next-Generation Medical Infrastructure Act, this demonstration will collect, aggregate, and anonymize medical information (certified by competent authorities) to create secure and useful life course datasets, thereby addressing challenges in data utilization for healthcare-related businesses.

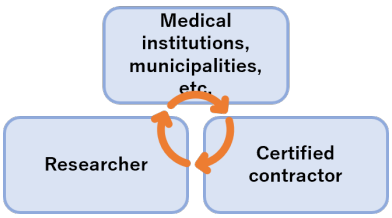
[Technology's features and sophistication level]

■ Collaboration with Japan Medical Association Medical Information Management Organization (J-MIMO), a certified preparation business under the Next-Generation Medical Infrastructure Act, enables secondary use (data provision)

■ Life course data is created by aggregating electronic health records from healthcare institutions with health checkup and other data held by local governments, thereby contributing to the creation of new industries and policymaking and evaluation in the healthcare, medical, and welfare fields

⇒ Ultimately, build up life course data

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

■ Aim to acquire about 1% (about 5 billion yen) of the domestic and international medical big data market (projected to reach 719.7 billion yen in 2035)

Development Schedule and Targets for Social Implementation

[Development targets]

FY2024: TRL 5 and above	FY2025: TRL 6 and above	FY2027: TRL 7 and above
• Collect, aggregate, and anonymize data from medical institutions, and provide data to AI development companies, etc.	• Collect, aggregate, and anonymize data from local governments, and provide data to AI development companies, etc.	• Provide life course data to healthcare companies, such as pharmaceutical, insurance, and AI companies, and others
	• Build up regional medical big data based on next-generation medical infrastructure	• Build up life course data based on next-generation medical infrastructure

Demonstration completed

End of March 2028

Collaboration with Consortium Partner Companies

■ Aggregating and anonymizing the data for provision in accordance with the Next-Generation Medical Infrastructure Act will contribute to enhancing the product development speed and quality of participating companies.

■ Life course data will be provided to Mediest and integrated with its developed AI, improving product quality through mutual interoperability of products.

[Data flow]

Representative's Message (Future Vision)

■ As a certified contractor under the Next-Generation Medical Infrastructure Act, we pioneer new markets and promote business developments in medical data with the aim of creating a vibrant society through medical data.

President and CEO Ryohei Nishimoto

<Company Details> Certified contractor (I-20-01) for handling medical information, etc. under the Next-Generation Medical Infrastructure Act

■ Company Website: https://www.ici-inc.co.jp/

■ Head Office: 6th Floor, Koishikawa Sakura Building, 1-28-1 Koishikawa, Bunkyo-ku, Tokyo

■ Contact: 03-5981-9591

Development and Implementation of Data Collection, Data Sharing, and AI Prediction Result Notification Functions Using PHRs

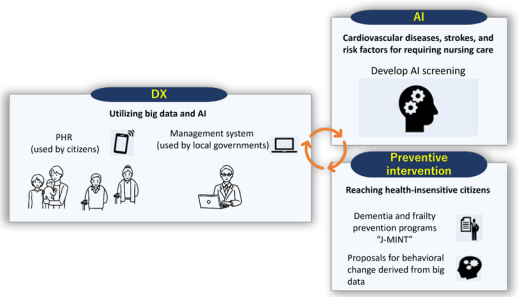
Ishinban, Inc. (Joint Proposal Startup)

Large-scale technology demonstration: January 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Verification of technology related to collection of life log data on diet, exercise, etc. using "With Wellness" personal health records (PHRs), and integration with the database created for this project linked to local governments and hospitals
- Construction of a monitoring interface for managing life log data by accessing the above database, along with provision of message sending and questionnaire functions enabling feedback on the collected life log data

[Society to be achieved through demonstration]



Future demonstrations planned in multiple local governments, including Nobeoka, Miyazaki

[Technology's features and sophistication level]

- Life log data collection using PHRs (via devices such as smartphones)
- Integration with blood test data from health checkups, etc.

⇒ Develop a new PHR management system combining life log data and communication

[Outcome (illustrative only)]

Sending of personalized messages while managing life log data with the tool

[Post-social implementation immediate targets]

- Targeting the specific health checkup market of 815 municipalities in Japan (1.38 billion yen), aim to provide a tool enabling proactive resident participation and capture the market of 350 organizations (420 million yen) by 2035

Development Schedule and Targets for Social Implementation

[Development targets]

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Collect life log data • Develop monitoring functions • Develop questionnaire sending function	• API integration with data centers • Update functions • Improve UI/UX	• Expand fields of data collection • Enhance health guidance tool • Develop preventative program using PHRs
• Implement monitoring functionality for PHRs • API integration with data centers		• Implement data collection classification function by local government • Enhance feedback function

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Most PHRs are limited to applications for users to record their health status.
  To maximize the potential of PHRs, Ishinban believes that it is essential for administrators*1 to access users' life log data and engage in communication in order to generate major benefits for both parties. Through this project, we aim to unlock the potential of PHRs and contribute to the promotion of the medical and healthcare industry.
  *1. "Administrators" refers to entities such as administrative agencies, medical institutions, health checkup facilities, academia, and companies.

Ishinban, Inc. Director Takuya Hatakeyama

<Company Details>
■ Company Website: https://www.huf.co.jp/
■ Head Office: Akasaka Intercity AIR, 1-8-1 Akasaka, Minato-ku, Tokyo
■ Contact: ishinban-pro@hugp.com

Spread and Implementation of a Multi-Factor Intervention Program for Dementia and Frailty Prevention

J-MINT Accreditation and Promotion Center Co., Ltd. (Joint Proposal Startup)

Overview of Large-Scale Technology Demonstration

Large-scale technology demonstration: January 2024–March 2028

- This demonstration will develop a "community-based program" to provide evidence-based dementia and frailty prevention programs (J-MINT study) for elderly people at risk of dementia living in communities.
- It involves developing a training system for human resources to provide the community-based program as well as materials, and support tools, with repeated revisions through the demonstration project. It will establish a system for wide-scale rollout.

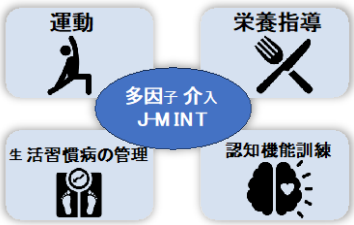
[Demonstration site] Obu, Aichi

[Technology's features and sophistication level]

- Social implementation of the J-MINT study conducted as part of a national project
- Help for addressing the social issue of dementia in collaboration with local governments

⇒ Build and spread a mechanism that enables individuals to receive dementia and frailty prevention programs in their familiar communities, thereby reducing dementia onset rates and alleviating the financial burden of nursing care

[Outcome (illustrative only)]



Packaging for community-based adaptation and widespread rollout

Development Schedule and Targets for Social Implementation

[Development targets]
- Build a human resources training system
- Develop shared materials
- Conduct demonstrations in multiple municipalities
- Establish provision methods

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Human resources training system • Develop materials • Investigate local government needs • Study feasibility	• Large-scale demonstration • Study transition to independent operation • Evaluate business	• Build a system for wide-scale rollout • Organize a monitoring framework • Implement promotional activities • Spread the qualification certification system

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- For the program to certify instructors who deliver the community-based program, aim for sales by FY2035 of 4.7 billion yen in enrollment and renewal fees for health and exercise instructors, etc.
- Aim for sales of 500 million yen by 2035 in terms of provision of the community-based program by "designated businesses" that spread the program

Developer's Message (Future Vision)

- Japan will lead the way in promoting social implementation of internationally-recognized multi-factor intervention programs for dementia prevention in collaboration with local governments.
- By raising awareness of dementia prevention in local communities and enabling elderly people to practice dementia and frailty prevention in their familiar surroundings, this initiative will contribute to realizing a society where people can enjoy a long life with anticipated reduction of healthcare and nursing care costs and improvement in the quality of life of the elderly.

J-MINT participants and instructors

<Company Details>
■Company Website:
■Head Office: Collaborative Laboratory Unit No. 2, National Center for Geriatrics and Gerontology, 7-430 Morioka-cho, Obu-shi, Aichi
■Contact: 090-3327-8877 (Eto)

Ministry of Agriculture, Forestry and Fisheries

Solicitation Topics

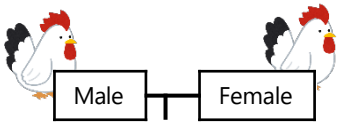
- A: Development and Demonstration of Groundbreaking Agricultural, Livestock, Forestry, and Fishery Products Using New Breeding Technologies
- B: Demonstration of Smart Breeding Project for Enhancing Breed Development Capability
- C: Development and Demonstration of Innovative Smart Agriculture Technologies and Services for Automation and Optimization of Agricultural Work
- D: Demonstration of Agricultural Technologies Contributing to Greenhouse Gas Reduction, Etc.
- E: Demonstration of Innovative Domestic Feed Production, Distribution, and Utilization Technologies Through the Use of New Feed and Production Expansion Equipment, Etc.
- F: Demonstration of Groundbreaking Livestock Farming Technologies Using Smart Technologies
- G: Demonstration of Smart Technologies for Automation and Remote Operation, Etc. of Forestry Work
- H: Technology Demonstration for Social Implementation of Advanced Utilization of Forest Products
- I: Development and Demonstration of Fishmeal Substitute Ingredients for Developing Sustainable Aquaculture
- J: Development and Demonstration of Innovative Smart Fisheries Technologies from Resource Assessment and Management to Production, Processing, and Distribution
- K: Development and Demonstration of Production and Distribution Systems That Accelerate Exports of Japanese Agricultural, Forestry, and Fishery Products and Foods
- L: Demonstration of Production Technologies That Create New Demand for Grain
- M: Development and Demonstration of Smart Technologies for Use in the Food Industry
- N: Development and Demonstration of New Foods and Feed Through Demonstration of Biotechnologies (Food Tech)

Revolutionizing Poultry Farming:
Enhancing Resource Efficiency and Animal Welfare with Genome-Edited In-Ovo Sexing

Setsuro Tech Inc.

Research and development period:
FY2023–FY2027

Overview of Large-Scale Technology Demonstration

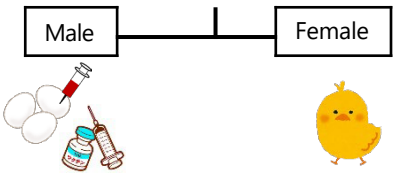


[Goals of the Research and Development]

- Implementation of our In-Ovo Sexing technology into commercial poultry breeds.
- Development of a high-throughput device to determine the sexing before hatching.
- Development of a new genome-editing nuclease.

[Goals after the Social Implementation]

- An added value of about 100 billion yen will be created in the global egg-laying chicken market in 2033
- Acquire about a 20% share (20 billion yen) of the anticipated added value



Development Schedule and Targets for Social Implementation

2024: TRL 5
- Perform genome editing on primordial germ cells of chickens
- Develop device for in-ovo sexing
- Develop proprietary genome editing factors

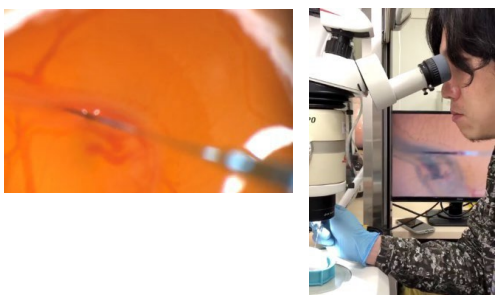
2025: TRL 6
- Produce genome-edited chickens
- Develop device for in-ovo sexing
- Apply for patent for proprietary genome editing factors
- Send notifications to the MAFF and MHLW

2027: TRL 7
- Evaluate performance of genome-edited chickens (F2 homozygous)
- Develop candling equipment capable of in-ovo sexing function
- Mass produce genome editing factors

Developer's Message (Future Vision)

- Around the world, male chicks produced as a by-product of egg-laying hens are killed shortly after birth after sex identification. We will solve this problem by implementing our unique technology using genome editing in society.

Transplantation of the primordial germ cells



Setsuro Tech

<Company Details> Setsuro Tech Inc. will create an industry that solves problems for both you and the planet by harnessing the potential power of living organisms.
- Company Website: https://setsurotech.com
- Head Office: Fujii Memorial Institute of Medical Sciences, 3-18-15 Kuramoto-cho, Tokushima-shi, Tokushima
- Contact: setsurotech@setsurotech.com

Development and Demonstration for Innovative Marine Product Sales Utilizing Breeding Technologies such as Genome Editing

Regional Fish Institute, Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- This project will demonstrate technology related to "superior marine products created through genome editing and other breeding improvement techniques" that contributes to reducing production costs and increasing sales prices in the aquaculture industry.
- The aim is to stably supply high-quality breeds that improve the profitability of aquaculture with relation to marine products, which has not seen selective breeding improvements as there have been for agricultural and livestock products.

[Demonstration site] Miyazu, Kyoto

[Technology's features and sophistication level]

- High-speed breeding improvement technology using methods such as genome editing
- Mastery of breeding and generational propagation technologies for key aquaculture breeds

⇒Ultimately, develop highly profitable breeds characterized by rapid growth, higher edible yield, and resilience to environmental changes

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]
- Achieve profitability-enhancing traits (rapid growth, improved yield, environmental resilience, etc.)

Prepare for commercialization
- Evaluate the traits of breeds in laboratory environments
- Complete notifications to the MAFF and CAA

2023: TRL 5 and above

Prepare for mass production
- Evaluate the profitability-enhancing effects of breeds in assumed aquaculture environments
- Establish mass production systems

2026: TRL 6/7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Aim to take about a 9% market share, including indirect sales, in Japan's marine product market (focused on specific fish species)
- Improve the profitability of aquaculture operations with the developed breeds
- Contribute to the expansion of marine product exports from Japan and the enhancement of the national food self-sufficiency rate

Developer's Message (Future Vision)

- Aquaculture in Japan faces an unstable and challenging business environment due to recent global warming, the occurrence of fish diseases, rising feed costs, and other issues. To address this situation, Regional Fish is developing and socially implementing high-revenue breeds to improve the business conditions of the aquaculture industry.
- By establishing a system capable of stably supplying high-quality breeds, we aim to transform aquaculture into a highly profitable growth industry and promote industrial development across entire regions where aquaculture has taken root.

Regional Fish Institute, Ltd.
CEO Umekawa (third from right in front row)

<Company Details>
- Company Website: https://regional.fish/
- Head Office: International Science Innovation Building, Kyoto University at 36-1 Yoshida-Honmachi, Sakyo-ku, Kyoto-shi, Kyoto
- Contact: https://regional.fish/contact/

J-Startup J-Startup Impact J-Startup KANSAI

Ministry of Agriculture, Forestry and Fisheries
(A: Development and Demonstration of Groundbreaking Agricultural, Livestock, Forestry, and Fishery Products Using New Breeding Technologies)

Small/Startup Business Innovation Research

Social Implementation of Allergen-Reduced Eggs to Achieve Food Accessibility

PtBio Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Advancement of the breeding of chickens that produce allergen-reduced eggs.
- Development of processed foods using allergen-reduced eggs and implementation of physical property and quality testing.
- Implementation of biochemical evaluations (laying rate, robustness, etc.) and economic assessments at a chicken coop capable of raising 500 chickens.

[Demonstration sites (planned)] Hiroshima and Kumamoto prefectures

[Technology's features and sophistication level]

- Development of allergen-reduced eggs from chickens made ovomucoid (OVM) gene-free using PtBio's proprietary genome editing "knock out" technology
- A world-first initiative that enables people with egg allergies to go from avoiding eggs to enjoying allergen-reduced eggs

⇒Ultimately, develop processed egg products that can be consumed by people with egg allergies

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Aim to acquire a 10% share (19 billion yen) of the global alternative egg market (valued at 190 billion yen in 2023)
- Expand not only in Japan but also into international markets
- Develop allergen-reduced eggs for vaccines (vaccine market: 585 billion yen in 2032)

Development Schedule and Targets for Social Implementation

[Development targets]

- Breeding and variety improvement of chickens
- Development of processed foods using allergen-reduced eggs
- Safety testing for allergen-reduced eggs
- Large-scale demonstration tests for allergen-reduced eggs at production and processing sites
- Formulation of commercialization and branding strategies

- Develop quality control methods for chickens
- Evaluate the safety of processed foods
- Establish a production system for 250 chickens
- Confirm safety through clinical trials
- Conduct outreach activities

2023: TRL 6 and above

- Develop next-generation breeds
- Launch processed food products
- Send notification to the CAA and supply products
- Conduct biochemical and economic evaluations through large-scale demonstration tests

End of FY2026: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Eggs are an excellent ingredient used in various foods, but people with egg allergies cannot eat foods containing eggs. The families of people with egg allergies also tend to avoid foods containing eggs, reducing food options not just for allergy sufferers but for their entire families.
- Through the social implementation of allergen-reduced eggs, PtBio will contribute to achieving "food accessibility" where everyone can gather at one dinner table, regardless of their allergies.

PtBio Inc. CEO Keisuke Okuhara

<Company Details>
- Company Website: https://www.pt-bio.com/en
- Head Office: 3-10-23 Kagamiyama, Higashi-Hiroshima-shi, Hiroshima
- Contact: info@pt-bio.com

J-Startup WEST

Ministry of Agriculture, Forestry and Fisheries
(A: Development and Demonstration of Groundbreaking Agricultural, Livestock, Forestry, and Fishery Products Using New Breeding Technologies)

Small/Startup Business Innovation Research

Development and Demonstration of New Seedlings via Expanded Genome Editing Technology to Enable Climate Change Countermeasures

GRA&GREEN Inc.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- GRA&GREEN will rapidly develop and demonstrate crop varieties that contribute to climate change countermeasures using genome editing technology with proprietary improvements added.
- Along with providing concrete solutions to meet the need for climate change countermeasures, we aim to increase social acceptance of genome editing technology and promote its swift spread in society.

[Demonstration site]

[Technology's features and sophistication level]

- Fundamental technology capable of genome editing across various crop varieties
- Genome editing technology to regulate gene function

⇒Develop innovative varieties adapted to climate change

[Outcome (illustrative only)]

Tomatoes developed to withstand extreme heat

Development Schedule and Targets for Social Implementation

[Development targets]

- Create tomatoes that can withstand extreme heat
- Roll out crops adapted to climate change through collaboration
- Develop and demonstrate adaptive traits for climate change

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Demonstrate cultivation under laboratory environment	• Provide information to and notify relevant ministries and agencies on genome-edited crops for general use and as food products • Establish seedling production and cultivation system	• Cultivate and evaluate crops in actual production environment • Demonstrate usefulness as breeding material

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Aim to capture 2% (approx. 5 billion yen) of the domestic tomato market (estimated at 240 billion yen by 2032)
- In addition, aim for overall sales growth of 8.7 billion yen by providing technology and seedlings through collaboration

Developer's Message (Future Vision)

- Lowered agricultural productivity and deteriorating product quality due to climate change are major challenges. We will therefore develop crop seedlings capable of adapting to these changes.
- Through partnerships, we will continue to provide solutions to challenges concerning a wider variety of crop species.

Representative Masaki Niwa (far left)
CTO Takehito Kobayashi (far right)

<Company Details>
- Company Website: https://www.gragreen.com
- Head Office: 5-112 Higashiyama-tori, Chikusa-ku, Nagoya-shi, Aichi
- Contact: info@gragreen.com

J-Startup CENTRAL

Ministry of Agriculture, Forestry and Fisheries
(B: Development and Demonstration of Smart Breeding Technology to Enhance Variety Development Capabilities)

Small/Startup Business Innovation Research

Innovation in the Breeding Business through a Data-Driven Platform

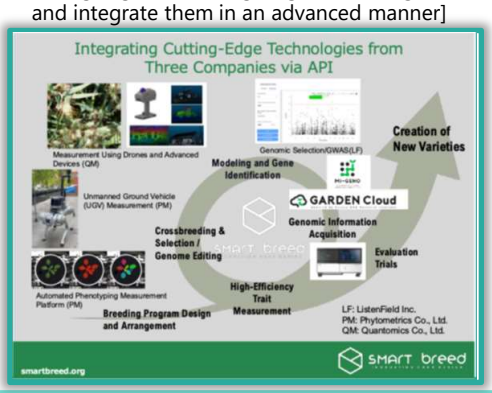
ListenField Inc. (representative)
Phytometrics Co., Ltd., Quantomics Co., Ltd.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- Many aspects of selective plant breeding still rely on the artisanal skills of breeders. To transform these skills into a streamlined, accessible, and efficient system, we are developing smart breed™, a breeding support platform powered by cutting-edge technology.
- smart breed™ is a next-generation service that leverages remote sensing and AI to precisely measure plant traits and analyze their relationship with genetic information using genomic data. This approach enhance the efficiency of selective breeding. To ensure practical implementation, we will test the system in real-world breeding environments through collaborations with private companies and public institutions, verifying its effectiveness along the way.
- We will establish a consortium with three startups and The University of Tokyo (contractor) to conduct the demonstration trials.

[Bring together cutting-edge Technologies and integrate them in an advanced manner]



[Technology's features and sophistication level]

- High-precision and efficient evaluation of plant characteristics using remote sensing and AI
- Modeling relationship between plant traits and genetic information to optimize selection and breeding
- A seamless API system for integrated analysis of plant trait data and genetic data
- A comprehensive, one-stop web service that enables data-driven breeding

[Outcome (illustrative only)]

- Enable easy implementation of high-precision plant evaluation and breeding plans for anyone
- Provide user-friendly systems that facilitate data analysis and decision-making
- Enhance the efficiency of selective breeding and significantly shorten development time

Development Schedule and Targets for Social Implementation

[Development targets]

Provide the smart breed™ service, replacing artisanal skills with streamlined technology to achieve "**breeding technology that anyone can use**"

- Design a system for secure and seamless data connectivity
- Initiate development of API functions
- Begin collecting crop data for demonstration testing

2024: TRL 5 and above

- Integrate products and services from multiple companies
- Analyze characteristics using genetic information
- Develop and evaluate selection models using genomic data

2025: TRL 6 and above

- Collaborate with client companies to design target breeding strategies and initiate trial operations
- Implement breeding using smart breed™ and assess its effectiveness

2026: TRL 7 and above

Demonstration completed

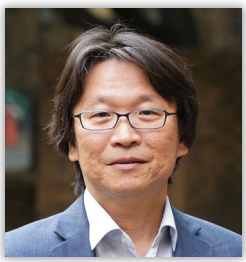
End of March 2028

[Post-social implementation immediate targets]

- Aim for sales of 3 billion yen, capturing 2.3% of global smart breeding R&D market, which is projected to reach 130 billion yen by 2033
- Expand service across various industries on top of existing seedling companies to realize development of new plant varieties in a wide range of fields, such as pharmaceuticals, food, and cosmetics

Developer's Message (Future Vision)

- Genetically designing plants with the desired characteristics and applying next-generation breeding systems will accelerate the breeding process, unlock new markets, and significantly enhance the competitiveness of breeding companies.
- smart breed™ enables data-driven, streamlined evaluation technology for breeding a wide range of plants, allowing even companies with no prior breeding experience to participate in the field.



Consortium Representative
Hiroyoshi Iwata
Quantomics Co., Ltd. Director

<Consortium Details>
- Consortium Website: https://smartbreed.org/
- Consortium Representative Company: ListenField Inc. (https://www.listenfield.com/ja/about)
- Head Office: 5th floor, Shima Building, 3-3-2 Meieki, Nakamura-ku, Nagoya-shi, Aichi
- Contact: https://bit.ly/smart-breed

Wide-Area Demonstration of Pesticide Spraying Services Using Autonomous Robots

Legmin Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- This project involves technology demonstration of "autonomous pesticide-spraying robots" that use GPS and sensing to autonomously navigate fields and automatically spray pesticides at designated locations.
- It aims to expand the application of the spraying robots, which have been demonstrated for green onions, to vegetables grown outdoors such as cabbage and broccoli, as well as facility-grown crops like strawberries and cucumbers.

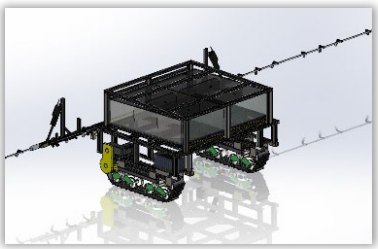
[Demonstration site] Fukaya, Saitama

[Technology's features and sophistication level]

- Development of spraying robots capable of autonomous navigation under various field conditions
- Development of a management system enabling the operation of multiple robots

⇒Ultimately, develop a system that provides optimized spraying work through to operations

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Achieve a 50% market share in the Fukaya, Saitama area within five years of the demonstration's conclusion
- Roll out direct and franchise operations centered on production areas for green onions, cabbage, and broccoli, capturing 10–50% market share in each area

Development Schedule and Targets for Social Implementation

[Development targets]
- Expand applicable crops
- Enhance autonomous navigation patterns
- Support large fields of 2 hectares or more

Enhance autonomous navigation patterns
- Autonomous navigation tailored to crop growth conditions
- Establish autonomous navigation for various cropping types

2024: TRL 5 and above

Expand applicable crops
- Apply to vegetables grown outdoors, such as cabbage and broccoli
- Apply to facility-grown crops such as strawberries and cucumbers

2025: TRL 6 and above

Adapt to various types of management systems
- Support large fields of 2 hectares or more
- Establish efficient operation methods for small-scale multiple farm management systems

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- As labor shortages become increasingly severe in various regions, Legmin wants to help improve agricultural productivity through this robot demonstration in order to maintain Japan's high-quality vegetable standards.
- By building a service-oriented business, we aim to make our robots accessible not only to large-scale corporate farms but also to all farmers.

Legmin Inc. Representative Director Naruse (right) and Development Supervisor Maruyama (left)

<Company Details>
■Company Website: https://legmin.co.jp/
■Head Office: 7-16-16 Kamishiba-cho Nishi, Fukaya-shi, Saitama
■Contact: sbir_info@legmin.com

Development of Smart Impact Indoor Vertical Farms to Lower Manpower and Resources Consumption

PLANTX Corporation

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- By integrating its highly productive and stable closed-type plant production machines with robotics technology and resource-saving technology, PLANTX will develop a smart impact vertical indoor farm that emphasizes manpower and labor reduction as well as efficient use of resources.
- Demonstration testing will be implemented at the cutting-edge indoor vertical farm owned by United Super Markets Holdings Inc. (USMH), a major supermarket chain, to finalize an on-site practical solution.

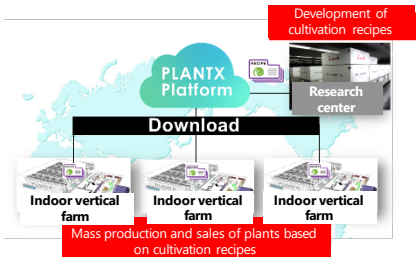
[Demonstration site]
USMH's indoor vertical farm

[Technology's features and sophistication level]

- Significant reduction in time required for cultivation and facility maintenance through automation, etc.
- Major improvements in power and resource utilization efficiency

⇒Complete a fully-automated indoor vertical farm with excellent labor and resource efficiency

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

[Development targets]
- Reduce cultivation workload
- Reduce facility maintenance and management workload
- Improve power utilization efficiency
- Improve water utilization efficiency
- Improve fertilizer utilization efficiency

- Prototype development of various automated machines and resource-efficient technologies

2024: TRL 5 and above

- Demonstration and verification through operation at indoor vertical farm sites

2026: TRL 6 to 7

Demonstration completed

End of March 2028

- Expand indoor vertical farm operations in Japan and abroad, achieving over 100 billion yen in sales in the global indoor vertical farm market which is projected to grow to 10 trillion yen in 2032 (PLANTX estimate)
- As a resource-efficient food production system, contribute to achieving the "MIDORI Strategy for Sustainable Food Systems"

Developer's Message (Future Vision)

- Unreasonable weather, depletion of finite resources, labor shortages, and other accumulating social factors have made stable food production a pressing issue. Indoor vertical farms have been gaining attention as a potential solution to address food and environmental issues. However, both the technology and industry are still in developmental stages.
- Through this initiative, PLANTX will integrate advanced technologies with our indoor vertical farms that feature sophisticated cultivation environment controls. This will enable us to develop an indoor vertical farm solution that maximizes labor and resource efficiency.

Director Sakaguchi (marked with red circle)

<Company Details>
- Company Website: https://www.plantx.co.jp/
- Head Office: 3-6-15 Kyobashi, Chuo-ku, Tokyo
- Contact: info@plantx.co.jp

Realization of a Groundbreaking DX-Driven Strawberry Indoor Vertical Farm to Revitalize Japanese Agriculture

MD-Farm Inc.

Technology demonstration for large-scale operation: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Demonstration experiment of an integrated system that includes automated guided vehicles (AGVs), automatic pollination equipment, automatic irrigation equipment, automatic harvesting robots, etc.
- Realization of an indoor vertical strawberry farm that is capable of efficient, stable year-round production and supply, establishment of an organization for easy rollout, and market introduction

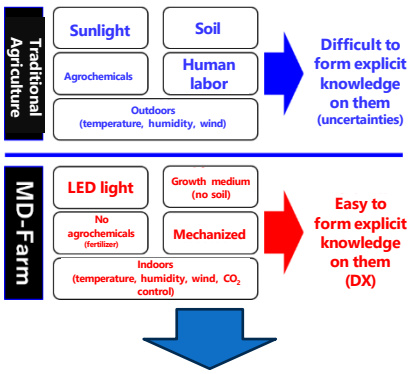
[Demonstration site] Shibata, Niigata

[Technology's features and sophistication level]

- High yield and stability based on a patented cultivation method enabling continuous growth of strawberries throughout the year
- Labor-saving indoor vertical farm using an integrated cultivation system driven by AI and DX

⇒Ultimately, realize a next-generation strawberry indoor vertical farm that can be rolled out globally

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

[Development targets]

- Integrate completed core technologies
- Enhance harvesting robot functionality
- Build management systems
- Prepare rollout frameworks

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Autonomous AGVs • Automatic pollination equipment • Automatic irrigation equipment	• Harvesting robots • Management systems • Cloud-based management	• Domestic rollout team • Overseas rollout team

Demonstration completed

End of March 2028

- Aim to acquire a 6% share (32 billion yen) of the domestic strawberry market (projected to reach 700 billion yen in 2030)
- Expand to North America and the EU based on acquired patents
- Establish a new industry called "AgrI-DX"

AgrI-DX

Developer's Message (Future Vision)

- MD-Farm will provide the world's first comprehensive and economical system and solutions for stable strawberry production.
- This next-generation agriculture will not only stabilize earnings but also greatly improve working conditions by enabling operation in cooler environments.
- We want to transform agriculture from just transporting crops into stable, localized production near consumers, and create a new way to supply Japan's strawberries to the world.

MD-Farm
CEO Yuki Matsuda

<Company Details>

- Company Website: https://www.md.farm/
- Contact: info@md.farm
- Head Office: 2-9-22 Johoku-cho, Shibata-shi, Niigata
- Company Promotional Video: https://youtu.be/vvZ0_Xf4lkc

Generalization of Design and Optimization of Field Environments to Create an Automated Harvesting Robot Business

inaho Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- This project involves collaboration with production operators in Japan and abroad to study cultivation methods that facilitate operation by both humans and harvesting robots in tomato and asparagus production environments.
- By developing affordable robots that are competitive not only in terms of performance but also price, this project will establish a harvesting robot market in Japan, a country that is difficult for foreign operators to enter.

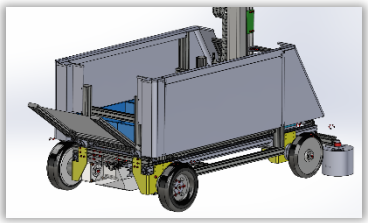
[Demonstration site]
's-Gravenzande, Netherlands

[Technology's features and sophistication level]

- Study of cost reduction through generalization and optimization of cultivation methods

⇒Ultimately, develop TRL Level 7 automated harvesting robots for both tomato and asparagus fields

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Achieve a market share with 10% adoption rate in the domestic market for labor-saving solutions in selective harvesting of representative vegetable (2030: 120 billion yen/year (TAM))
- Aim to achieve a market share with 0.5% adoption rate (3 billion yen/year) in the global selective harvesting robot market (2032: 524.2 billion yen/year)

Development Schedule and Targets for Social Implementation

[Development targets]
- Achieve TRL 7 for mini tomato and asparagus harvesting robots
- Standardize and generalize specifications across crops to reduce costs
- Optimize field and cultivation methods for harvesting robots

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Achieve TRL 5 for dedicated mini tomato harvesting robots • Optimize field and cultivation methods for harvesting robots	• Standardize specifications for dedicated tomato and asparagus robots • Optimize field and cultivation methods for harvesting robots	• Evaluate and improve performance of harvesting robots • Organize and evaluate cost reduction effects • Optimize field and cultivation methods for harvesting robots

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Mechanization is an effective solution for farming with a limited workforce. In particular, mechanization and labor-saving measures are highly desired in selective harvesting tasks, which occupy a large share of the work time in greenhouse horticulture. To achieve mechanization in greenhouse horticulture within Japan, it is essential to secure cost competitiveness in developing and producing robots that support implementation, as well as to advance the DX of Japan's greenhouse horticulture industry. To contribute to this, inaho will pursue (1) cost reductions for machinery that exceed cost levels in Europe and the United States, and (2) the identification of cultivation methods and operations that facilitate work automation, along with the consideration and implementation of mechanization suited to Japan's production circumstances.

Development team with partner domestic producers in the Netherlands

<Company Details>
- Company Website: https://inaho.co/en
- Head Office: 2nd Floor, Yanoya Building, 11-2 Onari-machi, Kamakura-shi, Kanagawa
- Contact: info@inaho.co

Large-Scale Demonstration for Maximizing Agricultural Net Income Based on Data Acquired by Automated Harvesters

AGRIST Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Establishment of methods for data collection using automated harvesting robots as well as data analysis methods
- Accumulation of data via automated harvesting robots (creation of training data) and algorithm development
- Demonstration of profitability improvements through environmental control based on data obtained by automated harvesting robots

[Core technology]
Automated harvesters for bell peppers and cucumbers

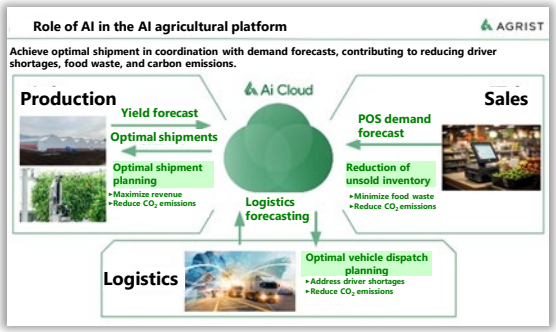
Demonstration planned for Joso, Ibaraki in future

[Technology's features and sophistication level]

- Collection of environmental and growth data from farms during harvesting by harvesters
- Analysis of growth conditions, yield forecast, and proposal of optimal farm management based on collected data

⇒Ultimately, develop a system to maximize revenue by proposing optimal farm management using data on growth conditions and market trends

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Establish data collection methods
- Establish data analysis methods

- Review collected data types and precision
- Establish data collection methods
- Select collection equipment
- Establish data analysis methods
- Set up demonstration facilities

2024: TRL 5 and above

- Accumulate data and develop algorithms
- Demonstrate profitability improvements

- Accumulate data
- Create training data
- Develop yield forecast models
- Develop revenue maximization models
- Demonstrate environmental control
- Upgrade systems

2026: TRL 6 and above

- Cultivation demonstration with environmental control based on developed models
- Demonstrate profitability improvements
- Upgrade systems

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Begin selling the complete set of demonstration results as bell pepper cultivation and cucumber cultivation packages
- Achieve an agricultural entry model with initial costs reduced to one-fourth compared to existing indoor farm market entry
- Within five years, create three sales agencies and expand sales to cover 30 hectares

Developer's Message (Future Vision)

- By strengthening and disseminating its service lineup, AGRIST will package various agricultural cultivation processes, and help create a world where anyone can cultivate crops with high reproducibility and stability.
- This initiative will encourage companies from other industries with strong capital to enter agriculture, improve management efficiency for existing agricultural producers, and thereby help maintain and enhance Japan's food self-sufficiency rate despite the declining number of agricultural workers.

CEO Junichi Saito

<Company Details>
■Company Website: https://agrist.com/about-agrist-english
■Head Office: 1-47-1 Tonda-higashi, Shintomi-cho, Koyu-gun, Miyazaki
■Contact: info@agrist.com

Ministry of Agriculture, Forestry and Fisheries
(C: Development and Demonstration of Innovative Smart Agriculture Technologies and Services for Automation and Optimization of Agricultural Work)

Small/Startup Business Innovation Research

Development of Large-Scale Organic Smart Farms for Contributing to Realizing MIDORI Strategy for Sustainable Food Systems

Tokuiten Inc.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- Labor-saving technology for organic farming using robots, automated environmental control technology using sensors, and greenhouse heating technology using solar heating, etc. are being demonstrated on 20 ares. We will demonstrate their application on large-scale farms of 1 hectare or larger.
- We aim to establish a model for large-scale, carbon-neutral, organic smart farms.

[Demonstration site]Chita, Aichi

[Technology's features and sophistication level]

- Labor-saving and manpower-saving using robots
- Automated control of greenhouse environment
- Greenhouse heat retaining technology using carbon-neutral heat sources

⇒ Ultimately, develop large-scale, carbon-neutral, organic smart farms with labor-saving achieved using robots

[Outcome (illustrative only)]

Automated suction-type harvesting robot for mini tomatoes

Development Schedule and Targets for Social Implementation

[Development targets]

- Apply labor-saving and manpower-saving technologies using robots on large-scale farms
- Establish system for on-farm environmental data collection and automated control
- Establish greenhouse heat retaining technology using carbon-neutral heat sources

Verify on 20-are farm

- Improve robot motions, enhance dust- and drip-proofing
- Verify optimal sensor placement
- Survey greenhouse heat retaining technology, establish mathematical model

2024: TRL 5 and above

Verify on 1-hectare farm

- Verify robot operation, select communication standard
- Build environmental control system adapted for large-scale use
- Reduce fossil fuel consumption by amount equivalent to 50%

2025: TRL 6 and above

Stably operate on 1-hectare farm

- Ensure stable operation of robots
- Ensure stable operation of environmental control system
- Achieve carbon neutrality in the production process

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Achieve 100% automation rate in organic mini tomato production, aiming for sales of 30 billion yen within five years following commercialization
- Roll out large-scale, carbon-neutral, organic smart farms in various regions across Japan, aiming to reach a total project area of 50 hectares within five years following commercialization

Developer's Message (Future Vision)

- Reducing environmental impact is crucial to the sustainable development of agriculture, and organic farming is an effective way to bring this about. However, its spread has been hindered by labor shortages and difficulty with cultivation.
- Tokuiten will help realize sustainable agriculture by reducing labor needed for agriculture through robots and environmental control technology, establishing highly reproducible organic farming methods based on data, and increasing the number of carbon-neutral farms that do not use fossil fuels.

Tokuiten Representative Ryuichiro Toyoshi (right)
Cofounder Hiroki Mori (left)

<Company Details>
- Company Website: https://about.tokuiten.jp/
- Head Office: Room 2-15, NAGONO CAMPUS, 2-14-1 Nagono, Nishi-ku, Nagoya-shi
- Contact: info@tokuiten.jp

J-Startup CENTRAL

Development and Demonstration of a Recycling-Oriented Society System Contributing to the Reduction of Chemical Fertilizers and GHG Emissions

Toyohashi Biomass Solutions Co., LTD.

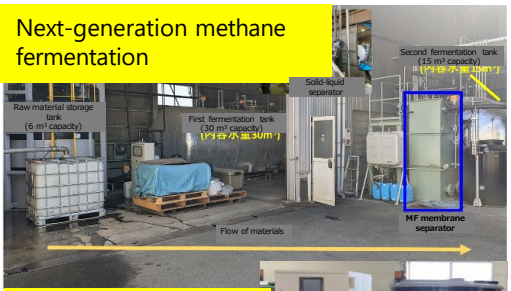
Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- This project will achieve social implementation of a system that manufactures high-grade bio-liquid fertilizer from biomass resources through the combination of Toyohashi Biomass Solutions' next-generation small-scale methane fermentation technology with Asahi Kasei's bio-liquid fertilizer production technology (Nature Ponics®).
- This will enable the production of high-grade bio-liquid fertilizer, primarily composed of nitric acid, with minimal GHG emissions, which has rarely been seen before.

[Core technology]

Next-generation methane fermentation



Bio-liquid fertilizer production (Asahi Kasei)

[Technology's features and sophistication level]

- Digestate produced by next-generation methane fermentation suitable as raw material for bio-liquid fertilizer
- Technology for efficiently converting ammonia-rich digestate into liquid fertilizer suitable for crops

⇒Ultimately, develop an integrated system for methane fermentation, liquid fertilizer production, and concentration

←Photo: Previous test equipment
Equipment for this demonstration is currently under construction

[Outcome (illustrative only)]

- Production of liquid fertilizer for hydroponics and nutrient solution cultivation, which has been challenging until now
- Further value-added through filtration sterilization and RO concentration
- Significant reduction in GHG emissions during production through the utilization of biogas-generated electricity and waste heat

Development Schedule and Targets for Social Implementation

[Development targets]

- Integrate methane fermentation, liquid fertilizer production, and concentration into a single system
- Achieve over 90% reduction in GHG emissions during the production of bio-liquid fertilizers, etc.
- Enhancement of quality (increased concentration)

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above	End of March 2028
• Demonstration using pilot test equipment	• Implement large-scale demonstration test (including nutrient solution cultivation of vegetables)	• Achieve stable operation over one year	Demonstration completed

[Post-social implementation immediate targets]

- Aim to acquire a 2% (8 billion yen) market share in the global biogas plant market (2020: 400 billion yen). The liquid fertilizer market is large, at 3 trillion yen, and we aim to manufacture and sell high-quality bio-liquid fertilizer.
- For businesses that had given up due to the need for wastewater treatment of digestates, implementation will be possible immediately after the completion of this project

Developer's Message (Future Vision)

- It will be possible to significantly expand the potential of bio-liquid fertilizers, which have seen limited active use to date. In addition to energy production, Toyohashi Biomass Solutions will supply society with high-grade liquid fertilizers and vegetables cultivated using these fertilizers as end products.
- This system will enable biomass waste generators to independently engage in regional, decentralized resource circulation systems across various locations.

<Company Details>
■ Company Website: https://toyohashibs.com/
■ Head Office: #206, Incubation Building, Toyohashi University of Technology at 1-1 Hibarigaoka, Tempaku-cho, Toyohashi-shi, Aichi
■ Contact: info@toyohashibs.com

"New Green Revolution" to Survive Global Climate Change

Ac-Planta Inc.

Large-scale technology validation: FY2023–FY2027

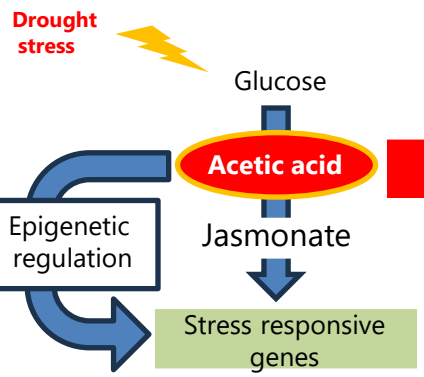
Overview of Large-Scale Technology Demonstration

■ Today, we face the challenges of "global boiling" and its effects of exacerbated drought and heat damage. To tackle this problem, Ac-Planta is expanding its "acetic acid-based" plant stimulation technology, which enhances agricultural productivity for food scarcity alleviation, and accelerates environmental restoration.

【Technological features and novelty】

Development and application of drought and heat tolerance technology to plants. Technology derives from the cutting-edge epigenetics research space.

Mechanism of plants utilizing acetic acid and becoming tolerant to environmental stress

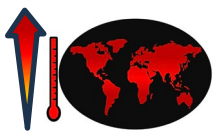


Trial under extreme drought and heat conditions (tomato)

Technology applied　　Control

【Problem to be solved】

Global boiling causes reduction in agricultural production



Technology validation

Development Schedule and Targets for Social Implementation

Target: Establish cultivation methods by using acetic acid-based plant stimulation technology in key vegetables, grains, and oilseeds

Schedule (Establishment of cultivation methods and key results)**:**

2024-2025	Dec 2026: TRL 5 → 6	Oct 2027: TRL 6 → 7	Mar 2028
• Growth in 5°C above optimal temperature • 20% reduction in water usage	• Growth in 10°C above optimal temperature • 50% reduction in water usage	• Utilization for large-scale farming • 20% reduction in fertilizer use • 20% reduction in GHG emissions	**Validation Complete**

Targets after Implementation

- Achieve 5-billion-yen market share of agricultural inputs market in 2028
- Sustainably provide food for 1 billion people worldwide
- Conserve 17.6 billion tons of water
- Absorb 2.2 million tons of CO_2

Developer's Message (Future Vision)

■ To achieve a sustainable and resilient world and society, we provide climate adaptation solutions. Through our cutting-edge epigenetic technology-based farming solutions, we drive stable food production and environmental protection.

Ac-Planta Inc. CEO Jong-Myong Kim (fifth from right)

<Company Details>
■Company Website: https://ac-planta.com/
■Contact: info@ac-planta.com
■Head Office: 3rd Floor, Chidori Building, 2-16-9 Yushima, Bunkyo-ku, Tokyo
■Yokohama Lab : 75-1 Ono-cho, Tsurumi-ku, Yokohama, Kanagawa 230-0046, Japan

Large-Scale Demonstration of Carbon Credit Generation and Trading Using Satellite Data for Agricultural Greenhouse Gas Mitigation

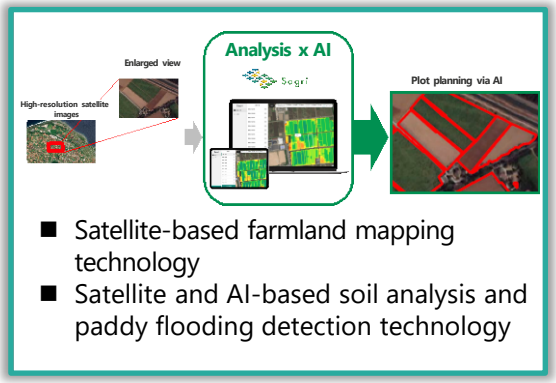
Sagri Co., Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- This project involves development and demonstration of agricultural technologies that contribute to greenhouse gas mitigation, utilizing a combination of carbon credit mechanisms and satellite data analysis technology for simplified monitoring.
- The goal is to promote greenhouse gas mitigation in agriculture and maximize the generation of carbon credits.

[Core technology]
Demonstrations leveraging the characteristics of satellite data are planned across various regions in Japan



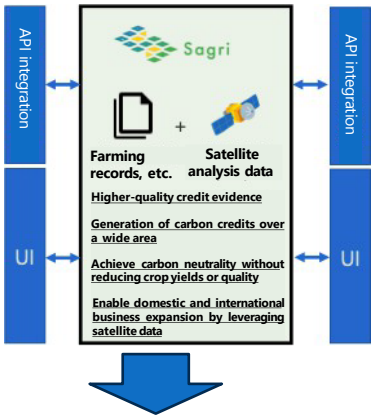
- Satellite-based farmland mapping technology
- Satellite and AI-based soil analysis and paddy flooding detection technology

[Technology's features and sophistication level]

- Simplified monitoring for greenhouse gas reduction technologies
- Maximization of carbon credit generation through wide-area monitoring

➢ Aim to develop a "Carbon Credit Generation Platform Through Advanced Monitoring and Analysis"

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- By the fifth year after commercialization (2033), contribute to reducing 10.7 million tons of greenhouse gas emissions from agricultural land domestically and internationally
- Aim for a 1.4% market share (10.9 billion yen) in the carbon credit market for agriculture in Japan and emerging countries, encompassing both government and private sectors

Development Schedule and Targets for Social Implementation

[Development targets]

- Offer digital farmland mapping information as a service via APIs
- Provide satellite data analysis services to support greenhouse gas (GHG) reduction efforts
- Generate carbon credits using advanced satellite analysis technology

Build the technology foundation
- Establish the basis for digital farmland mapping technology
- Enhance the accuracy of analysis models

2025: TRL 5 and above

Apply the technology
- Integrate into carbon credit methodologies

2026: TRL 6 and above

Commercialize the technology
- Generate carbon credits by leveraging satellite data

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- By leveraging satellite data and AI, Sagri aims to accelerate greenhouse gas reduction in agriculture toward achieving the carbon-neutral society targeted for 2050.
- Through the wide social adoption of greenhouse gas reduction technologies, we strive to maximize agricultural carbon credit generation and enhance farmland value.

Sagri Co., Ltd. CEO Tsuboi (The second from the right)

<Company Details>
- Company Website: https://sagri.tokyo/en/
- Head Office: 725-1 Joraku, Hikami-cho, Tamba-shi, Hyogo
- Contact: info@sagri.co.jp

J-Startup J-Startup KANSAI J-Startup Impact

Ministry of Agriculture, Forestry and Fisheries

(D: Demonstration of Agricultural Technologies Contributing to Greenhouse Gas Reduction, Etc.)

Small/Startup Business Innovation Research

Development and Large-Scale Farmland Demonstration of a Large-Scale Manufacturing Process for High-Function Biochar

TOWING Co.,Ltd

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Development of a large-scale manufacturing process for high-function biochar
- Quantification of the effects through large-scale application and cultivation demonstrations of high-function biochar
- Maximization of GHG emission reduction effects in the manufacturing and application processes of high-function biochar

[Demonstration site (illustrative only)]

[Technology's features and sophistication level]

- Database of independently-screened soil microorganism groups
- Wide network spanning from biomass raw material procurement to sales to farmers

⇒Develop high-function biochar with cost competitiveness and high adoption benefits for farmers

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Develop large-scale manufacturing process
- Quantify effects through large-scale application and cultivation demonstrations
- Maximize GHG emission reduction effects in the manufacturing and application processes

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Evaluate input conditions • Quantify implementation effects	• Finalize input conditions • Improve application technologies • Complete LCA for each type of biomass	• Scale up to 10,000-ton production capacity • Formulate an implementation effects model • Finalize the optimal model for GHG reduction and performance

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Aim to acquire a 0.1% (240 million USD) market share in the combined global market for bio-fertilizers, biochar, organic fertilizers, soil improvement materials, and carbon credits (2023 market size: 265 billion USD)

Developer's Message (Future Vision)

- TOWING Co.,Ltd aims to leverage its soil microorganism cultivation technology to develop highly-efficient, sustainable food production systems not only in Japan but also worldwide and for space bases.
- By setting the goal of simultaneously addressing the challenges of increasing food production and solving environmental issues faced by the Earth's food production systems, we bring together diverse colleagues and create new innovations.
  Together with all our employees and everyone involved with our company, we aim to work toward building a food production system that will continue forever into the future.

CEO Nishida (center)

<Company Details>

- Company Website: https://towing.co.jp/
- Head Office: Facility of Incubation, Nagoya University, Tokai National Higher Education and Research System, at 1 Furo-cho, Chikusa-ku, Nagoya-shi, Aichi
- Contact: Inquiry form: https://forms.gle/K3KxyC4WAGPbqu7M9 Email contact: info@towing.co.jp

J-Startup CENTRAL

Development of New Eco Feed Using Apple Pomace and Establishment of Economic Rationality via Superheated Steamer Innovative Drying Technology

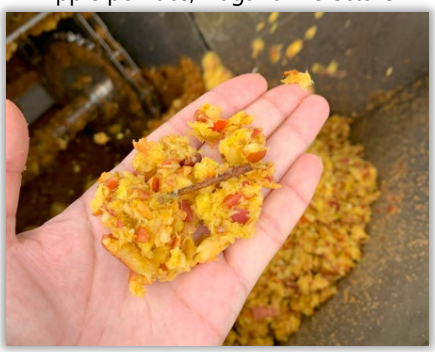
ASTRA FOOD PLAN Co., Ltd.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will develop and demonstrate a larger and more efficient superheated steamer, proprietary technology for using apple pomace generated at food production plants as an ingredient and drying it in a short period of time without compromising on nutrition or flavor.
- We will verify whether it is possible to establish a low-cost feed supply system and improve profitability by using for food products as well.

[Demonstration site]
Apple pomace, Nagano Prefecture



[Technology's features and sophistication level]

- Superheated steamer, proprietary drying equipment that can dry and sterilize ingredients in just 5 to 10 seconds
- Produce dried products using domestically produced raw materials and develop sales channels for use as feed, while also establishing economic rationality by using as food products as well

⇒Ultimately, manage the entire value chain

[Outcome (illustrative only)]

Dried products made by processing pomace using superheated steamer

[Post-social implementation immediate targets]

- In terms of sales, capture 0.1% share of the market, which is in excess of 200 billion yen, after completion of the project, aiming to reach 3.6% share and sales of about 8 billion yen over the following five years

*Market size is calculated by multiplying the volume of hidden food waste suitable for upcycling (10 million tons) by a volume reduction rate of 1/10 and a product price of 200 yen/kg

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop large superheated steamer (processing capacity: 500 kg/hour)
- Automated plant operation
- Develop mass production processes
- Initial cost reduction

Development and medium-scale testing
- Verify Apple Pomace Gulurico*, a dried product made by processing apple pomace using a superheated steamer, for use as animal feed
- Improve processing capacity of superheated steamer

2025: TRL 5 and above

Verify at test plant
- Complete large-scale plant and manufacture Apple Pomace Gulurico*
- Verify profitability

2026: TRL 6 and above

Improvement and implementation, verify effects
- Improve plant, expand lines
- Establish sales channels for Apple Pomace Gulurico*

2027: TRL 7 and above

*Apple Pomace Gulurico: A dried product made by processing apple pomace using ASTRA FOOD PLAN's proprietary superheated steamer

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Dried products made from apple pomace are currently being imported from China in large quantities for use as animal feed. We want to shift away from importing cheap, mass-produced raw materials from overseas and discarding domestic resources, which is irrational.
- Aiming to both reduce environmental impact and achieve economic rationality, we hope to realize a society in which the upcycling of unused resources is a matter of course.

ASTRA FOOD PLAN Representative Chihiro Kano

<Company Details>
- Company Website: https://www.astra-fp.com/
- Head Office: 1-10-26 Tsuruse-higashi, Fujimi-shi, Saitama
- Contact: info@astra-fp.com

Demonstration of Integrated Management System for Feeder Pigs Using AI Trainer-Equipped DX Pig Barn

Eco-Pork Co., Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- **Demonstrate technology related to the "integrated management system for AI trainer-equipped DX pig barn,"** which utilizes smart technologies such as ICT/AI/IoT to enable feeder pigs to be reared with very little human involvement
- Integrate and analyze information on individual pigs and rearing environment from cameras and sensors to recommend optimal rearing policies and realize automated control of rearing management

[Demonstration site] Tahara, Aichi

[Technology's features and sophistication level]

- Develop no-contact individual feeder pig information management function
- Develop functions for identifying and managing barn environment

⇒ Ultimately, resolve the issues of labor shortages and low feed efficiency and profitability via AI trainer-equipped DX pig barns and create a sustainable model for pig rearing and production

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Aim to drive growth in the domestic DX pig barn market (25 billion yen) and capture 42.6% (10.6 billion yen) of the market
- Through the social implementation of AI trainer-equipped DX pig barns, improve productivity and profitability of pig rearing, thereby helping to expand the scale of domestic pork production and establish a stable supply framework

Development Schedule and Targets for Social Implementation

[Development targets]

- Reduce labor related to feeding by 75%
- Increase feed efficiency by 25%
- Improve profitability (percentage of high-quality products: 10%)

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Construct DX pig barn • Develop prototype equipment	• Demonstration of integrated management system • Demonstration testing under different environments	• Refine rearing recommendation function • Improve UX

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Eco-Pork will improve profitability by increasing labor productivity of pig rearing and production and reducing feed costs through improved feed efficiency. Through this, we aim to expand the scale of pig rearing and production to increase the self-sufficiency rate for pork in Japan, and build a framework for the stable supply for pork following expansion of the domestic pork market.
- In this way, we will help resolve the social issue known as the protein crisis.

Founder and CEO, Overall Project Supervisor
Takashi Kambayashi

Cofounder and Director, Project Progress Manager
Shinsuke Arafuka

Director, Project Financial Manager
Kento Suzuki

<Company Details>
■Company Website: https://www.eco-pork.com/
■Head Office: 2nd Floor, 3-21-7 Kanda-Nishikicho, Chiyoda-ku, Tokyo
■Contact: info@eco-pork.com

J-Startup
J-Startup Impact

Promoting the Use of Autonomous Electric and High-Performance Forestry Machinery

mapry Co., LTD. (Representative)
elever labo LLC

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Technology demonstration related to autonomous and remotely operated electric forestry machinery for afforestation and logging
- Technology demonstration related to environmental valuation (reduction of CO_2 emissions) and automation of forest carbon credit generation in the forest and timber supply chain using electric forestry machinery

[Demonstration site] Tamba, Hyogo

[Technology's features, sophistication level, and outcome (illustrative only)]

- Develop electric forestry machinery for afforestation and logging
- Develop general-purpose autonomous hardware/software
- Develop models for afforestation and logging

⇒ Develop low-cost, general-purpose tools so that each person (entity) can own one

[Post-social implementation immediate targets]

- Aim to capture sales of 6.7 billion yen (in 2027) in the new domestic and overseas electric forestry machinery market
- Aim for new market creation of 5.7 billion yen (in 2027) in the new domestic and overseas forest carbon credit market (includes reduction of CO_2 emissions from machinery)

Development Schedule and Targets for Social Implementation

[Development targets]
- Complete electric forestry machinery for afforestation and logging models
- Complete autonomous module (hardware/software) development

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Model for afforestation • Autonomous module • Environmental valuation algorithm	• Model for logging • Autonomous module • Environmental valuation algorithm	• Complete each mass-production model • Complete supply chain management system

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Interest has been growing in Japan and overseas in visualizing and improving forest functions, such as the use of forest resources, disaster prevention, biodiversity conservation, environmental value, and water source recharge. In the midst of this, we aim to improve visualization, productivity, and economic value by offering all-in-one electric forestry machinery that can handle steep slopes and other site environments, has lower-cost base machines and autonomous modules, and ensures usability of applications.
- We aim to eradicate industrial accidents during forest maintenance through autonomous operations using electric forestry machinery.

<Company Details> mapry Co., LTD. (representative)
■Company Website: https://mapry.co.jp/
■Head Office: 165 Tada, Kasuga-cho, Tamba-shi, Hyogo
■Contact: info@mapry.co.jp

Technological Demonstration for Large-Scale Manufacture of New Forest-Derived Lignin-Based Materials and Resin Compositions

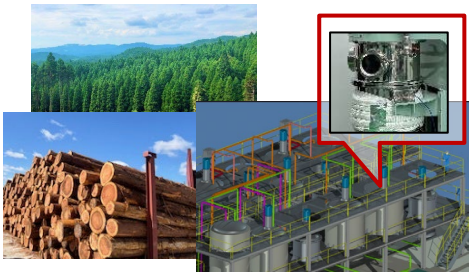
Lignin lab Inc.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will demonstrate manufacturing technology for glycol modified lignin*, a new material derived from cedar wood, on a semi-commercial scale (production capacity of 1,000 tons/year) and establish technology for stable production on a large scale.
- We will demonstrate the production of resin compositions (phenolic resins and composite materials) made from glycol modified lignin on a large scale, and establish technology for stable production of materials that meet the level of performance required by manufacturers.

[Demonstration site (illustrative only)]Kihoku, Ehime



[Technology's features and sophistication level]

- New high-performance material derived from lignin, which has been difficult to use on an industrial scale
- Possible to combine with resins and fillers to replace various high-performance plastics

⇒Ultimately, build a commercial package for manufacturing glycol modified lignin and resin compositions regionally to generate profits

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Establish technology for efficient mass production of glycol modified lignin (65% reduction in chemical usage, 30% reduction in input energy)
- Establish technology for mass production of resin compositions

Complete basic system line
- Build plant
- Prototype glycol modified lignin-based composite materials and phenolic resins

2024: TRL 5 and above

Trial operation
- Stabilize physical properties of glycol modified lignin
- Stable manufacture of glycol modified lignin-based composite phenolic resinsmaterials and

2026: TRL 6 and above

Demonstrate continuous production
- Demonstrate continuous production of glycol modified lignin
- Demonstrate continuous production of glycol modified lignin-based composite materials and phenolic resins

2027: TRL 7 and above

Demonstration completed

End of March 2028

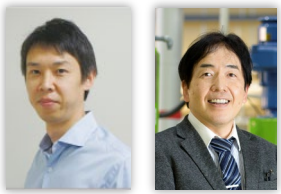
[Post-social implementation immediate targets]

- Achieve annual sales of 6.5 billion yen by the fifth year following commercialization
- Achieve annual sales of 100 billion yen by 2050 by supporting glycol modified lignin businesses in various regions and expanding sales channels through product development

*Glycol modified lignin is a new material developed by Dr. Tatsuhiko Yamada (our CTO) at the Forest Research and Management Organization (NRDA). It is derived from Japanese cedar, a species endemic to Japan. It has excellent heat resistance, strength, and workability, and can be used as a high-performance plastic such as resin used for electronic materials or fiber-reinforced composites. In addition, fiber-reinforced composites containing glycol modified lignin are stronger than conventional products, and are therefore expected to increase environmental compatibility by improving fuel efficiency, etc. due to the reduced weight of automobile parts.

Developer's Message (Future Vision)

- Lignin lab is taking the lead in activities to create high-performance materials from renewable forest resources in Japan and enrich local communities through the nationwide rollout of glycol modified lignin businesses.
- By promoting the use of biomass materials, we will curb the use of fossil resources, thereby helping to create a circular economy and achieve carbon neutrality.



Representative Kazunari Masutani (left)
CTO Tatsuhiko Yamada (right)

<Company Details>
■Company Website: https://www.lignin-lab.jp/
■Head Office: 205 Matsuzumicho Annex, 2-1-4 Sotokanda, Chiyoda-ku, Tokyo
■Contact: info@lignin-lab.jp

Development and Demonstration of Fishmeal Substitute Ingredients for Aquafeed Using Food Waste

Toresyoku Co., Ltd. (Representative)
RegenWorks Co., Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Large-scale demonstration of technology for high-purity extraction of protein from animal- and plant-derived residues, and of technology for processing plant-derived residues into a culture medium to culture bacteria
- Design and development of a pilot plant capable of large-volume and cost-efficient production in order to achieve social implementation of fishmeal substitute ingredients using Group technologies

[Core technology] Minamisoma, Fukushima Pref.

[Technology's features and sophistication level]

- Development of animal and plant protein production using a continuous tube-type mechanical device
- Development of technology for continuous production of proteins utilizing koji mold culture

⇒ Aiming to achieve daily production of 15 tons of animal-, plant-, and fungi-derived fishmeal substitute ingredients

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

[Development targets]
- Efficient protein extraction
- Development of pilot plant
- Improvement of machinery and development of new models
- Production capacity of 15 tons/day

- Establish manufacturing technology
- Improve/develop machinery
- Test using demonstration machinery

2024: TRL 5 and above

- Introduce automated control system
- Improve quality management

2026: TRL 6 and above

- Start operation of pilot plant

2027: TRL 7 and above

Demonstration completed

End of March 2028

- Aim to capture 20% (8 billion yen) of the domestic fishmeal feed market (40 billion yen in 2020)
- Build a system for the integrated management of raw material purchasing, shipment, and transport to stabilize price and quality

Developer's Message (Future Vision)

- We aim to contribute to a sustainable society by extracting protein from raw materials, mainly food waste not fit for consumption, and reusing it to make valuable products such as fish feed for farmed fish.
- We aim to contribute to the development of the aquaculture industry by using our continuous degradation technology to create a new market for fishmeal feed and to become the market leader in this field.

Toresyoku Co., Ltd.
CEO and President
Satoshi Okimura

<Company Details> Toresyoku Co., Ltd. (representative)
- Company Website: https://syokulabo.jp
- Head Office: 3-461-1 Nishimachi, Haramachi-ku, Minamisoma-shi, Fukushima
- Contact: info@syokulabo.jp

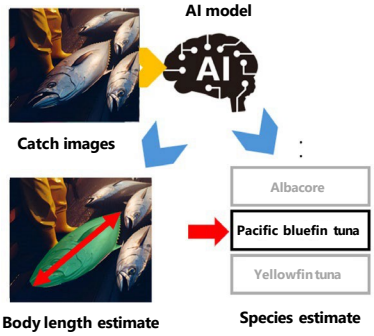
Development of Data Platform for Fishing Catches Starting with Electronic Observer System Using AI

Lighthouse Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Develop a device that captures operational conditions in longline fishing using cameras, recording data along with location information, and a data analysis application that processes the recorded data into a format suitable for submission to international resource management organizations
- Automate fish species identification and body length estimation using AI, significantly reducing workload and time required for data analysis



In the future, the system is scheduled to be installed on longline fishing vessels for demonstration purposes.

[Technology's features and sophistication level]

- Develop domestically-produced data collection system and data analysis application
- Develop AI model for fish species identification and body length estimation using camera images

⇒ Ultimately, develop a domestically-produced electronic monitoring system (EMS) capable of significantly reducing workload and time required for data analysis

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Aim to capture 0.8% (320 million yen) of the domestic and overseas EMS market (estimated at 41.6 billion yen in 2032)
- Develop features that benefit fishers, such as enabling the system to be used for domestic catch reporting, to promote use of the technology, and to support the advancement of resource management in the Japanese fishing industry

Development Schedule and Targets for Social Implementation

[Development targets]

- Compatibility with various international organization standards
- Reduction of analysis time and workload
- Fish species identification and body length estimation using AI
- Ensured durability on board vessels

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
(Develop electronic observer system) • Data collection system • Data analysis application • Data platform	(Improve accuracy of AI model) • Species identification • Body length estimation • Detecting casting and retrieving hooks	(Accuracy verification and durability testing) • Durability testing of hardware • AI model accuracy verification

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- As production volume of Japan's fishing industry decreases due to various factors, resource management is becoming more important than ever. Lighthouse aims to implement an electronic observer system that will enable many fishers to comply with resource management measures in a secure and less burdensome manner.
- By doing so, we will help develop the economy of Japan's fishing industry and enable fishers to ensure opportunities for appropriate fishing operations.

CEO Katsuki Shindo (center)
CTO Yosuke Matsuno (left)

<Company Details>
■ Company Website: https://lighthouse-frontier.tech/
■ Head Office: 1-15-5 Tenjin, Chuo-ku, Fukuoka-shi, Fukuoka
■ Contact: corporate@isana-g.com

Development and Demonstration of "Short-Term Fattening System" for Oysters and "Distribution DX Platform" for Improved Quality and Increased Export Volume of Frozen Japanese Oysters for Raw Consumption

Novelgen Co., Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Development and demonstration of the following two technologies for increasing exports of Japanese oysters for raw consumption
  - A "short-term fattening system" that uses microalgae to improve the quality of the oyster meat and other properties
  - A "distribution DX platform" for distribution management of timely production, shipment, export, and other processes

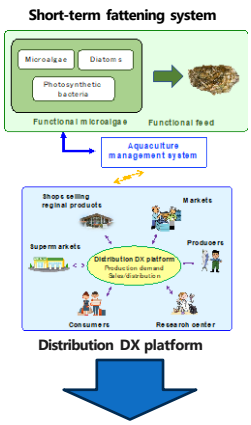
[Development and demonstration facilities] Nagahama, Shiga

[Technology's features and sophistication level]

- [Short-term fattening system] Enables high value to be added to oysters in a short time using microalgae
- [Distribution DX platform] Enables production, shipment, and inventory management linked with the short-term fattening system

⇒ Develop a system that can be used at production, processing, and other sites in Japan and overseas

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Aim to capture approx. 1% of Japan's export market for oysters for raw consumption (estimated at 9.9 billion yen in FY2027)
- Establish a supply chain with Taiwan, South Korea, Europe, North America, ASEAN, and other regions, taking on the challenge of further increasing exports of Japanese oysters for raw consumption and developing the brand

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop short-term fattening system
- Develop distribution DX platform
- Production at a demonstration facility in Japan and test marketing

2024	2026	2027
• Develop short-term fattening system ver. 1	• Develop demonstration machinery and link it with distribution DX platform	• Demonstration in Japan and test marketing overseas
2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Rolling out this system throughout Japan will enable the production of high-quality Japanese oysters for raw consumption, which will help increase export volume and stabilize profits for producers.
- Moreover, Novelgen aims to apply this technology to shellfish other than oysters, such as key Japanese exports including scallops and pearl oysters, and further expand exports of Japanese marine products across the board.

Novelgen CEO
Atsushi Ogura, Ph.D.

<Company Details>
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- Contact: Atsushi Ogura (office@novelgen.jp)

Ministry of Agriculture, Forestry and Fisheries

(K: Development and Demonstration of Production and Distribution Systems That Accelerate Exports of Japanese Agricultural, Forestry, and Fishery Products and Foods)

Small/Startup Business Innovation Research

Project for Establishing and Demonstration Testing Export Network for Agricultural, Forestry, and Fishery Products and Foods Using Innovative Freshness-Keeping Technology

ZEROCO Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

■ For the continued export of tasty Japanese foods and ingredients across the world, we are developing ZEROCO equipment and software to be installed along the global food supply chain, as well as installing it in actual environments and engaging in activities for creating demand. On the other hand, for the continued global export of high-quality Japanese foods, it is essential to improve sustainability and increase added value by resolving issues in the domestic food supply chain. Therefore, we will work on activities on both key fronts of global expansion and the introduction of ZEROCO in Japan.

[Demonstration site]
Shibuya, Tokyo

[Technology's features and sophistication level]

- ■ Expand for use with larger equipment. Enable the same level of quality (stable and uniform storage temperature and humidity) as that of the simulation site to be maintained under the climate conditions of the installation site, despite differences in temperature and humidity
- ■ Expand for use with smaller equipment. Enable adaptability to noise, power performance, and other properties while maintaining the same level of quality as that of the simulation site in a typical retail store or home
- ■ Expand for use with transport equipment. Verify whether the same level of quality (stable and uniform storage temperature and humidity in particular) as that of the simulation site can also be achieved stably in an environment impacted by lateral shaking and vibration during movement

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

- Develop ZEROCO equipment and software to be installed along the food supply chain
- Installation and demonstration testing at main ZEROCO bases in Japan and overseas (We believe simply installing equipment along international transportation networks, such as reefer containers on cargo ships, will not increase exports; it is also necessary to strengthen domestic industries producing globally competitive foods and ingredients. Accordingly, we will also work on two fronts to also expand into domestic operations)
- Create ZEROCO-specific recipes and procedures, generate demand, and achieve international standardization

To achieve the above targets, work on development to raise TRL from 5 to 7 for three models by applying current technology

• Large equipment for production and distribution bases, ports, and bonded warehouses etc.	• Refrigerated containers for reefer container trucks/transport containers etc.	• Small equipment for refrigerated display cases and home refrigerators etc.
2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- ■ By five years after project completion, aim for sales growth 10 times or more the funded amount (sales growth of 34.7 billion yen in 2032)
- ■ Aim to create 5,000 new positions related to ZEROCO equipment manufacture in 2032 (calculated by dividing ZEROCO equipment sales by per capita sales for each industry subcategory)
  Further, aim to increase the number of primary industry workers by 100 per municipality by introducing ZEROCO in each municipality
  Through this, aim to create 10,000 new jobs in 100 municipalities in 2032
  In addition to job creation, significantly contribute to reaching the national target of 5 trillion yen in exports of agricultural, forestry, fishery products and foods in 2030
  Through these activities, help raise the average annual income for the food industry and resolve social issues related to the global food system

Developer's Message (Future Vision)

■ Through ZEROCO, we will bring Japan's food culture, which has been carefully developed in harmony with nature, into the future with the key phrase, "tasty, healthy, and sustainable." We will also build a sustainable foundation for supporting the future development of the food industry (= enabling increased production on the basis of keeping products fresh) and helping resolve global challenges with the "great taste" of Japan.

ZEROCO Inc. Shujiro Kusumoto

<Company Details>

■Company Website: https://zeroco.co.jp/

■Head Office: 3rd Floor, Los Gatos, 5-27-8 Jingumae, Shibuya-ku, Tokyo ■Lab: 1st Floor, 100BANCH, 3-27-1 Shibuya, Shibuya-ku, Tokyo

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Ministry of Agriculture, Forestry and Fisheries
(K: Development and Demonstration of Production and Distribution Systems That Accelerate Exports of Japanese Agricultural, Forestry, and Fishery Products and Foods)

Small/Startup Business Innovation Research

Establishment of a Short-Term Sea Urchin Roe Improvement System to Boost Exports

Kita-Sanriku Factory INC. (representative)
Caloria Japan Co., Ltd.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will establish a demonstration plant for UNI-VERSE Systems®, a short-term sea urchin roe improvement system utilizing our core technologies—formulated feed, tank structure, and non-destructive inspection—based on land-based semi-recirculating tanks in Hirono, Iwate Prefecture. This initiative aims to develop short-term land-based sea urchin aquaculture technologies that can be deployed across other regions of Japan.

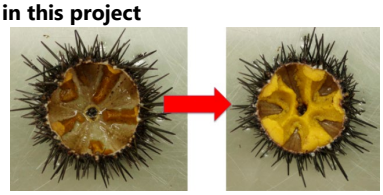
[Site scheduled for demonstration plant (Yagi Port, Hirono)]

[Technology's features and sophistication level]

1	Optimize the composition of our world's only formulated feed for sea urchins.
2	Develop a tank structure capable of rearing sea urchins at high density.
3	Sort and ship sea urchins with high roe content using non-destructive inspection.

[Outcome (illustrative only)]

UNI-VERSE systems®
to be developed and demonstrated in this project



Convert starved sea urchins with reduced roe into high-quality sea urchins over a short period of time.

Development Schedule and Targets for Social Implementation

[Development targets] Establish short-term sea urchin roe improvement system and demonstrate production of high-quality sea urchins for export.

- Design rearing facilities.
- Explore raw materials for formulated feed and conduct small-scale prototyping.
- Develop a basic design for inspection equipment prototype

2024: TRL 5 and above

- Establish and operate rearing facilities year-round, exploring and demonstrating optimal conditions.
- Introduce an extruder, develop feed, and conduct demonstration trials.
- Manufacture an inspection equipment prototype, perform field testing, and enhance reliability.

2025–2026: TRL 6 and above

- Integrate the elemental technologies to demonstrate a short-term sea urchin roe improvement system in an actual operating environment and conduct test marketing overseas.

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Establish a stable, year-round production, processing, and distribution system for high-quality domestic sea urchins.
- Achieve sales of 4.05 billion yen by 2030 and 9.6 billion yen by 2032.
- Promote the global expansion of sushi and other Japanese cuisine, contributing to the goal of 1.3 trillion yen in fisheries product exports by 2030.

Developer's Message (Future Vision)

Sea urchin is a prized seafood that Japan proudly shares with the world. Our company is based in a small fishing village in KITASANRIKU, a North Pacific coastal region of Japan known for supplying some of the highest-quality sea urchins. However, significant changes in the marine environment caused by climate change have led to "ISOYAKE", a phenomenon known as ocean desertification, which has become a major factor in the decline of sea urchin quality. To ensure a sustainable future for fisheries over the next decade, it is essential to establish a strong foundation for fisheries technologies originating in Japan and create a more attractive fisheries platform.

We are committed to completing the UNI-VERSE Systems®, which integrate our core technologies co-developed with Hokkaido University and other organizations, as soon as possible. Through these efforts, we aim to enrich the world's oceans, starting from KITASANRIKU.

CEO Yukinori Shitautsubo

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J-Startup TOHOKU

POC and Commercialization Testing of Amorphization Technology for Creating New Demand for Grain and Realization of Decarbonization

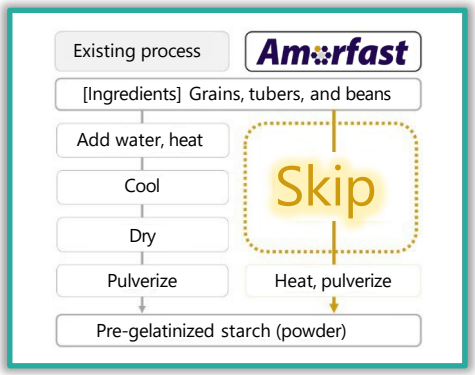
Alphatech Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Design, evaluate, and improve mass production machinery for pre-gelatinized powder for food, feed, and bioplastics through Amorfast®, which works "instantly and without water"
- Product development and commercialization testing of bread and other rice flour foods, feed, and bioplastics

[Core technology: Overview of Amorfast®]

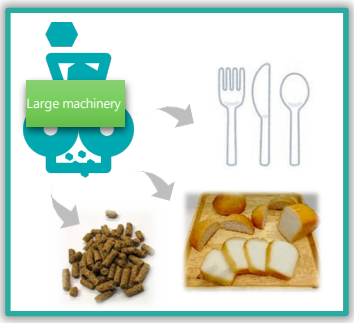


[Technology's features and innovation]

- Pre-gelatinizes starch "instantly and without water"
- Enables continuous production and stable supply at low cost

⇒ Install large machinery at a feed mill in Ibaraki Prefecture and at Alphatech's own laboratory in Yamagata Prefecture for product commercialization testing

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Sales target for five years after project completion: 14 billion yen (40% food, 50% feed)
- Sales examples
  Domestic wheat flour: 0.6% of 1.8 trillion yen (10.8 billion yen as pre-gelatinized rice flour) in 2030
  Domestic feed binder: 32% of 3 billion yen (1 billion yen) in 2030

Development Schedule and Targets for Social Implementation

[Development targets]

- The machine capable of disassembling and cleaning (for food)
- The machine capable of processing more than 1 t/h (for feed)
- Development of high-quality final products adaptable for mass production

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above	End of March 2028
• Develop large machinery for food • Develop large machinery for feed (starch, cellulose)	• Develop recipes • Make prototype pellets • Propose bioplastic compositions	• Commercialization testing at some plants	Completion of the Demonstration

Developer's Message (Future Vision)

- It is hoped that the use of rice, which has a 100% self-sufficiency rate in Japan, will increase from the perspective of food security. For the livestock industry, an important source for providing protein, the challenges are steep increases in raw ingredient costs and a low self-sufficiency rate for feed. Substituting fossil resources with biomass is also an urgent task from the perspective of achieving decarbonization across society.
- Scaling up Amorfast®, a technology for pre-gelatinizing grains and amorphizing cellulose "instantly and without water," will allow us to resolve the above issues by changing the physical properties of ingredients at low cost.

Alphatech Inc.
CEO Komai

Executive Technical Advisor at Alphatech Inc. and Professor at Yamagata University, Nishioka

<Company Details>
■ Company Website: https://alpha-technology.jp/
■ Head Office: 4-3-16 Jonan, Yonezawa-shi, Yamagata
■ Contact: Chika Hikichi (COO) Hikichi@alpha-technology.jp

Creation of New Demand for Domestic Rice Flour Ingredients Through Development of Nutritionally Balanced Bread with High Content of Brown Rice Flour

BASE FOOD Inc.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will promote the development of fundamental technology for nutritionally balanced bread with a high content of whole grains, develop technology applicable to nutritionally balanced bread with a high content of brown rice flour, and improve its flavor, texture, and manufacturing efficiency.
- We will create new demand for rice flour by improving the flavor, texture, and manufacturing efficiency of nutritionally balanced bread with a high content of brown rice flour to a level equal to or better than conventional bread with a high content of refined white flour.

[Demonstration site]

[Technology's features and sophistication level]

Improve productivity at breadmaking plants by reducing odor and acridity of grain bran and starch aging, along with controlling protein texture, utilizing microbial engineering (fermentation), molecular engineering (protein science), and digital and manufacturing technologies

⇒Bread with high content of brown rice flour that is nutritionally balanced, tastes great, and is reasonably priced

[Outcome (illustrative only)]

Nutritionally balanced bread with high content of brown rice flour

Development Schedule and Targets for Social Implementation

[Development targets] Improve taste and reduce manufacturing costs of nutritionally balanced bread with high content of brown rice flour

- ・Improve taste
- ・Develop fundamental technology
- ・Design products

By FY2026: TRL 6 and above

- ・Reduce manufacturing costs
- ・Develop applied technology
- ・Prepare for mass production

FY2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

Create tens of billions of yen in new demand for domestically produced rice flour as a raw ingredient for nutritionally balanced bread within the first five years following commercialization (including increased demand due to entry by other companies)

Developer's Message (Future Vision)

- With our mission to "Reinvent staple foods to make a healthy and sustainable lifestyle accessible to all," we are developing technologies that will eliminate the need to choose between nutritional balance, great taste, and affordability.
- It is very difficult to improve the nutritional balance of bread with a high content of brown rice flour while achieving the same great taste and manufacturing costs as those of conventional bread with a high content of refined white flour, but we believe that BASE FOOD's technological capabilities will make this possible.

(CEO Shun Hashimoto)

<Company Details> BASE FOOD Inc.
- Company Website: https://basefood.co.jp/
- Head Office: 5-25-2 Nakameguro, Meguro-ku, Tokyo
- Contact: contact@basefood.co.jp

Demonstration of Dry Ultrafine Milling Production Technology For Grains at Negative Temperatures

Fit & Recovery Co., Ltd.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will conduct a technological demonstration for a milling method not dependent on the use or variety of rice used, using ultrafine milling technology under negative temperatures, which is a departure from conventional milling technology.
- We aim to capture the domestic as well as global market with rice flour based on this technology, which is capable of turning around the negative image of rice flour (poor water retention and lack of binding, bad taste, etc.).

[Demonstration site]Odate, Akita

[Technology's features and sophistication level]

- High-quality rice flour can be milled regardless of rice variety or quality
- Relatively high amount of remaining nutrients and High water retention and viscosity for ease of use

⇒Ultimately, create a mill capable of freely controlling quality of finished product

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Aim to capture 3 to 4% share (9.4 to 12.5 billion yen) of the domestic and overseas rice flour markets (estimated at 341 billion yen by 2032)
- To create a business of this scale, built at least two new plants in Japan. About 150 employees to be hired at each plant

Development Schedule and Targets for Social Implementation

[Development targets]

- Establish ultrafine powdering technology
- Create library of particle sizes, shapes, etc., for final products
- Increase size of equipment
- Electrification of mechanical power, etc.

Achieve large-scale production capacity

- Establishment of ultrafine powdering technology under minus temperature (w/research institute)
- Develop large-scale machinery
- Electrification of mechanical power and adaptation for energy saving

2024: TRL 5 and above

Establish powdering control method

- Improve quality of large-scale machinery
- Create library of optimal pulverizing settings for each final product

2026: TRL 6 and above

Achieve production scale for general consumers

- Develop super-large-scale machinery
- Implement large-scale test marketing

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Our milling technology makes it possible to produce rice flour and brown rice flour suitable for bread, noodles, baked confectionery, and other products irrespective of rice variety, or whether using old or new rice.
- Since no heat is applied during the milling process, it is possible to produce "raw" rice flour and brown rice flour that have not undergone gelatinization. This allows us to provide the original taste of rice.
- We will further revitalize the global gluten-free market through the power of rice.

Fit & Recovery Representative Yoichi Tsurudome (left)
CTO in Charge of Development Ogura (right)

<Company Details>
- Company Website: https://fit-recovery.co.jp/
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- Contact: ytsurudome@fit-recovery.co.jp

Innovation and Social Implementation of Food Handling Technology for the Food Industry

Connected Robotics Inc. (Representative)
FingerVision Inc. and Closer, Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Promote the full automation of manufacturing processes in prepared food factories and aim to realize smart factories.
- Strive for the industry's first practical implementation of a prepared food serving robot system.
- Key initiatives: (1) **Diversification of robot hands** to handle a wide variety of prepared food ingredients: expanding from 10 types to 100 types. (2) **Reduction of the cost of serving robots**: lowering production costs from 10.5 million yen per unit to 5 million yen per unit. (3) **Lowering of the cost of automated serving robot systems** for the serving process (including container supply, pouch transfer, cell production serving, and inspection processes). (4) Development of an affordable robot optimized for prepared food manufacturing.

[Demonstration site] Yorii, Saitama

[Key technologies and innovations]

- **Handling technology** for non-industrial products like food, which often have unique properties such as viscosity.
- **Technology for supplying various food trays** to accommodate various packaging requirements.

⇒Ultimately, develop an affordable robotic system for handling food products

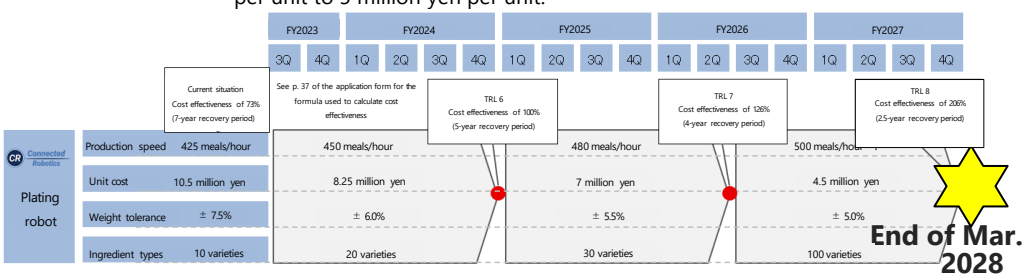
[Outcome]

[Short-term goals]

Development Schedule and Targets for Social Implementation

[Development targets]

Adaptation to a wide variety of prepared food ingredients: Expand from handling 10 types to 100 types.
Reduction of production costs: Decrease from 10.5 million yen per unit to 5 million yen per unit.



- **Achieve a total revenue of 38.5 billion yen within five years after the project's completion across the three collaborating companies.** (This corresponds to a 0.6% adoption rate in the 6 trillion yen domestic prepared food factory automation market. In the future, the goal is to reach a 50% adoption rate.)
- In the long term, expand the application of food pick-and-place technology to other areas, such as pre-shipment packaging of fruits and vegetables, as well as sorting and classifying fish.

Developer's Message (Future Vision)

- Prepared food manufacturing factories often operate in harsh environments, such as low or high temperatures, which are challenging for human workers. Additionally, it is becoming increasingly difficult to secure the necessary workforce to support the growing market, resulting in a chronic labor shortage. Despite these challenges, automation in this field remains underdeveloped.
- While automation in the cooking processes for food ingredients has advanced, the packaging processes for prepared foods, which follow the cooking stage, have seen little to no mechanization. This has forced manufacturers to continue relying on manual labor, leaving productivity improvements as an unresolved issue.
- Through this project, we aim to promote the full automation of manufacturing processes in prepared food factories and work toward the realization of smart factories.

CEO Sawanobori (left); Executive Officer Tsukamoto (right)

<Company Details> Connected Robotics Inc. (representative)
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■ Head Office: 5-4-1 Kajino-cho, Koganei-shi, Tokyo
■ Contact: cr_subsidy@connected-robotics.com

Ministry of Agriculture, Forestry and Fisheries

(M: Development and Demonstration of Smart Technologies for Use in the Food Industry)

Small/Startup Business Innovation Research

Social Implementation of Next-Generation Smart Cafeterias Through Automation of Cooking, Plating, and Dish-Sorting Operations, Menu Personalization via an App, and Optimization of Kitchen Operations Using AI

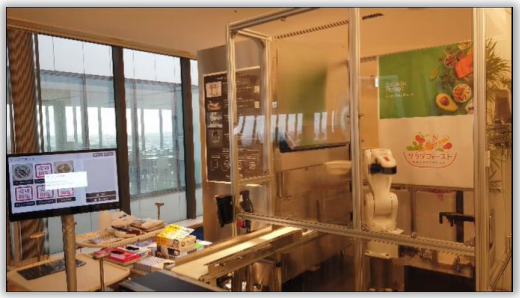
TechMagic Inc.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- To achieve manpower-saving on a large scale, we will demonstrate automated cooking, plating, and dish-sorting operations in modules, as well as combining modules to create optimal robot systems.
- We will demonstrate optimal kitchen operations for both consumers and businesses by implementing a robot system capable of kitchen and restaurant designs that meet customer needs based on customer and kitchen layout data acquired using AI.

[Demonstration site]
Demonstrate linkage between ordering app and salad plating in demonstration customer environment



[Technology's features and sophistication level]

- Develop compact automated robots with a wide range of applications by creating modules for cooking and work processes and combining them
- Advanced integration of AI and hardware, including technology for personalization

⇒Ultimately, robots provide individual and optimized experience while smoothing customer flows

[Outcome (illustrative only)]

Achieve optimal combinations of modules

[Post-social implementation immediate targets]

- Aim to capture 0.5% (approx. 6 billion yen) of the domestic and overseas food service industries (estimated at about 1.1 trillion yen by 2030)

Development Schedule and Targets for Social Implementation

[Development targets]
- Expand applicable items
- Improve hourly processing capacity
- Create modules and combine them

Modular design and development of each robot and app
- Enhance range of items capable of being prepared and plated and improve hourly processing capacity

2024: TRL 5 and above

Establish linkages between each robot and application
- Establish conditions enabling each type of hardware and software to be linked or controlled at both the information and operating levels

2026: TRL 6 and above

Introduce solutions on unit basis at actual business environment
- Optimize kitchen design in line with customer environment and demonstrate module selection and introduction of automated mechanism

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- The circumstances surrounding how we eat are changing rapidly, and there are calls to accommodate the diversification of individual preferences, as well as to consider health and food waste. At the same time, the industry faces ever-worsening labor shortages, along with rapidly rising labor and other costs.
- TechMagic will use the module development for this project in implementing future operations that will not only lead to manpower-saving, but will also increase the value provided to customers.

CEO Yuji Shiraki
CTO Ryosuke Tajima

<Company Details>
- Company Website: https://techmagic.co.jp/
- Head Office: 19th floor, Telecom Center Building West Tower, 2-5-10 Aomi, Koto-ku, Tokyo
- Contact: info@techmagic.co.jp

Establishment of Production System for Cell-Cultivated Foods Using Conditioned Medium From CulNet System

IntegriCulture Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Establishment of production system for cell-cultivated foods: (1) supply framework of seed cells, (2) food-grade materials for cell culture, and (3) production of growth factors using the CulNet system
- Manufacture of cell-cultivated foods combining the above technologies, confirmation of their safety as food products, and fostering of their social acceptance

[Demonstration site] Fujisawa, Kanagawa

CulNet system
(Circulating bioreactor system)

[Technology's features and sophistication level]

- Development of cell-culture materials only consisting of foods and food additives
- Production of growth factors using the CulNet system

⇒ Launch of cell-cultivated food products with safety and traceability

[Outcome (illustrative only)]

Demonstration of cell-cultivated cuisine (a flan) containing duck liver-derived cells

Development Schedule and Targets for Social Implementation

[Development targets]
- Supply framework of seed cells
- Food-grade materials for cell culture
- Conditioned medium from CulNet system
- Safety of cell-cultivated foods

Stable production
- Acquire stabilization parameters for seed cells
- Develop food-grade materials
- Produce conditioned medium by CulNet

2025: TRL 5 and above

Confirm safety
- Commercialize food-grade materials
- Confirm safety of cell-cultivated foods
- Start scaling up

2026: TRL 6 and above

Scaling up
- Scaling up of CulNet system
- Scaling up of product reactor for cell-cultivated foods

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Short-term goals after market launch]

- Aim to obtain 1.2% (6.19 billion yen) of cell-cultivated food market in Japan and abroad (estimated at 524.4 billion yen TAM in 2032)
- Deployment of cellular agriculture infrastructure through business development of food-grade materials (basic culture media, etc.) and consultation on cell-cultured food products

Developer's Message (Future Vision)

- With growing concern about a "protein crisis" (demand for protein exceeding supply), we aim to implement cell-cultivated food products as a new protein source.
- We aim to provide a platform for commercial production of cell-cultivated foods, by developing food-grade materials (e.g., culture media) and more efficient bioreactors.

CEO Hanyu (right),
CTO/COO Kawashima (left)

<Company Details>
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- Head Office: A32F-3111 Shonan Health Innovation Park, 2-26-1 Muraoka-higashi, Fujisawa, Kanagawa
- Contact: info@integriculture.com

Commercialization of Brewer24 Algae Fermentation System for Bringing the Flavors of Today into the Future

AlgaleX Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Social implementation of the algae fermentation control system Brewer24, a core technology for sustainable DHA production, at a commercial-size plant
- Production demonstration of Umamo, a plant-based umami ingredient with a rich seafood flavor created by fermenting algae with awamori (distilled rice liquor indigenous to Okinawa) lees, at a commercial-size plant

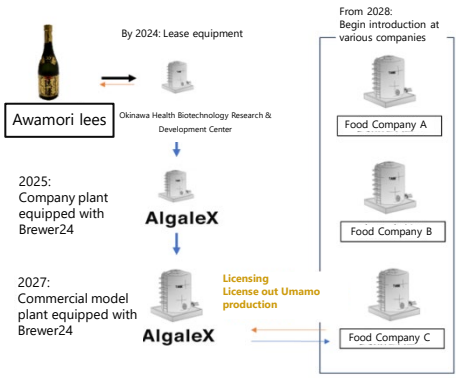
[Demonstration site] Uruma, Okinawa

[Technology's features and sophistication level]

- Automated fermentation AI control that replicates the judgment of a skilled technician
- A plant-based ingredient with the rich taste of seafood, akin to karasumi (dried mullet roe)

⇒ Production demonstration of Umamo, a high value-added umami ingredient, using raw ingredients that normally go unused, such as awamori lees

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Begin operation of commercial-size plant
- Scaling up demonstration of Brewer24
- Increase awareness of Umamo (Japan/overseas)

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Begin operation of pilot plant (PP) • Implement Brewer24 • Increase awareness of Umamo in Japan	• Build commercial-size plant • Improve accuracy of AI at PP • Scaling up demonstration at PP • Increase awareness in overseas markets	• Scaling up demonstration at commercial-size plant • Begin test marketing overseas

Demonstration completed

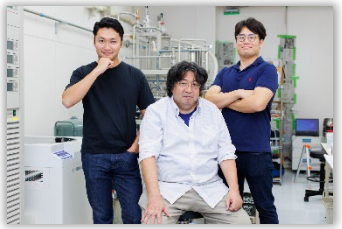
End of March 2028

[Post-social implementation immediate targets]

- Aim to capture 0.2% (10.0 billion yen) of the global plant-based food market (4.9 trillion yen in 2021)

Developer's Message (Future Vision)

- AlgaleX's mission as a company is to "connect the abundance of our oceans to the future through good taste." We are developing a technology to produce DHA, an essential nutrient for life, sustainably and without impacting our oceans. It uses unused resources as raw materials rather than taking away limited resources from fish. We are fully devoted to the success of this project, which aims for the social implementation of our core technology, Brewer24.



CEO Takada (left)
CTO Tada (center)

<Company Details>
- Company Website: https://algalex.com/
- Head Office: 12-75-201 Suzaki, Uruma-shi, Okinawa
- Contact: info@umamo.jp

Scaling-Up Demonstration of Fundamental Technology for Developing Plant-Derived Functional Materials

Fermelanta, Inc.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Develop **platform strains** for high-yield production of various key plant-based intermediates, and **model strains** for practical compounds derived from these intermediates.
- Demonstrate **scaling-up** from lab to pilot/semi-commercial scale.

[Core technology]

Microbial fermentation using synthetic biology

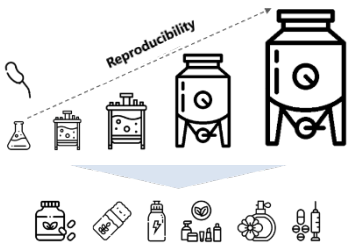
- Traditional production of plant-derived ingredients (e.g., food additives, pharmaceutical ingredients) relies heavily on extracting them from large volumes of plants. This is an extremely expensive process, ranging from tens of thousands to several million yen/kg
- We enable mass production at a low cost through artificially constructed microbial strains using simple sugars as starting materials
  - Large-scale demonstration planned in Nonoichi, Ishikawa

[Technology's features and sophistication level]

- Create platform strains for mass producing intermediates (speed up material development)
- Resolve issues arising from scaling up and large-scale culturing

⇒ Ultimately, establish a material development base capable of adaption and expansion to a variety of plant-derived functional ingredients

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Mass fermentation production of key plant alkaloid, terpenoid, and flavonoid group intermediates
- Practical fermentation production of multiple model compounds derived from intermediates

Lab/bench demonstration
- Construct high-production strains
- Achieve practical production yield with lab- to bench-scale culturing

2024: TRL 5 and above

Pilot demonstration
- Pilot-scale culture testing
- Demonstration of bench-scale reproducibility

2026: TRL 6 and above

Semi-commercial demonstration
- Semi-commercial-scale culture testing
- Pilot-scale reproducibility demonstration

2027: TRL 7 and above

Demonstration completed

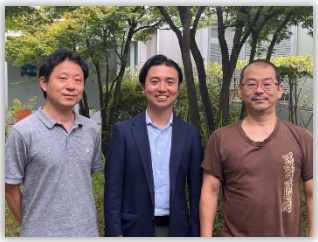
End of March 2028

[Post-social implementation immediate targets]

- Manufacture and sell proprietary target compounds and roll out strain licensing business for compounds commissioned for development from partner companies
- Within five years of project completion, aim to capture 2% (30 billion yen) of the domestic and overseas rare plant-based refined products market (estimated at 1.5 trillion yen in 2030)

Developer's Message (Future Vision)

- Through a comprehensive process, from constructing strains to scaling up, Fermelanta aims to establish the world's first material development base for plant-derived functional ingredients. Doing so will enable us to supply the world with a variety of useful ingredients that will contribute to human health and well-being in a more cost-effective and stable manner.
- Moreover, we will contribute to a new agriculture, forestry, and fisheries industry through innovative "molecular farming" driven by biotechnology



(From left) CSO Minami; CEO Fukizaki; and CTO Nakagawa

<Company Details>
- Company Website: https://fermelanta.com/
- Head Office: 3-570 (within i-BIRD), Suematsu, Nonoichi-shi, Ishikawa
- Contact: info@fermelanta.com

Commercialization of "Plant-Based Egg" Utilizing Japanese Technology and Global Expansion

UMAMI UNITED JAPAN CO., LTD.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- UMAMI EGG is a plant-based egg powder that has a price advantage equivalent to that of eggs and can be used as an egg substitute with comparable texture and application. We will make some functional improvements to UMAMI EGG, along with building a large-scale production system and pilot plant, and ultimately scale up the pilot plant and establish a large-scale production system.
- We will collaborate with major food companies and food tech accelerators in Japan and overseas to distribute laboratory samples to prospective customers (major food manufacturers, caterers). We will also establish a brand image through test marketing while developing sales channels for rapid social implementation.

[Demonstration site] Shibuya, Tokyo

[Technology's features and sophistication level]

- High water retention and emulsifying properties, in addition to the heat thickening property from the main ingredient, konjac flour
- Replication of the unique flavor and richness of eggs by making use of fermentation technology in a proprietary enzyme process

⇒ Ultimately, complete large-scale adjustment on a level that enables full-scale production of a complete egg substitute with foamability at a plant

[Outcome (illustrative only)]

Move to large-scale production

Development Schedule and Targets for Social Implementation

[Development targets]

- Develop a large-scale culturing system
- Produce 1 kg/day of the final powder
- Complete large-scale adjustment on a level that enables full-scale production at a plant

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Establish proprietary culturing technology and scale up laboratory culturing • Co-create equipment with perfusion culturing equipment manufacturer	• Build pilot plant • Conduct provisional operation of pilot plant, identify issues and make improvements • Create and distribute test samples, check response	• Further scaling up of pilot plant • Approach customers with test samples • Follow-up with customers on product development

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Set a sales target of 4 billion yen, equivalent to about 4 times the funded amount, from the first year of commercialization by utilizing mass production at a plant and sales channels developed during the project period
- Set a sales target of 56 times the funded amount for the fifth year of commercialization

Developer's Message (Future Vision)

- With our vision to be "the 'intel' of the food industry," UMAMI UNITED aims to become a "core ingredient" manufacturer, producing an ingredient used as an egg substitute in processed foods.
- Through this plant-based egg substitute, we will help stabilize the supply and price of eggs and create a world where people of all backgrounds can come together around the same dining table.

<Company Details>
- Company Website: https://jp.umamiunited.com/
- Head Office: 5F REID-C Shibuya Dogenzaka-bldg., 1-16-16 Dogenzaka, Shibuya-ku, Tokyo 150-0043, Japan
- Contact: info@umamiunited.com

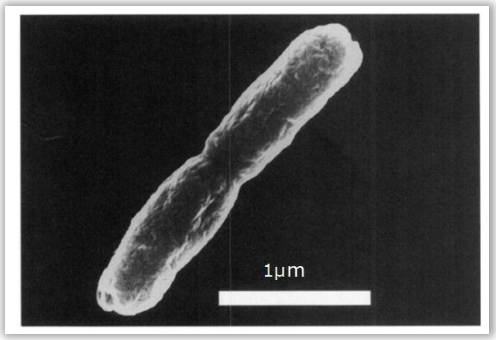
Production of Protein Ingredients Derived from UCDI® Hydrogen Bacteria Grown with CO_2 and Development of Food Products

Utilization of Carbon Dioxide Institute Co., Ltd.

Large-scale technology demonstration: FY2023–FY2027

Overview of Large-Scale Technology Demonstration

- Establish processes for processing and manufacturing protein ingredients derived from UCDI® Hydrogen Bacteria grown with CO_2 in collaboration with Mitsubishi Corporation Life Sciences Limited at the company's Tsuchiura Plant
- Apply for U.S. FDA food certification and carry out customer sampling to target sales



[Technology's features and sophistication level]

- Create processes for processing shapes and textures, convenience, shelf life, etc.

⇒ Produce new protein ingredients that take advantage of the superior properties of UCDI® Hydrogen Bacteria, which have a high crude protein content of 83.8% and a well- balanced composition of essential amino acids. Ultimately, develop food products in a variety of forms, including liquid and solid.

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Produce protein ingredients derived from UCDI® Hydrogen Bacteria grown with CO_2 and develop food products
- Apply for food certification (U.S.)

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above	End of March 2028
• Process testing of bench-scale protein ingredient production	• Process testing of pilot-scale protein ingredient production • Apply for food certification	• Design commercial-scale process • Develop protein ingredient products	Demonstration completed

[Post-social implementation immediate targets]

- As a leading producer of protein ingredients, which we derive from UCDI® Hydrogen Bacteria grown with CO_2, begin expansion into domestic and overseas markets in FY2030, aiming for sales of 20 million USD (3 billion yen when converted at 150 yen/1 USD)

Developer's Message (Future Vision)

- UCDI® Hydrogen Bacteria are propagated using CO_2 and hydrogen. Through the process of culturing UCDI® Hydrogen Bacteria, we can consume CO_2 directly, which will help solve environmental issues.
- There is a limit of livestock production for the rapid increase in demand for animal protein due to an increasing global population. Our UCDI® Hydrogen Bacteria will help solve future issues caused by lack of protein sources.

<Company Details>
■ Company Website: https://www.co2.co.jp/en/top/
■ Head Office: 14th Floor, Tradepia Odaiba, 2-3-1 Daiba, Minato-ku, Tokyo
■ Contact: info@co2.co.jp

Commercial Establishment of Rice-Derived, *Koji*-Grown Functional Mycoprotein

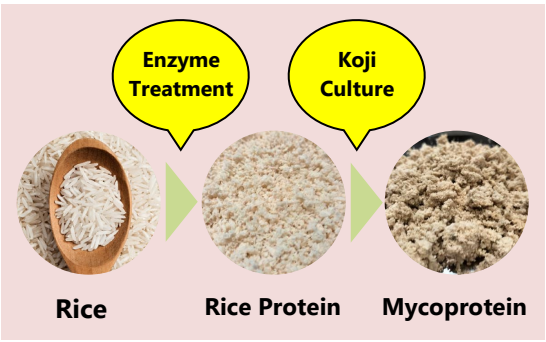
Agro Ludens Inc.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will establish a manufacturing method for functional mycoprotein, a new food ingredient utilizing rice-derived protein and *koji* (a type of Aspergillus mold) fermentation technology, and demonstrate scaling up for mass production.
- We will verify market fit for food products utilizing mycoprotein functionality in order to develop sales channels for our company's products and raw materials at food manufacturers.

[Demonstration process]



[Technology's features and sophistication level]

- New technology for utilizing *koji* developed from traditional enzymatic and fermentation methods

Patent nos. 7264556 and 7441567

⇒Develop novel fermented foods that contain *koji*-derived functional ingredients, are high in protein, and show promise as a digestion aid

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop large-scale manufacturing processes for mass production scaling
- Improve processes to reduce manufacturing costs and enhance functionality
- Develop products utilizing functional mycoprotein

- Manufacture mycoprotein samples on a bench scale
- Prototype food products utilizing mycoprotein and explore functionality

2024: TRL 5 and above

- Demonstrate mycoprotein manufacture on a pilot scale
- Verify market fit of food products utilizing mycoprotein

2026: TRL 6/7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Aim to launch products utilizing mycoprotein on the market, capturing sales of 5 billion yen or higher within five years following commercialization
- Expand production bases and markets internationally, particularly in Southeast Asia, where rice is produced in huge volumes

Developer's Message (Future Vision)

- We have developed mycoprotein, a new kind of fermented food made from rice, a familiar food for Japanese people, and *koji*, the national mold of Japan. We will expand the scale of mycoprotein production and commercialize products that meet market needs, aiming for their early social implementation.
- Through the use of mycoprotein, we will not only solve the protein crisis, but also promote the conservation of paddy fields and the effective use of unused resources.

CEO Kiyotaka Saga (center)
Director Sueko Atobe (second from right)
Researchers Komiya, Kawabata, and Sakai (from left)

<Company Details>Agro Ludens Inc.
■Company Website: https://www.agroludens.com/
■Head Office: 2-10-1 Yurakucho, Chiyoda-ku, Tokyo
■Contact: info@agroludens.com

Ministry of Agriculture, Forestry and Fisheries
(N: Development and Demonstration of New Foods and Feed Through Demonstration of Biotechnologies, Etc. (Food Tech))

Small/Startup Business Innovation Research

Demonstration of Mass Production of Upcycled Green Food Ingredients Using Fermentation Technology for Unused Biomass

Fermenstation Co., Ltd.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will carry out a pilot scale technological demonstration of our Upcycled Green Food (UGF) technology platform for upcycling unused biomass, such as leftovers from food and beverage manufacturing processes, into food ingredients through fermentation technology.
- We will develop quality standards for UGF ingredients and verify compliance with the Food Sanitation Act. Moreover, we will also perform a life cycle assessment (LCA) and work to reduce greenhouse gas emissions throughout the demonstration process.

[Technology's features and sophistication level]

- Saccharification module: enzymatic saccharification process specialized for unused biomass capable of utilizing resources that are hard to degrade, such as coffee grounds
- Fermentation module: novel fermentation process that combines multiple microorganisms to produce complex flavor compound profiles

Library of enzymes and microorganisms, and fermentation technology

[Outcome (illustrative only)]

Utilize produced UGF ingredients in plant-based milk, etc.

⇒Ultimately, develop food ingredients that can solve the challenge of making plant-based foods, etc. taste great

Development Schedule and Targets for Social Implementation

- Verify integrated mass production of saccharification and fermentation modules comprising UGF technology platform to achieve food level quality

[Development targets]

- Examine and optimize mass production of technological modules
- Comply with Food Sanitation Act
- Perform LCA on processes

Optimize saccharification module	Optimize fermentation module	Examine food processes for legal compliance
• Establish efficient saccharification process using rice bran, coffee grounds, etc.	• Establish fermentation process capable of controlling production of specific flavor compounds	• Integrate saccharification and fermentation modules, ensure compliance with Food Sanitation Act, and perform LCA
2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Aim to capture 0.5% (3.3 billion yen) of the food ingredients market, including food preservatives, flavorings, and umami seasonings (estimated at 660 billion by 2033)

Developer's Message (Future Vision)

- We hope to develop food ingredients high in flavor quality utilizing unused biomass, such as manufacturing by-products generated by food and beverage manufacturers.
- We aim to provide new food experiences while also solving food waste and other social issues by producing food ingredients matched to the needs of the next generation of customers with sustainable fermentation technology.

Representative Lina Sakai (left)
Developer Toshikazu Sugimoto (right)

<Company Details>
- Company Website: https://fermenstation.co.jp/
- Head Office: 1-17-25 Kitahon-cho, Funabashi-shi, Chiba
- Contact: sbir@fermenstation.jp

J-Startup　J-Startup Impact

Demonstration of Scaling Up of Agricultural Pulverizing Technology and Utilization of Unused Food Powder

greenase Inc.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will develop technology to pulverize agricultural products while retaining their color, aroma, and nutrients, and establish the technology on a food plant scale.
- We will demonstrate upcycling efforts for transforming unused food products into new food products with multiple companies and create a market for upcycled food products through trial sales.

[Demonstration site]

Vegetable powder produced using this technology

[Technology's features and sophistication level]

- Combine heat and air to dry and pulverize agricultural products in a short period of time, thereby enabling processing that retains color, aroma, and nutrients to a high degree
- Enable unused food products to be utilized hygienically through instantaneous sterilization
- Be responsible for everything from powders to planning upcycled food products, and work with other companies to create a market

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Stable manufacture of high-quality agricultural powders that retain color, aroma, and nutrients
- Create market through trial sales of upcycled food products

Demonstrate under actual operating conditions (TRL7)
Demonstrate stable production using **drying and pulverizing technology** at food plant under actual operating conditions

Build environment (TRL5)
Manufacture test equipment and acquire additional data

Verify technology using test machinery (TRL6)
Verify **dual heat/jet pulverizing** technology, manufacture powders that retain high degree of nutritional content

Demonstrate under actual operating conditions (TRL7)
Demonstrate stable production at food plant under actual operating conditions

Demonstrate sales of upcycled food products
Work with other companies to trial sales of food products upcycled from unused food products

2024 — 2026 — 2027 — Demonstration completed: End of March 2028

[Post-social implementation immediate targets]

- Stable operation of dual heat/jet pulverizing equipment for manufacturing high-quality powders at multiple plants
- Each year, utilize approx. 3,000 tons of unused food products and achieve sales of 9.8 billion yen
- Use pulverizing technology to develop upcycled food products market

Developer's Message (Future Vision)

- At greenase, we aim to transform food that would otherwise be thrown away and wasted into new food products using our unique pulverizing technology.
- We will promote upcycling efforts as a way of spreading the idea that unused food is not food waste, but an underutilized resource.

CEO Shinnosuke Nakamura

<Company Details>
■Company Website: https://greenase.jp
■Head Office: 3 Kurakoji, Sakata-shi, Yamagata
■Contact: info@greenase.jp

Ministry of Agriculture, Forestry and Fisheries
(N: Development and Demonstration of New Foods and Feed Through Demonstration of Biotechnologies, Etc. (Food Tech))

Small/Startup Business Innovation Research

Implementation Plan to Realize Next-Generation Food Products that Resemble Real Meat

Deats Food Planning Co., Ltd

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- We will implement an integrated line for the automated mass production of the Deats base ingredient, which is made by kneading raw soy pulp with konjac powder and then alkalizing the mixture.
- We will layer and combine the Deats base ingredient with other base ingredients containing multiple components with different physical properties, and develop automated manufacturing equipment for the cost-effective and stable production of next-generation food products that resemble real meat.

[Demonstration site]Fukuoka City, Fukuoka

[Technology's features and sophistication level]

- Ensure the safety of raw soy pulp and prevent spoilage
- Layer the Deats base ingredient with other functional base ingredients produced through the automation process

⇒Simultaneously upcycle soy pulp while stably supplying next-generation food products and ingredients

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Stable and inexpensive supply of next-generation food products the resemble real meat using the Deats
- Aim for sales of 1.3 billion yen at an early stage and
- 4.1 billion yen within five years following the project by expanding the scale of commercial production at automated plants

Development Schedule and Targets for Social Implementation

[Development targets] Implement integrated production line using automation and mass production technologies to stably provide high-quality and affordable next- generation food products that resemble real meat

Create prototypes of actual machinery
- Develop and create prototypes of machinery and equipment for each process of alkalizing and cooling raw soy pulp, producing the Deats base ingredient, layering with functional ingredients, and heating

2024: TRL 5 and above

Check operation of individual equipment and prototype integrated line
- Check individual operation of machinery and equipment for each part listed on the left, implement production on integrated line combining individual equipment, and collect data

2026: TRL 6 and above

Check operation of integrated line
- Analyze data from integrated line and work with equipment and machinery manufacturers to make improvements for efficient and stable production

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- We are working to on promote the Deats, a delicious next-generation upcycled food product that crafted from traditional Japanese ingredients, soy pulp and konjac, using proprietary manufacturing techniques.
- Through this project, we will implement a more advanced production and supply system for our next-generation food, the Deats, to provide consumers with even greater satisfaction, while consistently promoting ethical consumption, reducing food waste, and realizing a circular economy.

Representative Norihiro Okawa (left)
Mr. Maruyama of the Product Development Department (right)

<Company Details>
- Company Website: https://deats.co.jp/
- Head Office: 3rd floor, Five Annex Building, 1-3-10 Ebisunishi, Shibuya-ku, Tokyo
- Contact: soumu@deats.co.jp

Ministry of Economy, Trade and Industry

Solicitation Topics

- Development and Operational Demonstration of Lunar Landers
- Demonstration of Business Sophistication Using Satellite Remote Sensing
- Development of Flying Cars and Flight Tests for Acquiring Type Certification, Etc.
- Development and Demonstration of Drones Adapted to Administrative Needs, Etc.
- Project for Mass Production and Social Implementation of Infrastructure for Small-Scale Decentralized Water Reuse
- Large-Scale Demonstration of Technologies for Updating High-Precision 3D Map Data Globally Using Probe Car Data

Development and Operational Demonstration of Lunar Landers

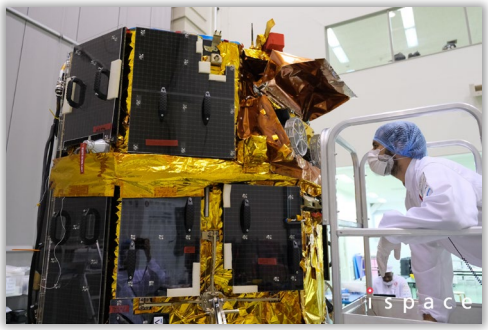
ispace, Inc.

Large-scale technology demonstration:
December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- ispace will conduct a demonstration related to the development (design, manufacturing, and assembly), launch, and operation (orbit control and landing guidance control) of a lunar lander for transporting a payload of 100 kg or greater to the moon's surface.
- Centered around ispace's opportunity to carry out a transportation mission to the moon's surface planned for FY2027, the company will leverage its existing knowledge of lander development in undertaking the entire process from development and manufacture at a central base in Japan to the provision of transportation services. Through this, ispace will establish a track record and knowledge of the supply chain for lunar transportation services from Japan, which will be utilized in future continued business development.

[Demonstration site] Chuo, Tokyo

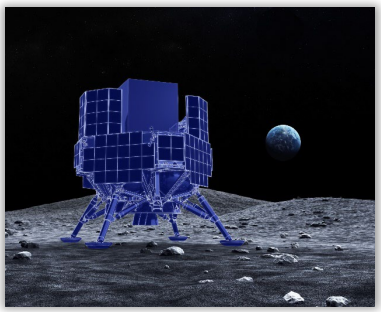


[Technology's features and sophistication level]

- Leverage track record and knowledge in implementing commercial lunar transportation missions
- A vision and business model combines high-frequency transportation and data acquisition
- Establish bases in Japan, the U.S., and Europe for development and sales activities

⇒Enable high-frequency lunar transportation missions adapted to global demand

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- In the second half of the 2020s, promote the business by utilizing the Japan-developed lander (developed under this project) for one or more of the two to three missions scheduled by ispace each year
- Expand sales and market share (annual sales are expected to be in the tens of billions of yen)

Development Schedule and Targets for Social Implementation

[Development targets]
- Realize a lunar lander capable of high-precision landing (within 100 m) and storing a payload with a total weight of 100 kg or greater

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Complete technical feasibility assessment of newly developed components	• Complete development of newly designed component engineering model • Complete demonstration of each component technology under assumed conditions • Begin manufacture of flight models • Confirm landing accuracy performance	• Manufacture flight models Complete demonstration under assumed conditions as a system • Determine weight and orbit • Begin launch/operation

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- As the competition for lunar exploration heats up, we aim to spur on national development of lunar transportation services and develop a globally competitive transportation craft (lunar lander) for the private lunar transportation market.
- We will contribute to the growth of Japan's space industry by leveraging the results of ispace's Mission 1, in which we took on the challenge of landing on the moon, alongside collaborations with other organizations and companies in Japan.

ispace CTO Ryo Ujiie

<Company Details>
- Company Website: https://www.ispace-inc.com/
- Head Office: 3rd Floor, Sumitomo Fudosan Hamacho Building, 3-42-3 Nihonbashi-Hamacho, Chuo-ku, Tokyo
- Contact: comms@ispace-inc.com

Demonstration of Business Sophistication Using Satellite Remote Sensing

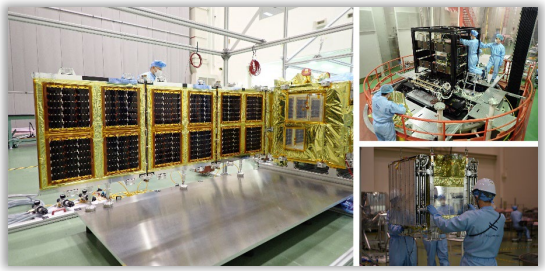
Synspective Inc. (representative)

Large-scale technology demonstration: December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- Synspective will develop two small SAR satellites equipped with high-precision orbit/attitude control systems using its proprietary small SAR satellite development technology and launch them into orbit, along with developing InSAR analysis system.
- The company will conduct a technology demonstration to operate and improve orbit/attitude control systems and InSAR analysis system, which will provide regular, stable wide-area and high-frequency (daily frequency level) InSAR analysis using the two satellites.

[Demonstration site]

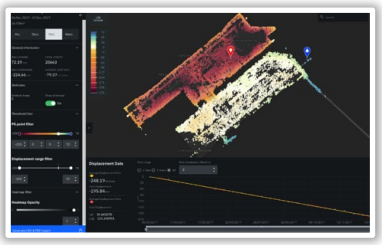


[Technology's features and sophistication level]

- Launch small SAR satellites with high-precision orbit/attitude control systems into orbit
- Develop InSAR analysis system tailored to small SAR satellites

⇒Ultimately, enable wide-area, high-frequency InSAR analysis using small satellites

[Outcome (illustrative only)]



InSAR analysis results from daily observations

[Post-social implementation immediate targets]

- Capture a total of 480 billion yen of the domestic and overseas InSAR market (estimated at 1.6 trillion yen in 2032) through establishing daily InSAR technology, including data sales (100% share) and solution sales (30% share)

Development Schedule and Targets for Social Implementation

[Development targets]
- Provide regular, stable wide-area and high-frequency (daily frequency level) InSAR analysis using two small satellites

Identify challenges
- Identify system challenges
- Reflect solutions in system design
- Select/procure equipment

2023: TRL 5 and above

System verification in test environment
- Test procured equipment
- Assemble and test two satellites

2024: TRL 6 and above

Full-scale demonstration in actual environment
Demonstrate daily InSAR using the two launched satellites

2026: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- To meet emerging needs for infrastructure management to counteract worsening natural disasters, risk management in civil engineering and mining operations, and similar, we aim to be the world's first to provide services using daily InSAR with wide-area, high-frequency, and high-resolution InSAR technology, which differs from current technology.

<Company Details> Synspective Inc. (representative)
- Company Website: https://synspective.com/jp/company/
- Contact: jumat@synspective.com (project office)
- Head Office: THE BREW KIYOSUMISHIRAKAWA, 3-10-3 Miyoshi, Koto-ku, Tokyo

J-Startup J-Startup Impact

Demonstration of Sophistication of Small Observation Satellite Missions

ArkEdge Space Inc. (representative)

Large-scale technology demonstration: December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- ArkEdge Space aims to develop and demonstrate in orbit a camera system with high wavelength and spatial resolution and a small satellite bus system suitable for mass production.
- The company will develop a geospatial information platform required for carbon credits and ESG investments, and acquire satellite data usable for environmental conservation and research in coastal and vegetation areas, etc.

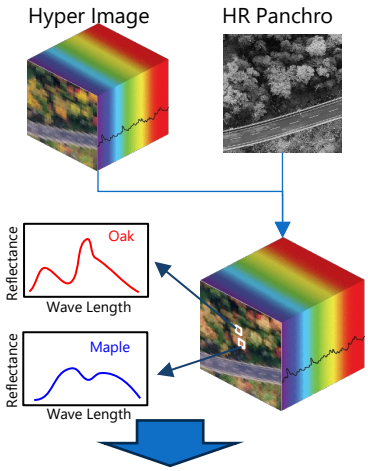
[Site of satellite development]

[Technology's features and sophistication level]

- Panchromatic and hyperspectral camera system that can be utilized in growth areas, such as green transformation (GX) and ESG investments
- Satellite bus system with highly precise timing and attitude determination suitable for mass production

⇒Develop a satellite system that allows for observations with optimal spatial, wavelength, and temporal resolution

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Ultimately, develop and demonstrate in orbit a small satellite system capable of capturing images with high wavelength and spatial resolution.

2024: TRL 5 and above	2027: TRL 6 and above	2028: TRL 7 and above
• Design satellite mission equipment • Design satellite bus system	• Develop satellite flight model	• Launch satellite • In-orbit demonstration

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Capture 12 billion yen of the domestic and overseas ESG remote sensing market (estimated at 1.7 trillion yen in 2030)
- In future, enable high-frequency observations by establishing a satellite constellation

Developer's Message (Future Vision)

- We will address various social challenges including environmental monitoring, sustainability certification, and environmental management in energy resource development through high wavelength resolution that enables observation of qualitative characteristics such as environmental changes and tree species, and spatial resolution for identifying changes in land use (illegal activities, accidents, or natural phenomena).
- We will achieve high-frequency observation by launching multiple satellites at a low cost, which will allow for efficient monitoring of the environment and illegal activities, as well as creating new value in ESG investment and sustainable economic activities and giving rise to powerful advantages for related industries.

ArkEdge Space Inc. CEO Takayoshi Fukuyo

<Company Details>
■Company Website: https://arkedgespace.com/
■Head Office: 3rd Floor, Dome Ariake Headquarters, 1-3-33 Ariake, Koto-ku, Tokyo
■Contact: ae-business@arkedgespace.com

Demonstration of Small SAR Satellite System for Achieving High-Resolution, High Image Quality, and Wide-Area Observation

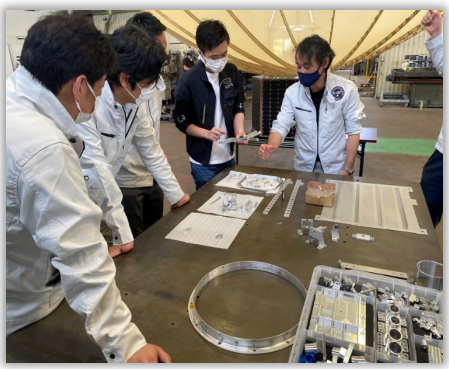
Institute for Q-shu Pioneers of Space, Inc. (iQPS)

Large-scale technology demonstration: December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- iQPS will develop a small SAR satellite system that maintains high-resolution and high image quality while resolving the issue of narrow observation width by implementing an offset parabolic antenna and digital beamforming (DBF).
- The use of an optical data relay service will enable rapid data delivery regardless of positional relationship with ground stations by equipping the system with an optical communication terminal.

[Demonstration site] Fukuoka Prefecture



[Technology's features and sophistication level]

- Adopt offset parabolic antenna (reflector deployed in a folding fan shape) and DBF to be developed by JAXA
- Equipped with an optical communication terminal for the use of an optical data relay service for rapid data delivery

⇒Resolve the issues of existing SAR satellite systems by developing a small SAR satellite system equipped with the above technologies that is revolutionary even by global standards

Development Schedule and Targets for Social Implementation

- EM development of offset parabolic antenna and DBF (JAXA)
- I/F modified design, FM design, and manufacturing of the above

- Design and prototyping of satellite system, including solar array paddles

2024: TRL 5 and above

- Detailed design, prototyping, evaluation, and FM manufacturing for satellite system, including solar array paddles

2025: TRL 5 and above

- FM manufacturing for satellite system
- (Launch)
- (In-orbit demonstration)

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- By launching multiple satellites to be developed during the project period and forming them into a constellation, expand the project, evaluate social implementation status, and improve the system to accelerate social implementation
- In five years after project completion, aim for sales growth of 21.1 billion yen (4.5 times project expenses)

Developer's Message (Future Vision)

- While the resolution and image quality of our small SAR satellites are competitive against those of larger satellites, their narrow observation swath width is an issue. By overcoming this issue through this project and creating a constellation of satellites, we will develop satellites with a sufficient observation swath width while maintaining the advantage of small satellites.
- Achieving the above will enable faster and more accurate monitoring, particularly in the areas of defense and security, MDA, and disaster response, thereby contributing to national security, mitigating environmental pollution, lifesaving, and security of livelihoods.

iQPS CEO Shunsuke Onishi

<Company Details>
- Company Website: https://i-qps.net/
- Head Office: 6th Floor, Rengo Fukuoka Tenjin Building, 1-15-35 Tenjin, Chuo-ku, Fukuoka-shi, Fukuoka
- Contact: 092-751-3446; sales@i-qps.com

Demonstration of Business Sophistication Using Satellite Remote Sensing

New Space Intelligence Inc. (NSI)

Large-scale technology demonstration: February 2024–March 2028

Overview of Large-Scale Technology Demonstration

- To strengthen the foundation of its data platform (Tellus), NSI will develop harmonization technology*1 for linking data from multiple satellites and prepare analysis-ready data (ARD)*2 using NSI's proprietary satellite data pipeline technology*3 and calibration technology*4.
- NSI plans to utilize ARD to create foundational data as global indices*5 for non-financial sectors. This initiative aims to promote the increased use of satellite data and accelerate the development of various applications.
- NSI will research and develop interfaces that can search for and acquire relevant satellite and other data from vast datasets. This will involve leveraging generative AI and large language models to expand the use of Tellus.

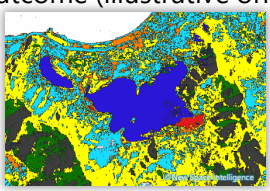
*1 Enabling the integration of satellite data from multiple sensors into a single seamless time series as if they were from a single data source.
*2 Pre-processed satellite data organized in a format that allows for immediate analysis with minimum additional pre-processing.
*3 A platform that automates and systematizes the entire process of selecting, integrating, analyzing, and providing the most suitable satellite data from a wide variety of satellite data sources.
*4 Calibration technology corrects distortions in satellite data and improves the accuracy and reliability of satellite monitoring.
*5 Highly reliable and frequently updated information, such as land cover data.

[Technology's features and sophistication level]

- Deliver calibration and harmonization capabilities via the satellite data pipeline
- Develop global indices for non-financial domains

[Demonstration site]

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Target the global market in non-financial sectors, aiming to capture 4% of the total market valued at 680 billion yen.
- Lower the barriers to entry for users not currently utilizing satellite data through global indices and Tellus.

Development Schedule and Targets for Social Implementation

[Development targets]

- Improve platform features to increase the usage of Tellus
- Generate ARD using harmonized data from multiple satellites
- Develop global indices for non-financial domains
- Utilize generative AI and large language models to find optimal satellite data

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Organize harmonization functions • Consider land cover classifications • Design generative AI	• Partially implement ARD on Tellus • Partially implement global indices	• Implement ARD on Tellus • Implement global indices • Implement search system

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Over a thousand observation satellites are set to be launched in the coming years. Our calibration and harmonization technologies will enhance Tellus functions, improving the reliability of satellite data and facilitating its broader use.
- As a result, we will create new markets for a diverse range of users in non-financial sectors and beyond.

New Space Intelligence Inc. CEO
Yumiko Nagai

<Company Details>
■Company Website: https://www.newspaceint.com
■Head Office: Ube-shi, Yamaguchi
■Contact: info@newspaceint.com

Technology Development for Quantifying Naturally-Derived Carbon/Biodiversity Credits

sustainacraft Inc.

Large-scale technology demonstration:
December 2023–December 2026

Overview of Large-Scale Technology Demonstration

■ To circulate funding toward forest conservation and other natural capital, sustainacraft will develop a low-cost and highly accurate evaluation system for nature projects and establish a methodology linked with carbon standards or similar, and then complete environmental value (carbon credits or biodiversity credits) trading through a pilot demonstration.

[Site]

Degraded forest lacking proper management
State of Amazonas

Natural forest in Atlantic Forest
State of Bahia

[Technology's features and sophistication level]

■ Develop an analysis method for the comprehensive analysis of multiple data sources with different temporal and spatial resolutions, such as satellite imagery, field-acquired data, and environmental DNA

⇒Develop a mechanism for quantifying carbon and non-carbon benefits

[Post-social implementation immediate targets]

■ Capture 4 billion yen of the domestic and overseas naturally-derived carbon credit market (estimated at 4.4 trillion yen in 2030)

Development Schedule and Targets for Social Implementation

- Develop evaluation systems for ARR, IFM, and blue carbon projects (baseline and monitoring)
- Research biodiversity monitoring methods targeting forests, agricultural land, and peat swamps

2024: TRL 5 and above

- Monitor programs using the biodiversity credit methodology

2025: TRL 6 and above

- Complete trading on an actual project basis using the biodiversity credit methodology

2026: TRL 7 and above

Demonstration completed

End of December 2026

Developer's Message (Future Vision)

■ We aim to establish a framework by which not only carbon benefits, but also non-carbon benefits including biodiversity, are properly evaluated to circulate funding.

■ We will also work toward social implementation alongside technology development in order that financing is given for adaptation, in addition to mitigation.

<Company Details>
■Company Website: https://jp.sustainacraft.com/
■Head Office: 8th Floor, US Building, 1-6-15 Hirakawa-cho, Chiyoda-ku, Tokyo
■Contact: info@sustainacraft.com

Social Implementation of Site Assessment System in Renewable Energy Business Sector Using Big Data Analysis from Multiple Satellite/Sensor Types

Tenchijin Inc. (representative)

Large-scale technology demonstration: January 2024–December 2026

Overview of Large-Scale Technology Demonstration

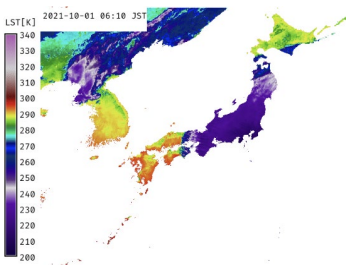
- Tenchijin aims for social implementation of site assessment for power generation sites in Japan and overseas, and through this, will contribute to effective and sustainability-conscious deployment decisions in the renewable energy sector, particularly in the areas of solar and wind power generation.

[Technology's features and sophistication level]

- Site assessment based on proprietary Tenchijin Compass GIS system, etc.
- Utilize land surface temperature product in site assessments for solar power generation
- Use various sensor and satellite information to select a suitable site

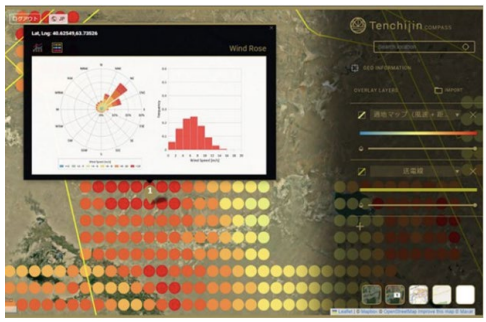
[Outcome (illustrative only)]

Sophisticated proprietary information



High-frequency and high-resolution land surface temperature product for areas across Japan that excludes cloud interference using AI and multiple satellite integration (Tenchijin proprietary technology)

Tenchijin Compass for Renewable Energy



[Post-social implementation immediate targets]

- Capture 313.2 billion yen of the global renewable energy market (about 104 trillion yen) in our target markets, site assessment software markets (SAM) for solar and onshore wind power generation
- In the fifth year following commercialization, aim for sales of 0.9 billion yen, equal to double the funded amount (total cumulative sales of about 1.643 billion yen over the five-year period)

Development Schedule and Targets for Social Implementation

[Development targets]

- New development of satellite data analysis technology
- UI/UX testing and front-end development
- Deployment demonstration through trial phase at user companies

2024: TRL 5 and 6

(Systemwide)
- Implement basic design of base server environment and I/F design with cloud server
- Create UI/UX prototype (satellite analysis technology)
- Broaden area of land surface temperature product
- Land surface change analysis using optics/SAR

2025: TRL 6 and above

(Systemwide)
- Prepare server environment and conduct testing simulating the usage environment
- Run site determination algorithm prototype on UI/UX prototype (satellite analysis technology)
- Test accuracy of land surface temperature product
- Test accuracy of land surface change analysis using optics/SAR

2026: TRL 7 and above

(Systemwide)
- Complete demonstration during actual operation by five trial user companies (target)
- Reduce workload required by users for site assessment by 80%
- Reduce outsourcing costs required for land assessment by users by 50%

Demonstration completed

End of 2026

Developer's Message (Future Vision)

- In this project, we aim to develop software that will enable anyone to access highly accurate information required for selecting sites for renewable energy generation through the advanced usage of earth observation satellite data. Through this, we aim not only to maximize power generation efficiency, but also to help build a sustainable society that cares for the earth and humankind; that is, one where biodiversity is protected and disaster risks are mitigated.

<Company Details>
- Company Website: https://tenchijin.co.jp/?hl=ja
- Head Office: Nihonbashi 1-chome Mitsui Building, 1-4-1 Nihonbashi, Chuo-ku, Tokyo
- Contact: info@tenchijin.co.jp

Service to Promote Digitization of Port Logistics Using Satellite Images × Vessel/Truck Data

LocationMind Inc. (representative)

Large-scale technology demonstration: 2023–2027

Overview of Large-Scale Technology Demonstration

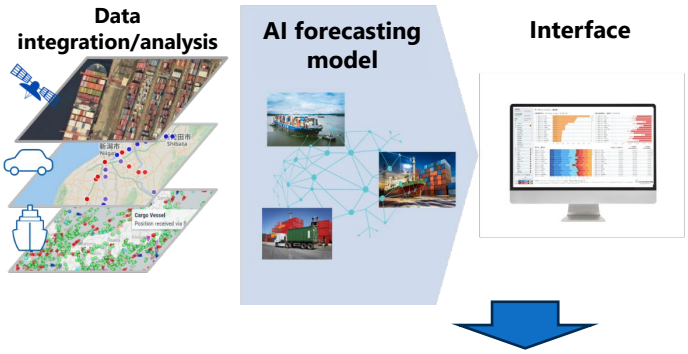
- LocationMind will conduct a technology demonstration related to comprehensive monitoring and AI forecasting of the operational status of major international ports based on three data sets: satellite imagery, vessel GPS data, and cargo truck GPS data.
- This project will enable closer and more proactive coordination between port operations and land/sea logistics systems to improve profitability and reduce costs for land/sea transport operators and cargo owners.

[Technology's features and sophistication level]

- Combine three data sets to create high-resolution, real-time collective intelligence on the operational status of ports
- Build a practical system with support from academics and companies at the forefront of the industry

⇒Ultimately, develop an operational status monitoring platform targeting major international ports and land/sea transport operators

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Capture 0.2% (4 billion yen) of the international port analysis systems market (1.7 trillion yen in 2023) for Japanese shipping companies and create a ripple effect
- Following the establishment of a business foundation through sales aimed at Japanese companies, scale up translation and sales structure for expansion into 10 countries worldwide

Development Schedule and Targets for Social Implementation

[Development targets]
- Enable visualization of congestion at major ports
- Identify examples of inefficiencies in logistics and potential ways of reducing GHG emissions (10 or more)
- Quantitatively show potential scope of improvement for the above examples

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 6/7 and above
• Build development environment • Refine work design	• Enable visualization of operational status • Develop congestion forecasting algorithm • Establish demand forecasting method • Modeling of container activities	• Assess practicality • Improve data processing • Refine various models • Improve UI legibility

Demonstration completed

End of March 2027

Developer's Message (Future Vision)

- As countries review their supply chains from a need for stable procurement unaffected by world events and environmentally-conscious management, we aim to promote the digital transformation for integrating land and sea logistics systems with a particular focus on ports, one of the most important types of infrastructure, particularly for the island nation of Japan.
- We will help improve efficiency in international logistics and reduce environmental impacts caused by shipping through the creation of just-in-time land/sea logistics systems connected by ports.

CEO Naoki Kiritani

<Company Details>
■Company Website: https://locationmind.com/
■Contact: iwazaki@locationmind.com
LocationMind Inc. Iwazaki of the Strategic Initiatives Division (PIC of project)
■Head Office: 4th Floor, PMO Kanda Tsukasamachi, 2-8-1 Kanda-Tsukasamachi, Chiyoda-ku, Tokyo

Demonstration of Business Sophistication of Abandoned Farmland and Crop Classification Analysis Using Satellite Remote Sensing

Sagri Co., Ltd.

Large-scale technology demonstration:
December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- Sagri will conduct a technology demonstration of AI models utilizing high-resolution and other data to develop more accurate services for its Actaba abandoned farmland detection service and Detaba crop classification service.
- Moreover, the company will build a data platform and automate system processing to enable the development of services that can be used by a greater number of users.

[Outcome (illustrative only)]

⇒Improve accuracy of crop classification, etc. checked by an application

[Technology's features and sophistication level]

- Enable the unclear statuses of ground surfaces to be distinguished using high-resolution optical satellite data
- Enable the system to be used by a greater number of users by building a data platform for satellite data analysis

⇒Ultimately, develop an AI model and system utilizing high-resolution and other data

Development Schedule and Targets for Social Implementation

[Development targets]
- Ensure 80% or greater accuracy in farmland and crop distinction capabilities
- Achieve processing capacity that can handle use by 1,000 local government bodies

2024: TRL 6.0 and above	2026: TRL 6.5 and above	2027: TRL 7.0 and above
• Aim to distinguish specific crops and land categories, etc., which is currently a challenge • Aim for processing capacity that can handle use by 100 local government bodies	• Aim to determine regional generalization, etc. • Aim for processing capacity that can handle use by 300 local government bodies	• Aim to develop models adapted to overseas farmland • Aim for processing capacity that can handle use by 1,000 local government bodies

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Reduce labor hours by 48% and increase income by 55% for approx. one million farmers across 1,000 municipalities by effectively using farmland
- Through this, positively impact society with improved self-sufficiency rates for food and the efficient use of environmental resources

Developer's Message (Future Vision)

- At present, farmland is identified by way of visually checking a site in person, making it difficult for even local governments to get a detailed picture of nearby farmland. We aim to improve analysis accuracy of deployed services to enable farmland nationwide to be understood across a wider area using satellite data.
- By delivering services to a greater number of users, we aim to reduce on-site checking by local governments and promote a better understanding of farmland, which will lead to the more effective use of farmland.

Sagri Co., Ltd. COO Shu Masuda (bottom center)

<Company Details>
■Company Website: https://sagri.tokyo/
■Head Office: 725-1 Joraku, Hikami-cho, Tamba-shi, Hyogo
■Contact: customer@sagri.co.jp

J-Startup J-Startup KANSAI J-Startup Impact

Type Certificate Testing for Commercialization of Flying Cars

SkyDrive Inc. (representative)

Large-scale technology demonstration: December 2023–December 2026

Overview of Large-Scale Technology Demonstration

- SkyDrive will develop a flying car (SD-05) based on technology it has developed related to flying cars, and acquire a type certificate.
- Acquiring the type certificate will enable mass production of aircraft and stable, continuous operation of the operating business.
- The company will develop component parts, conduct flight tests, and establish manufacturing and maintenance methods to improve the prototype flying car developed by SkyDrive to a commercial level of reliability, quality, and functionality, and complete testing necessary for the type certificate.

[Aircraft (illustrative only)]

Future demonstrations are scheduled in Toyota City, Aichi Prefecture, and other sites

[Technology's features and sophistication level]

- Multicopters (small aircraft) are lightweight, and with many takeoff and landing sites, can move around within cities
- Arrange multiple rotors on an optimal sphere surface for ensuring redundancy

⇒Through the subsidized project, complete testing for the type certificate of flying cars and acquire the certificate, targeting mass production

[Post-social implementation immediate targets]

- Capture 20% (124.7 billion yen) of the domestic and overseas short-range multicopter market (estimated at 614 billion yen in 2031)
- Begin mass production and build a track record of deliveries to customers, while at the same time accelerating social implementation through launching operation and maintenance businesses, business expansion, system improvements, and funding

Development Schedule and Targets for Social Implementation

[Development targets] • Seats three passengers • Range of 15 km or greater

• Begin SD-05-00 flight test	• Begin SD-05-01 flight test	• Complete testing for the type certificate
2023–first half of 2024: TRL 5 and above	Second half of 2024–first half of 2025: TRL 6 and above	Second half of 2025–: TRL 7 and above

Demonstration completed

End of December 2026

Developer's Message (Future Vision)

- With the completion of TC testing, which is the most important step in bringing SkyDrive aircraft to society, we will aim to capture the largest share of the market segment.
- We hope to create an environmentally friendly form of mobility that will allow for comfortable travel on a daily basis, along with an era in which anyone can fly anywhere, anytime.

From left, SkyDrive Inc. CTO Nobuo Kishi, CEO Tomohiro Fukuzawa, and CDO Arnaud Coville

<Company Details>
■Company Website: https://skydrive2020.com/
■Head Office: Toyota Head Office 2-1-1 Koromo-cho, Toyota-shi, Aichi
■Contact: info@skydrive.co.jp

J-Startup J-Startup TOHOKU

Development of Two-Passenger Flying Car (eVTOL) to Solve Issue of Intercity Travel

teTra aviation Corp. (representative)

Large-scale technology demonstration: December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- This project will dramatically shorten the time it takes to make a one-way car journey of two hours or more using flying cars (eVTOL: electric vertical take-off and landing) that travel 100 km in 30 minutes. First, teTra aviation will develop an aircraft (LSA) that meets the standards of the North American recreational and sports aircraft market and conduct a proof of concept (PoC) for the commercial viability of a domestic intercity travel service using this aircraft, and then develop aircraft for the commercial market. Both will involve carrying out development and PoC primarily in Japan, with additional testing in the U.S. To revitalize the domestic aerospace industry, teTra aviation aims to use 50% or more domestic products in terms of weight, with the expectation of acquiring type certification.

Future demonstration scheduled to take place close to Minamisoma, Fukushima

Minamisoma

[Technology's features and sophistication level]

- Demonstrate a high level of safety with failure tolerant design and protection against dropping
- Accumulate consistent in-house knowledge and international development experience, from aircraft design and manufacturing to flight testing
- Scalability to enable shift to high-speed aircraft in accordance with market size

⇒Develop a two-passenger lift + cruise eVTOL and achieve PMF

[Outcome (illustrative only)]

Reference: current model (Mk-5)

Development Schedule and Targets for Social Implementation

[Development targets]
- Complete LSA prototype component demonstration (Q4 of 2024)
- LSA prototype flight demonstration (Q4 of 2026)

- Formulate v-model development plan
- Function and performance testing on the component level
- Functional testing of subsystems in an actual environment

2024: TRL 5 and above

- Flight testing of recreational aircraft
- Launch sales of recreational aircraft
- PoC flights for domestic intercity travel using recreational aircraft
- Create in-house documents and regulations for mass production of aircraft

2026: TRL 6

- Flight demonstration using mass-produced recreational aircraft
- Quantify ROI and achieve PoC using mass-produced recreational aircraft
- Create forecast for commercial aircraft

2027: TRL 6 and 7

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Provide an aircraft that can travel 100 km in 30 minutes as a daily means of transportation in Japan
- Take reservations for a total of 100 aircraft, with an annual production capacity of 24 aircraft
- Sales of 1 trillion yen in 2040 through aircraft sales

Developer's Message (Future Vision)

- By nurturing people and accelerating global change, we aim for a society where no one, no matter where they are, will be told, or feel, that they are isolated, and everyone will have more time and capital at their disposal. Through the products and services that we develop, we will create a world in which people can travel 100 km in 30 minutes safely and securely as part of daily life, contribute to developing a sustainable society, science and technology, and commercial distribution, and encourage the balanced development of Japan's territory and the world.

teTra aviation Corp. President and CEO (and PIC of development) Tasuku Nakai

<Company Details>
- Company Website: https://jp.tetra-aviation.com/
- Head Office: 292 Kitayachi, Kaibama, Haramachi-ku, Minamisoma-shi, Fukushima
- Contact: 050-3145-0155 backoffice.tetra-aviation.com

Development of Small Aerial Photography Drones Adapted to Administrative Needs

ACSL Ltd. (representative)

Large-scale technology demonstration: December 2023–December 2025

Overview of Large-Scale Technology Demonstration

- ACSL will leverage its experience and knowledge of developing small drones and market feedback to develop a small aerial photography drone with market-leading flight performance and peripheral system.
- To ensure that the small aerial photography drone and peripheral system meet the needs of government bodies and other organizations such as infrastructure inspections and disaster responses, the company will also incorporate ease of use and other essential features for operations that are not shown in spec tables.

[Technology's features and sophistication level]

- Develop drones with market-leading flight time, wind resistance, and weather resistance
- Scale up safety functions using AI

⇒Ultimately, develop and manufacture small drones with advanced functions

[Outcome (illustrative only)]

Reference: current model (SOTEN)

[Post-social implementation immediate targets]

- Capture 9% of the domestic and overseas small drone market (estimated at 923 billion yen in 2030) in Japan/the U.S.
- Aim to develop aircraft that enable an urgent response to disasters and inspections without any particular skills through implementing the small drones in this project

Development Schedule and Targets for Social Implementation

[Development targets]
- Flight time of 45 minutes or longer
- IP44 or higher
- Third-party airspace detect and avoid functions using AI

Second half of 2024: TRL 5 and above	First half of 2025: TRL 6 and above	Second half of 2025: TRL 7 and above	End of December 2025
• Manufacture prototype for basic design testing and achieve flight time and wind resistance	• Manufacture prototype for detailed design testing and achieve weather resistance and reliability • Fulfill security requirements	• Develop and implement a high-level peripheral safety recognition system using AI, etc. through a prototype equivalent to a mass-produced drone	Demonstration completed

Developer's Message (Future Vision)

- I have heard that conditions for rescue and support after the Noto Peninsula Earthquake were harsh. ACSL hopes to develop drones capable of reducing the burden of those working in the field, even if by just a little.
- In a society with a decreasing workforce, we aim to develop drones that can enrich people's lives by reducing workload at high altitudes and in dangerous regions.

<Company Details>
- Company Website: https://www.acsl.co.jp/
- Head Office: Hulic Kasai Rinkai Building, 3-6-4 Rinkai-cho, Edogawa-ku, Tokyo
- Contact: info@acsl.co.jp

Development of Unmanned Aircraft for Logistics Support Adapted to Administrative Needs

EAMS ROBOTICS Co., Ltd. (representative)

Large-scale technology demonstration: December 2023–March 2028

Overview of Large-Scale Technology Demonstration

- EAMS ROBOTICS will develop a logistics multicopter (MC) (develop a multicopter with scaled-up functionality, including increased payload and unmanned cargo delivery, and acquire Class 1 UAS Type certification).
- The company will develop a logistics VTOL (develop a VTOL unmanned aircraft with a longer flight range than a multicopter, and acquire Class 1 UAS Type certification).
- It will develop logistics system (build system to support the logistics business, such as one-to-many operation, AI, and remote operation, and acquire Class 1 UAS Type certification for aircraft with the logistics system added).

[Technology's features and sophistication level]

- Acquire Class 1 UAS Type certification for VTOL UAV equipped with hybrid power system
- Acquire Class 1 UAS Type certification for aircraft connected with AI and software

⇒Ultimately, develop logistics multicopters and logistics VTOLs and link them with the logistics system for social implementation

[Outcome (illustrative only)]

Logistics MC

Logistics VTOL

Development Schedule and Targets for Social Implementation

[Development targets]
- Acquire type certification for logistics MC
- Acquire type certification for logistics VTOL
- Acquire type certification including logistics system

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Create logistics MC prototype • Create logistics VTOL prototype • Create logistics system prototype	• Develop logistics MC aircraft • Develop logistics VTOL aircraft • Implement PoC with logistics system	• Acquire Class 1 UAS Type certification for logistics MC • Acquire Class 1 UAS Type certification for logistics VTOL • Acquire Class 1 UAS Type certification including logistics system

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Capture 0.3% (7.5 billion yen) of the domestic and overseas drone logistics market (estimated at 2.5 trillion yen in 2030)
- Examine overseas expansion, especially into Asian markets, from 2029, the second year following commercialization

Developer's Message (Future Vision)

- We believe that utilizing a variety of drones and autonomous mobility devices will enable us to resolve challenges in the logistics industry and across society. Our aim is for the aircraft developed by EAMS ROBOTICS in this project to soar through the skies above communities all over Japan.
- We hope to promote Japan's technological capabilities overseas by deploying aircraft developed by EAMS ROBOTICS not only domestically, but also internationally.

EAMS ROBOTICS Co., Ltd.
Representative Director

<Company Details>
- Company Website: https://www.eams-robo.co.jp/
- Head Office: 65-1 Minamihara, Hansaki, Odaka-ku, Minamisoma-shi, Fukushima
- Contact: info@eams-robo.co.jp

J-Startup TOHOKU

Development of High-Performance Drone Ports Capable of Meeting Government and Private Sector On-Site Needs (Long-Distance/Long-Haul Flights and Automated Operations)

VFR Inc. (representative)

Large-scale technology demonstration: December 2023–March 2027

Overview of Large-Scale Technology Demonstration

- In this project, VFR will use drone ports to solve operational challenges involved in inspecting public infrastructure facilities and transporting emergency supplies, for which there is a great need for fully automated and long-haul/long-distance flight drone operation.
- The company will develop a domestically produced drone port system equipped with the three key technical requirements for drone ports: safety, versatility, and scalability.

[Technology's features and sophistication level]

- Safety: Functions that enable drones to take off and land reliably and safely
- Versatility: Enabling drones from multiple drone manufacturers to take off and land based on various on-site needs
- Scalability: Functions that enable the drone port information management system to be linked with external systems

⇒Develop a domestically-produced drone port through which social implementation is possible

[Outcome (illustrative only)]

Reference: current drone port

[Post-social implementation immediate targets]

- Sales of 3.16 billion yen in 2031 (fifth year) following commercialization, with a total cumulative sales revenue of 6.27 billion yen over five years. Define the drone inspection market adapted to Japanese government needs as a niche market and make it an oligopoly
- Achieve unmanned/reduced operator drone operations through the full-scale social implementation of drone ports

Development Schedule and Targets for Social Implementation

[Development targets]

- Functions enabling drones to safely take off and land
- Take off and landing of drones from multiple drone manufacturers
- Scalability with linkage to external systems

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Complete coupling testing in specific environments with prototype drone ports, information management system, peripheral equipment, and prototype aircraft	• Examine, design, and develop various functional improvements • Complete coupling testing in specific environments	• Complete product design and development, and undertake comprehensive testing in specific environments • Comprehensive testing of actual operation

Demonstration completed

End of March 2027

Developer's Message (Future Vision)

- With the lifting of the ban on Level 4 drones, there is a growing need in the field for drones capable of longer-haul/longer-distance flights and fully automated operations beyond visual line of sight. It is therefore important to develop drone port infrastructure as take-off/landing sites for drones capable of charging drone batteries. Four companies (VFR Inc., Cube Earth Co., Ltd., Blue innovation Co., Ltd., and Prodrone Co., Ltd.) have formed a powerful tag team to accelerate the social implementation of drone port systems. In future, we will help resolve the issue of Japan's decreasing workforce caused by an aging population and declining birthrate through drone ports, which are an important solution for low-population or uninhabited environments.

From left, Members of Prodrone, Cube Earth, VFR, and Blue innovation

<Company Details>VFR Inc.
■Company Website: https://vfr.co.jp/
■Head Office: 21st Floor, JP Tower Nagoya, 1-1-1 Meieki, Nakamura-ku, Nagoya-shi, Aichi
■Contact: Eiki.Tokuni@vfr.co.jp (PIC of this drone port project)

Development of Platform to Optimize Inspections Using Drones

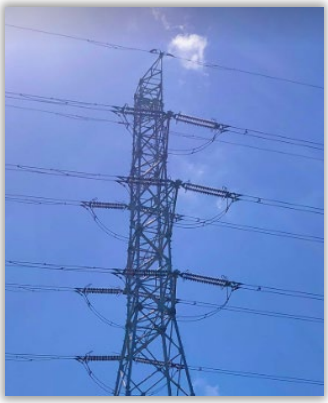
Terra Drone Corporation (representative)

Large-scale technology demonstration: December 2023–November 2025

Overview of Large-Scale Technology Demonstration

- Terra Drone will develop a platform for centralizing the various software required for phases of drone inspection planning, application, flight, and data analysis, and significantly optimizing tasks.
- The company aims to accelerate the social implementation of drones for various inspection tasks through use of the platform.

[Site scheduled for demonstration]
Fukuoka Prefecture

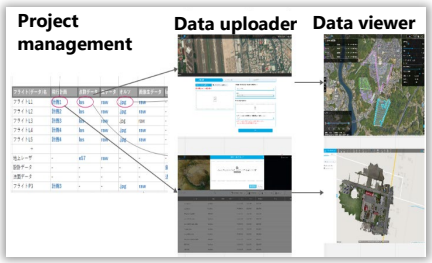


[Technology's features and sophistication level]

- Develop a cloud for enabling centralized management of flight plans and acquired data
- API connection to external services for flight applications and image data processing

⇒Ultimately, reduce the time for tasks from flight planning to completion of data processing to within 2.5 hours, one-tenth of the time normally required

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Capture 1% (5.2 billion yen) of the domestic and overseas drone inspection market (estimated at 5.2 trillion yen in 2030)
- Through the social implementation of this platform, lower the hurdle for introducing drone inspections, thereby helping to build a framework for efficiently maintaining infrastructure without man-made disasters

Development Schedule and Targets for Social Implementation

[Development targets]
- Complete non-hardware tasks for drone inspections using the platform
- Complete tasks within 2.5 hours, one-tenth of the time normally required

2023: TRL 5 and above	2024: TRL 6 and above	2025: TRL 7 and above
• Complete project management window • Connect external APIs • Connect LiDAR/photo analysis	• Simulation demonstration for each inspection measure • Transmission tower inspection functions • Chemical plant inspection functions • Bridge demonstration inspection functions	• Demonstration testing for reaching development targets

Demonstration completed

End of November 2025

Developer's Message (Future Vision)

- Using drones to replace the labor-intensive and dangerous tasks of scaffold assembly and suspending ropes for structural inspections is expected to significantly optimize these tasks.
- However, completing inspection work with drones currently involves a high barrier to entry as it requires proficiency in a variety of different software, and thus the potential of such technology has not yet been fully explored.
- Through this development, we will help reduce the many burdens and risks faced by inspection workers.

Terra Drone Corporation
Shunichi Shiozawa

<Company Details>
- Company Website: https://terra-drone.net/
- Head Office: 3rd Floor, Totate International Building, 2-12-19 Shibuya, Shibuya-ku, Tokyo
- Contact: 03-6419-7193; info.jp@terra-drone.co.jp

Development of Framework for Enabling Seamless Drone Inspection

Intent Exchange, Inc. (representative)

Large-scale technology demonstration: December 2023–March 2027

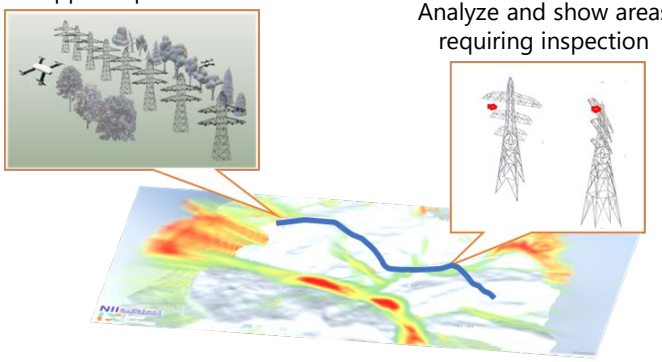
Overview of Large-Scale Technology Demonstration

- This project will improve productivity of specialized operations required for drone inspections, including image capture coordination, formulating flight plans, checking inspection results, and creating reports.
- It aims to reduce total work time needed for drone inspection operations by 70% through not only optimizing each operation but also facilitating linkages between operations.

[Outcome (illustrative only)]

Design inspection routes and support operations

Analyze and show areas requiring inspection



[Technology's features and sophistication level]

- Build 3D models of inspection targets and identify inspection points on 3D models
- Reduce ground and aerial risks through inspection-specific UAV traffic management (UTM)

⇒Ultimately develop a drone inspection service platform

Development Schedule and Targets for Social Implementation

[Development targets]

- Enable faster photogrammetry functions
- Link with ground risk assessment
- 3D Viewer
- Data linkage with aircraft

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Build 3D model • Ground risk assessment	• Develop 3Dviewer display functions • Develop autopilot system for inspections	• On-site demonstration • Connect autopilot system for inspections with UTM

Demonstration completed

End of March 2027

[Post-social implementation immediate targets]

- Capture 30% (24.2 billion yen) of UTM/image processing service for domestic drone inspection market (estimated at 81 billion yen in 2031)
- Reduce total work time required for drone inspections and help expand and develop the drone inspection industry

Developer's Message (Future Vision)

- To develop new industries that utilize drones, it is essential for us to achieve both safety and efficiency. We hope to create a world where drones can be used safely and conveniently through developing a framework to achieve this.

Intent Exchange, Inc.
President and CEO Shinji Nakadai (center)

<Company Details> Intent Exchange, Inc.
- Company Website: https://intent-exchange.com
- Contact: info@intent-exchange.com
- Head Office: 2-3-10 Mukogaoka, Bunkyo-ku, Tokyo

SkymatiX, Inc. (co-proposer)
- Company Website: https://skymatix.co.jp
- Contact: info@skymatix.co.jp
- Head Office: 4-2-16 Nihonbashi-Hongokucho, Chuo-ku, Tokyo

Social Implementation of Small-Scale Decentralized Water Recycling System for Residential Use

WOTA CORP. (representative)

Large-scale technology demonstration: January 2024–December 2026

Overview of Large-Scale Technology Demonstration

- WOTA will conduct demonstrations of a small-scale decentralized water recycling system for single-family residences on a per-settlement basis in depopulated areas in Japan, aiming to implement it as social infrastructure and explore its potential as a structural solution to global water challenges.
- By showcasing the specifications of the mass-production system (including operating costs) and addressing key challenges to ensure its functionality as social infrastructure, the company aims to establish strategies for standardization and the establishment of industry-wide standards.

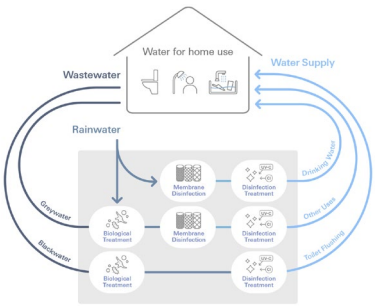
[Demonstration site (illustrative only)]

[Technology's features and sophistication level]

- Offer sophisticated treatment equivalent to large-scale water treatment plants on a per-household basis
- Achieve a high level of safety and high recycling rate with proprietary water treatment autonomous control technology

⇒Ultimately, develop a highly versatile mass production system capable of being implemented domestically and overseas

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Capable of being installed in single-family residences
- 90% or more water recycled on-site
- Provide recycled water at the same standard as potable water

Demonstration plan/launch
- Select municipality for demonstration
- Formulate a switchover plan
- Form consensus with municipalities and residents
- Begin demonstration

2024: TRL 6 and above

Demonstration operation
- Operation *Including summer and winter
- Continuous demonstration testing of one year or longer

2025: TRL 6 and above

Demonstration evaluation
- Evaluation/improvement
- Examine strategies for standardization and establishing standards

2026: TRL 6 and 7

Demonstration completed

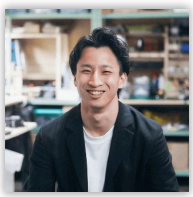
End of December 2026

[Post-social implementation immediate targets]

- Capture a share of the emerging water business market following commercialization, and transform the business into a "platform" through licensed production and other methods. This will accelerate the resolution of global water issues while contributing to export promotion, the development of domestic industries, and job creation.

Developer's Message (Future Vision)

- Our vision is to "seek structural solutions to the world's water crisis." Since our establishment in 2014, we have developed a small-scale decentralized water recycling system to recycle everyday wastewater and use it as effectively as possible, supported by autonomous water treatment control technology to enable its implementation. Through this, we hope to solve the various challenges caused by the uneven distribution, depletion and pollution of water resources on Earth. We aim to build sustainable water infrastructure by establishing a settlement model utilizing the small-scale decentralized water recycling system in Japan, which faces challenges such as population decline and aging water pipes.



WOTA CORP.
Representative Director and CEO Yosuke Maeda

<Company Details>
- Company Website: https://wota.co.jp/
- Head Office: 1-13-13 Nihonbashi-Bakurocho, Chuo-ku, Tokyo
- Contact: government.team@wota.co.jp

J-Startup
J-Startup Impact

Development of Road Change Detection Technology Using Probe Car Data

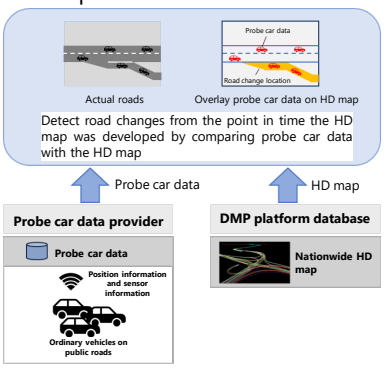
Dynamic Map Platform Co., Ltd. (representative)

Overview of Large-Scale Technology Demonstration

Large-scale technology demonstration: March 2024–March 2026

- This project will develop tools for analyzing probe car data, such as location information provided by automobiles.
- It will detect lead-times and costly road change details from analysis results of probe car data.
- Road change detectability will be evaluated quantitatively through large-scale demonstrations in Japan and North America.

[Overview of development]
Demonstration scheduled using expressways in Japan and North America



[Technology's features and sophistication level]

- Develop location information correction technology for probe car data using information from HD map
- Automatically detect road change locations using probe car data

⇒Ultimately, reduce lead times for road change detection by collecting probe car data in a timely manner

[Outcome (illustrative only)]

List of detection results of road change locations

Development Schedule and Targets for Social Implementation

[Development targets]

- Analyze probe car data from Japan and North America to detect road changes with an undetected rate of 10% or less and a false positive rate of 50% or less
- Analyze probe car data from Japan and North America to detect road changes with an undetected rate of 0% and a false positive rate of 20% or less

(Tool development/initial demonstration)
- Develop probe car data analysis tools
- Demonstrate road change detection on expressways in Japan and North America

2024: TRL 6 and above

(Tool development/initial demonstration)
- Develop probe car data analysis tools
- Demonstrate road change detection on expressways in Japan and North America

2025: TRL 7 and above

Demonstration completed

End of March 2026

[Post-social implementation immediate targets]

- In 2030, following completion of the project, capture 20% global share of HD mapping and 25 billion yen of the market
- Resolve the issue of increasing HD map coverage and enable the preparation of HD maps for general roads by shortening lead times and reducing the cost of road change detection

Developer's Message (Future Vision)

- To resolve social issues including loss of mobility in rural areas, we aim to shorten lead times for updating high-precision maps, which are essential for realizing self-driving cars, expand map coverage, and further promote the use of automated driving functions.

Managing Officer, Automotive Business: Motoyuki Yamashita (second from right)

<Company Details>
- Company Website: https://www.dynamic-maps.co.jp/company/overview/index.html
- Head Office: 12th Floor, Nextsite Shibuya Building, 2-12-4 Shibuya, Shibuya-ku, Tokyo
- Contact: 03-6459-3445

Ministry of Land, Infrastructure, Transport and Tourism

Solicitation Topics

(1) Disaster Risk Reduction and Infrastructure Management

- Development and Demonstration of Technologies for Sophistication (Labor-Saving, Automation, and Decarbonization) of Construction Work and Disaster Information Collection
- Development and Demonstration of Technologies for Maintenance and Management of Public Structures (Roads and Rivers) Using Digital Twins
- Development and Demonstration of Technologies for Urban Digital Twins
- Development of Technologies Contributing to Sophistication of River Management Monitoring and Observation Using Next-Generation Equipment, Etc.
- Development of Technologies Contributing to Sophistication of Road Management Monitoring and Observation Using Next-Generation Equipment, Etc.

(2) Transportation Platforms for Enhanced International Competitiveness

- Development and Demonstration of Technologies Related to Optimization and Sophistication of Inspections of Steel Port Structures Using Autonomous Underwater Vehicles (AUVs) and Remotely Operated Vehicles (ROVs)
- Development and Demonstration of Technologies Related to Improving Productivity of Airport Operations
- Development and Demonstration of Technologies Related to Optimization of Inspections and Surveys of Port Facilities Using Drones
- Development and Demonstration of Technologies for Safe and Efficient Docking and Undocking Contributing to Reducing the Risk of Collisions with Vessel Mooring Facilities

(3) Safe and Secure Public Transportation and Related Systems

- Development and Demonstration of Technologies Contributing to Optimization and Labor-Saving in the Maintenance and Management of Railway Facilities
- Development and Demonstration of Technologies Related to Enhancement of Guidance Services for Improving Safety at Railway Stations
- Demonstration of Automated Driving Technologies Adapted to Regional Public Transportation
- Development and Demonstration of Shipping-Related Data Linkage Platforms for Promoting Shipping DX

Automated and Autonomous Operation of Construction Machinery Work

DeepX, Inc.

Large-scale technology demonstration: April 2024–March 2028

Overview of Large-Scale Technology Demonstration

- DeepX will promote development and demonstration of software for automated operation of hydraulic excavators, bulldozers, caisson excavators, and other construction machinery.
- The company aims to resolve labor shortages and improve safety at construction sites by enabling automated operation of construction machinery at ordinary construction sites.

[Demonstration site] Tsukuba, Ibaraki

[Technology's features and sophistication level]

- Real-time recognition of surrounding environment to enable application at a diverse range of construction sites, and flexible situation assessment and control based on this recognition

⇒Ultimately, develop an automated system for construction machinery that can be operated at actual construction sites

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Enable continuous excavation and scraping operations at the diverse environments of actual sites
- Simultaneous operation of 10 or more caisson excavators

2024: TRL 5 and above	2025: TRL 6 and above	2027: TRL 7 and above
• Safety functions for cooperative work • Develop automated excavation and loading functions	• Increase number of simultaneously operating machines • Develop function for linking with other construction equipment • Develop automated scraping function	• Operate and demonstrate tester machine at an actual site

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Create construction machinery automated operation software license market (aiming for revenue of 3 billion yen with domestic sales of 300 billion yen in 2032)
- Contribute to labor-saving and eliminating hazards at construction sites where labor shortages are anticipated

Developer's Message (Future Vision)

- With automated operation technology for hydraulic excavators, we will revolutionize the future of construction sites.
- We aim to innovate safety and efficiency and solve the challenge of labor shortages at worksites. This technology will bring about new value for the construction industry.

DeepX Project Manager Kohei Nishimura

<Company Details>
■Company Website: https://www.deepx.co.jp/ja/
■Head Office: 3rd Floor, Daiichi Mikura Building, 3-21-4 Yushima, Bunkyo-ku, Tokyo
■Contact: info@deepx.co.jp

Work Style Reform Through Optimizing Snow Removal Tasks and Improving Resilience in Areas of Heavy Snowfall Using AI/IoT

Kensetsu IoT Kenkyujo, Co., Ltd.

Large-scale technology demonstration:
March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Kensetsu IoT Kenkyujo will conduct demonstration testing of a system that identifies snow pile conditions and freezing of road surfaces in real time from multiple network cameras, snow depth sensors, and weather information and determines the appropriate timing for snow removal tasks using AI.
- The company will conduct demonstration testing to verify the effectiveness of acquiring operating skills, such as creating a point cloud from snow pile images taken by action cameras mounted on light vehicles (kei cars) and avoiding contact with structures under snow piles using monitors facing the operator's seat.
- It will also conduct demonstration testing to improve operator skills and resilience capabilities through hands-on training using a digital twin.

[Demonstration site] Rumoi, Hokkaido

[Preliminary testing of digital twin for heavy snow removal machinery]

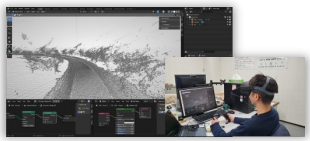
[Technology's features and sophistication level]

- Develop equipment for monitoring snow pile conditions in real time and automatically calculating snow depth to determine whether to dispatch snow removal vehicles
- Develop equipment that enables users to get hands-on training of snow removal tasks in virtual reality (VR), etc. using a digital twin

⇒Ultimately, develop equipment to support labor-saving in snow removal tasks and improve operator skills and resilience capabilities

[Outcome (illustrative only)]

[AI decision through remote presence]



[Immersive experience using digital twin]

Development Schedule and Targets for Social Implementation

[Development targets]

- Minimize remote presence facilities
- Build digital twin
- 80% accuracy in determining whether to begin snow removal
- Expand simulation functions

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• AI identification equipment • 3D measurement technology • Digital twin beta version	• Develop packaging • Simulator • Digital twin technology	• Technology using big data • Simulator • Digital twin technology

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Capture 27.5% (0.66 billion yen) of labor expenses (2.4 billion yen) in the domestic road snow removal market (24 billion yen in 2022)
- With labor-saving and skill transfer technologies that support mental health using AI/IoT, we expect to expand the market into other industries such as transportation and cargo handling at ports

Developer's Message (Future Vision)

- In the construction industry, labor shortages have become a serious challenge due to the aging population and declining birthrate. We aim to eliminate the shortage of snow removal workers by using ICT to optimize and automate snow removal tasks and reduce the physical and mental burden on snow removal workers.
- Through this, we will help to mitigate damage caused by snow and maintain infrastructure in Japan and overseas. In addition, the AI and digital twin technologies built as part of this technology development will be widely rolled out to other fields.

Kensetsu IoT Kenkyujo staff photo at the JSCE Annual Meeting

<Company Details>
■ Company Website: https://kensetsu-iot.co.jp/
■ Head Office: 5-711 Komaki, Komaki-shi, Aichi
■ Contact: n_kani@kani-kk.co.jp

Business Creation to Expand Sales of Remote, Automated, and Labor-Saving Systems for Construction Machinery to Small- and Medium-Sized Contractors

ORAM Corporation

Large-scale technology demonstration:
March 2024–December 2027

Overview of Large-Scale Technology Demonstration

- ORAM will conduct demonstration testing to develop an application for remote/automated construction and enhancing productivity targeting repetitive construction work by small- and medium-sized construction companies, such as disaster recovery work and tasks at plants.
- The company will provide safe and inexpensive unmanned control systems for construction machinery, including mass production of RemoDrive®, a retrofit remote control system for upgrading existing construction machinery into remote and automated construction machinery.

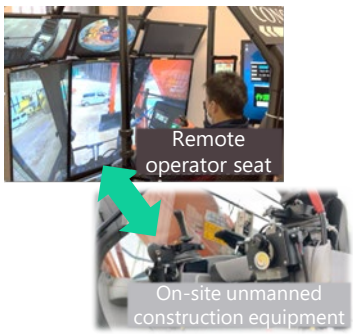
[Demonstration site]
Demonstration scheduled at Totsukawa, Nara
Demonstration scheduled at Seto, Aichi

[Technology's features and sophistication level]

- Develop a retrofit remote system that can be switched between manned and unmanned operation
- Develop a remote control system for remotely switching between multiple units/multiple types of construction machinery
- Develop a construction optimization system using automation/AI for repetitive tasks

⇒Ultimately, aim for 200% work efficiency

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Achieve 200% work efficiency by implementing a remote switching function for multiple and various types of construction machinery
- Implement function for selecting connections to a wide range of communication standards suited to on-site communication environments
- Develop and implement various remote operation assist systems (AR technology, etc.)

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Complete mass production design of RemoDrive® • Complete design of multi-connect function	• Complete mass production of RemoDrive® • Multi-connect function TRL 6-7 • AR operation assist technology TRL 6	• Commercialization of unmanned construction services TRL 5 • Remote operation support AI TRL 6-7

Demonstration completed

End of December 2027

[Post-social implementation immediate targets]

- Target annual turnover of 1 billion yen and operating margin of 35% in 2027 in the domestic construction equipment and logistics markets
- Establish a sustainable business model for the blue ocean market

Developer's Message (Future Vision)

- To protect, recover, and maintain Japan's world-class construction infrastructure in the face of labor shortages of construction workers in rural areas and infrastructure damage caused by natural disasters, we aim to provide an unmanned construction system and implementation management system that meet the actual needs of small- and medium-sized contractors arising from on-site tasks.
- The proprietary solution developed by ORAM will resolve the issue of labor shortages on-site: in Japanese, "hito ga oran."

Right: Mitsuhiro Nomura (CEO);
left: Junichi Kurata (CTO)

<Company Details>
■Company Website: https://www.oram.co.jp
■Head Office: ATC Building, 2-1-10 Nanko-Kita, Suminoe-ku, Osaka-shi, Osaka
■Contact: 06-7777-1410 info@oram.co.jp

Development of Construction Technology Package Using 3D Printer for Construction and Building of DB and Platform

Polyuse Inc.

Large-scale technology demonstration:
March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Polyuse will conduct a technical demonstration related to a construction platform for promoting the use of 3D printers for construction capable of efficient construction and creating a society where materials required at construction sites can be ordered and used easily.
- The company will build the necessary data platform for enabling anyone to use 3D printing safely and securely in construction and implement the field-tested construction technology package (*below, "CTP") widely in the field.

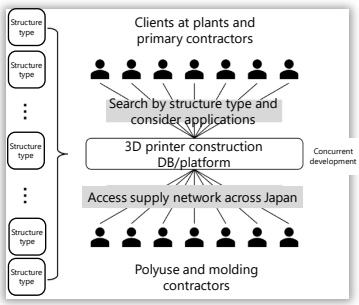
[Site where demonstration is already underway]
Komatsu, Ishikawa/Shinjo, Yamagata

[Technology's features and sophistication level]

- Establish best practices through field construction demonstration
- Promote usage at actual construction sites in cooperation with construction companies nationwide

⇒Ultimately, develop a platform implementing CTP for enabling anyone to easily utilize 3D printers for construction

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Run 6 types of CTP on the PF and allow internal sharing
  2024: TRL 5 and above
- Run 12 types of CTP on the PF and enable use by specific companies
  2026: TRL 6 and above
- Release CTP to make them available for actual construction using construction DB/PF
  2027: TRL 7 and above

Demonstration completed
End of March 2028

[Post-social implementation immediate targets]

- Capture 3.8% (10.7 billion yen) of the domestic and overseas 3D printer for construction market (estimated at 281.6 billion yen in 2028)
- Accelerate growth of the growing domestic 3D printing market and increase the presence of the Japanese market globally

Developer's Message (Future Vision)

- The construction industry has been maintaining domestic infrastructure while being pushed to the max. Labor shortages mean that construction work is not being carried out where needed, and unless damaged infrastructure is repaired, our lifestyles will no longer be tenable. We believe that a key challenge for the present time is how we can efficiently maintain the infrastructure necessary for our daily lives without being dependent on specialism. We will update the construction industry alongside everyone in the industry to support future infrastructure.

Cofounder Representative Director Takuya Iwamoto | Cofounder Representative Director Wataru Ooka | General Manager of Materials Development Executive Officer Taiyo Kamata

<Company Details>
■Company Website: https://polyuse.xyz/
■Head Office: 2-2-15 Hamamatsu-cho, Minato-ku, Tokyo
■Contact: info@polyuse.xyz

Project for Skill Maturation with Reinforcement Learning Program and VR Technology on Digital Twin to Enable Operation Equivalent to Skilled Operators

Crackin Inc.

Large-scale technology demonstration:
March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Crackin will accelerate skill maturation with reinforcement learning program and VR technology on digital twin to enable operation equivalent to skilled operators (demonstration to show that creating an environment and competitions for operators to gamify the practice of operating special heavy machinery daily at home will enable even inexperienced operators to demonstrate improved skills at an early stage).
- This project will help distribute deployment of heavy machinery operators, who are the key to reopening roads as soon as possible in the initial stages of a disaster.

[Demonstration site] Tsubaki area, Shirahama, Wakayama

[Technology's features and sophistication level]

- Develop simulators to enable operators to experience operating special heavy machinery at home
- Reduce operation training time using actual equipment

⇒Ultimately, develop a platform that will enable special heavy machinery operators to learn quickly

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Capture 3% (approx. 10 billion yen) of the domestic and overseas VR market (estimated at 331.3 billion yen in 2050)
- Verify the results of risk-free training in the metaverse at the actual demonstration site, the Tsubaki area of Shirahama in Wakayama Prefecture, and encourage the gamification of heavy construction machinery operation

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop four-wheel articulated work machinery simulator
- Promote the use of the above in households
- Promote the use of general construction machinery simulators in households
- Faster learning speed

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Develop simulator EM • Conduct monitor testing • Hold test contest	• Develop simulator FM • Conduct AB testing • Hold test contest	• Simulator FMBU • BU of learning PG • Hold global contest

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- We hope to bolster national resilience and provide a disaster prevention industry from Japan to the world by contributing to faster learning speeds of personnel who can be deployed in response to disasters, leveraging the metaverse technology we developed for the entertainment industry.
- Virtual experience and higher levels of proficiency across heavy machinery operators will surely help to reduce fatal accidents.

Crackin Inc. CEO
Yuta Ogawa (center)

<Company Details>
■Company Website: https://crackin.co.jp/
■Head Office: Kichijoji N22622F, 2-26-2 Kichijoji-Honcho, Musashino-shi, Tokyo
■Contact: enjoy@crackin.co.jp

Development of Small Drones and Swarm Flight Technology for Highly Efficient Patrolling of Infrastructure Facilities

Autonomy HD Co., Ltd.

Large-scale technology demonstration: March 2024–March 2026

Overview of Large-Scale Technology Demonstration

- Autonomy HD will conduct a technology demonstration related to small, high-performance drones having excellent maneuverability that are capable of being carried by a person in a backpack to a nearby site and quickly responding to site surveys and disasters, etc.
- The company will conduct a technology demonstration related to "swarm flights," by which a single operator can fly multiple drones (approx. 10), thereby enabling them to accurately survey disasters in a highly efficient manner.

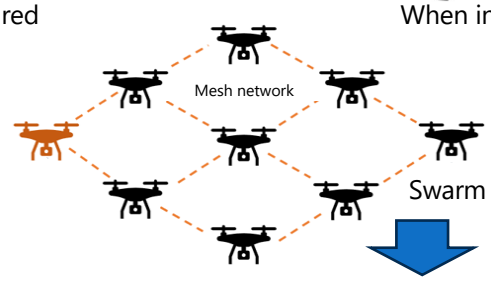
[Technology's features and sophistication level]

- Develop drones that can be folded up for storage, fit in a backpack for carrying, and transported
- Equipped with autopilot with guidance functions using AI technology
- Develop swarm flight control technology using a mesh network via inter-drone communication

⇒Ultimately, develop highly efficient patrol drones capable of easy transportation, unrestricted flying anywhere and at any time, and one-person control of multiple drones

[Outcome (illustrative only)]

When stored　　When in flight



[Post-social implementation immediate targets]

- Capture 20% (10 billion yen) of the domestic and overseas infrastructure inspection-related drone aircraft and service businesses market (estimated at 54 billion yen in 2029)
- Through social implementation of the system, help enable an immediate survey of isolated sites that have been difficult to approach during past disasters

Development Schedule and Targets for Social Implementation

[Development targets]
- Take-off weight of approx. 2 kg
- Flight time of 30 minutes or longer
- Equipped with cerebral autopilot
- Swarm navigation flight

April 2024: TRL 5	April 2025: TRL 6	October 2025: TRL 7
• Develop drones capable of long-haul operation in all weather conditions and automated navigation • Operation demonstration	• Technology testing under the same conditions as those of the environments in which drones will be used when patrolling infrastructure facilities	• Overall testing • Demonstration (scheduled at Ota, Gunma Pref.; Chiba, Chiba Pref.; and elsewhere)

Demonstration completed

End of March 2026

Developer's Message (Future Vision)

- Amid an increase in both frequency and severity of natural disasters due to global warming, we aim to promote the use of the system in order to facilitate a quick and accurate damage response through surveys, particularly in isolated areas with damaged road infrastructure.

Autonomy HD Co., Ltd. CEO
Kenzo Nonami

<Company Details>
- Company Website: https://www.autonomyhd.co.jp/
- Head Office: 2-1-7 Shintomi, Chuo-ku, Tokyo
- Contact: TEL 03-6280-5061

Enable Safe, Automated, and Simple River Patrolling Using Long-Range Drones

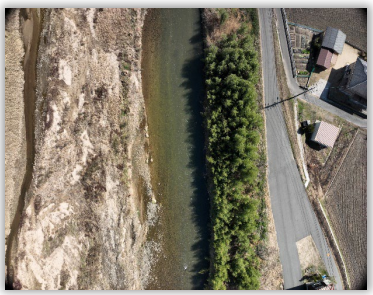
Luce Search Co., Ltd.

Large-scale technology demonstration: March 2024–June 2027

Overview of Large-Scale Technology Demonstration

- Luce Search will deploy electric drones capable of long-range (25 km) and long-haul (60 minutes) flights at river offices nationwide and offer technical and safety guidance to staff.
- The company will combine 3D surveying using RTK cameras with a data management cloud service to build a system for enabling the acquisition of highly precise survey results and immediate monitoring.

[Example of image taken by drone]



[Technology's features and sophistication level]

- Establish autonomous flight routes using LTE communication
- Safety management using UTM system (drone flight management)

⇒Operators focus on safety management and regular maintenance

[Drone image]

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop electric drones capable of flying 25 km
- Automated analysis of captured image data, viewing results

2024: TRL 5	2025: TRL 6	2026: TRL 7
• Design drone • Create prototype • Flight testing	• Monolithic molded drones • On-site testing • Automated analysis of captured images	• Continue on-site testing • Apply for aircraft certification • View analysis results

Demonstration completed

End of June 2027

[Post-social implementation immediate targets]

- Deploy drones at river offices to patrol a total length of 87,451 km. Enable drones to fly 20 km per day for 11 days
- Capture 30% of domestic river patrol expenses (estimated at approx. 8.7 billion yen in 2030)

Developer's Message (Future Vision)

- Class A rivers are long and have vast river basins scattered with points where water flows in and out from small- and medium-sized rivers. For this reason, regular patrols require a great deal of effort. Moreover, immediately following disasters, access becomes difficult, so drones capable of long-distance flight will contribute significantly at such times.
- We will therefore contribute to revolutionary improvements in river patrol operations.

Luce Search Co., Ltd. Development team

<Company Details>
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■Contact: info@luce-s.jp

Development of Drones Capable of Long-Haul Flight in Rainy Conditions, Even in Mountainous Regions

RAISEN. CO., LTD.

Large-scale technology demonstration: March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- RAISEN will develop a drone capable of long-haul flight (80 minutes) while carrying a 2 kg payload, even in the rain.
- The company will develop a drone capable of long-haul flight (80 minutes) in the rain, even in mountainous regions.

[Site scheduled for demonstration]
Matsuyama, Imabari (National Strategic Special Zone), and Kumakogen, Ehime

[Technology's features and sophistication level]

- Battery-powered multicopter drone capable of flying at 2 m/s while carrying a 2 kg payload for 80 minutes or longer in the rain
- Develop a wireless system for enabling long-haul flight even in mountainous regions

⇒Ultimately, develop a self-operated drone capable of long-haul flight in the rain in mountainous regions while carrying a 5 kg payload

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Capture 1.2% (0.36 billion yen) of the disaster information collection and domestic and overseas logistics, inspection, and surveying markets (30 billion yen in 2023)
- Through social implementation of the UAV, enable the operation of drones regardless of weather conditions in the event of a disaster, thereby contributing to robust crisis management measures

Development Schedule and Targets for Social Implementation

[Development targets]
- Payload of 5 kg or greater
- Battery-powered multicopter type
- Flight distance of 4 km or longer in mountainous regions
- Cruising time of 80 minutes or longer (when loaded with 2 kg)
- Equip with self-operating function

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Basic/detailed design • Start Unit 1 production • Waterproof structure testing	• Improved design • Start Unit 2 production • Flight tests in flat and mountainous regions	• Modify drone body • Flight tests in flat and mountainous regions • Overall testing

Demonstration completed
End of March 2028

Developer's Message (Future Vision)

- Battery-powered multicopter-type drones are easy to handle and maintain, and popular among general users. However, their short flight time has been an obstacle in preventing them from meeting demand for use in commercial operations. We will develop unparalleled drones that will make people rethink the notion that all battery-powered drones have a short flight time, and strive to have them received favorably in the market.
- Through this, we will contribute to improving efficiency and reducing the cost of information collection, logistics, inspection, and surveying during disasters.

RAISEN. CO., LTD. President Hideyuki Ogasawara (center)

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Sophisticated Construction Management Through Real-Time 3D Visualization of Terrain and Construction Equipment Status

DeepX, Inc.

Large-scale technology demonstration:
April 2024–March 2028

Overview of Large-Scale Technology Demonstration

- This technology demonstration will be conducted to introduce the GeoViz construction management system in actual construction sites. This system visualizes the construction and machinery status at construction sites in three dimensions in real time.
- By enabling real-time overhead views of construction sites, this system will "shorten verification and quality control work," "enable knowledge sharing through the digitalization of past construction situations," etc.

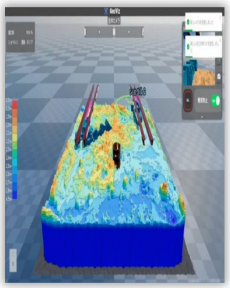
[Demonstration site] Tsukuba, Ibaraki

[Technology's features and sophistication level]

- A highly integrated software is required for real-time recognition and visualization of data sent from multiple construction machinery.
- Repeated, multi-faceted validation will be conducted to ensure continuous, safe operation on site.

⇒Ultimately, complete software that can be used for confined construction areas, e.g., vertical shafts and tunnels

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Capture 50% share of SAM, estimated at 4.2 billion yen in 2032 based on productivity improvements in pneumatic caisson and tunneling methods, etc.
- More advanced construction management that enables construction sites with enhanced safety and reduced workload

Development Schedule and Targets for Social Implementation

[Development targets]
- Establish visualization techniques useful for managing construction by various construction methods
- Stable daily construction operations

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Test prototype at a site using the pneumatic caisson method • Design system for tunnel construction	• Improve issues identified during testing • Development and demonstration test of the tunnel construction management system	• Demonstration of the actual system at a site using the pneumatic caisson method; further improvements • Test prototype at a tunnel construction site • Apply system to other construction methods

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- As the labor force continues to decline in the civil engineering industry, shortening work hours and ensuring safety are urgent issues. By using this system, we aim to digitalize construction sites to reduce the on-site workload and enable advanced construction management based on data.

DeepX Project Manager
Tomoyasu Kataoka (far left)

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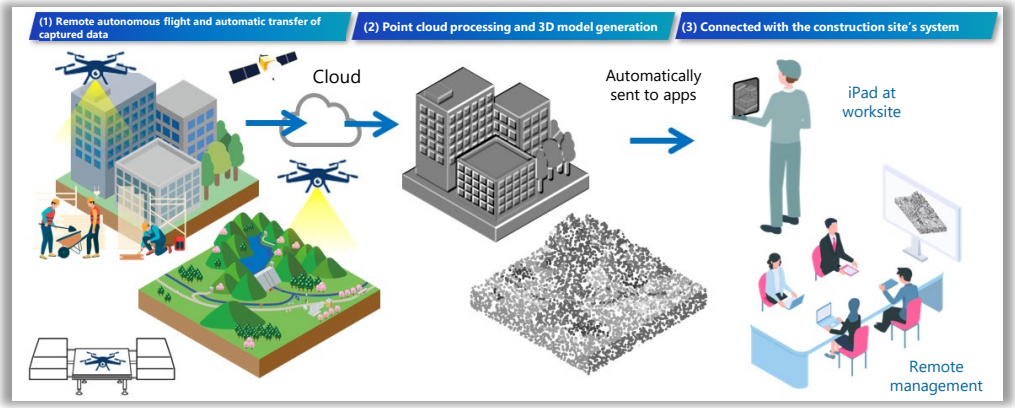
Development of Labor-Saving and Sophisticated Technology for Construction Management at Construction Sites

Liberaware Co., Ltd.

Large-scale technology demonstration:
March 2024–June 2026

Overview of Large-Scale Technology Demonstration

- Drone ports will be used to automate site patrols, progress checks, as-built inspections, and other labor-intensive work in the construction industry.
- Data captured during drone flights will be automatically transferred to the cloud, converted into 3D models, and automatically sent to applications used at construction sites to improve work efficiency at worksite.



Development Schedule and Targets for Social Implementation

[Development targets]
- Build a simple system that enables end users in the construction industry to use drones and captured data effortlessly

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Establish drone imaging methods • Develop data transmission methods	• Develop methods for converting data into 3D models • Develop methods for automatic transfer of data	• Demonstration of an end-to-end system from drone flight to data utilization

Demonstration completed
End of June 2026

[Post-social implementation immediate targets]
- Capture market share in drone inspection and construction (estimated at 255.1 billion yen in 2028)
- By implementing this system in society, contribute to managing construction sites more efficiently, enhancing their safety, and improving construction quality in the construction industry

Developer's Message (Future Vision)

- The construction industry's shrinking labor force is becoming a serious problem. To manage construction sites more productively in remote areas, especially dam sites, we aim to build an integrated system that automatically connects drone imaging to data utilization in the construction industry.
- Through this system, we will promote the use of drones and their data utilization technologies in society, and contribute to fundamentally solving the labor shortage in the construction industry.


CEO Hongkyu Min

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Ministry of Land, Infrastructure, Transport and Tourism
(1) Disaster Risk Reduction and Infrastructure Management

Small/Startup Business Innovation Research

Development of a Breakthrough Automated Rebar Inspection System Using HMS's 3D Sensors, and its Validation and Promotion in the Construction Industry Through the Construction RX Consortium Subcommittee

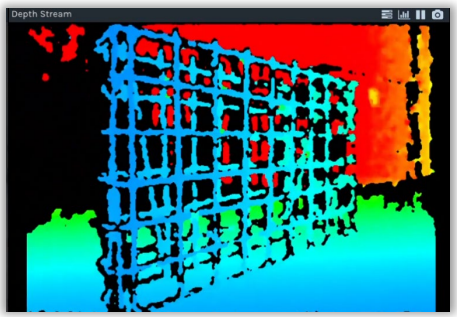
HMS Co., Ltd.

Large-scale technology demonstration:
April 2024–March 2028

Overview of Large-Scale Technology Demonstration

- HMS will conduct demonstration testing of an automated inspection method that uses 3D sensors to capture rebar arrangements in real time as point cloud data and utilizes codes to recognize the rebar as a 3D model, which will enable comparisons with design BIM data.
- By integrating with existing inspection platforms, the company will optimize inspection operations.

[Core technology] 3D sensing technology



Demonstration planned at construction sites in the Kanto region

[Technology's features and sophistication level]

- Develop an automated rebar inspection device that uses 3D sensing technology
- Develop a device to affordably print ArUco markers on rebars

⇒Ultimately, develop a device and system which can be operated even by non-experts and which significantly optimizes rebar inspection operations

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Processing for point cloud integration and segmentation
- Develop a platform for advanced sensor integration
- Develop rebar inspection device
- Develop APIs compatible with the systems of various companies
- Develop prototype of printing device

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Create platform for inspection device • Create integrated software • Create prototype of printing machine • Create app integration function	• On-site validation of the inspection device • Validation of the printing machine	• Validation with the second prototype • Validation of the printing machine at rebar manufacturing companies

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Achieve over 1 billion yen in sales of this product (Japanese construction tech market estimated to grow to 473.7 billion yen by 2029)
- By using this automated rebar inspection device in society, contribute to reducing personnel and decreasing labor hours for rebar inspections (save labor on on-site operations and improve productivity)

Developer's Message (Future Vision)

- Our 3D sensors and their corresponding software have been developed primarily for robotics use. We are confident that newly applying this technology to the construction industry will revolutionize tasks such as rebar inspection, which has been one of the labor-intensive, hindering construction operations, and significantly enhance productivity.
- Rather than competing with the construction industry, we aim to collaborate with them as a co-creation partner and do our utmost to share our technology and expertise for the success of this project.

HMS Co., Ltd.
President & CEO
Hu Zhencheng

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- Company Website:https://www.hms-global.com/
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- Contact: info@hms-global.com

J-Startup KYUSHU

Development of a Low-Cost, Highly Reliable, and Highly Secure Sensor Network System

Foresttosea Co., Ltd.

Large-scale technology demonstration: March 2024–December 2026

Overview of Large-Scale Technology Demonstration

■ This project will conduct the following R&D and integrated operational demonstrations (large-scale demonstrations planned in Kumakogen, Ehime, etc.):

(1) General-purpose wireless terminal with an interface that can flexibly connect to a variety of existing sensors
(2) A highly reliable and highly secure sensor network system (relay and base stations)
(3) A sensor network management system to control the entire system, including wireless terminals (cloud-based)

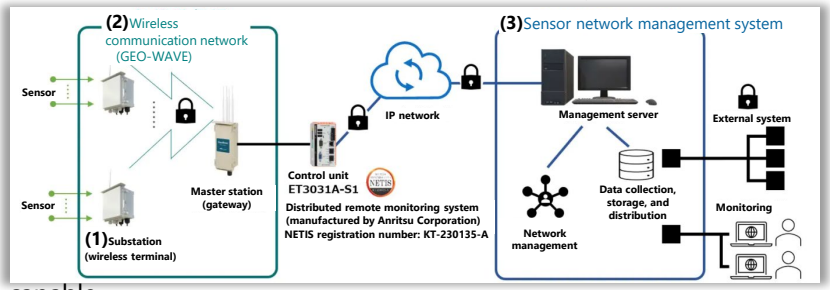
[Technology's features and sophistication level]

■ Develop wireless devices with LPWA, which enables long-range communication, for connecting to sensors and creating a network

■ Develop an advanced cloud system for controlling wireless devices safely and efficiently

⇒Ultimately, develop a sensor network system capable of reliably collecting river water level/landslide data, etc. over a wide area at low cost, which will be useful for natural disaster measures

[R&D and outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]
(1) Low-cost, general-purpose wireless terminal that connects to sensors using long-range LPWA
(2) Highly reliable relay and base stations using long-range LPWA
(3) Highly secure sensor network management system to control the entire system

- 2024: TRL 5 and above — Develop prototype-level versions of (1) to (3) above and perform individual and desk-based validations
- 2025: TRL 6 and above — Develop final product-level versions of (1) to (3) above and perform individual and desk-based validations
- 2026: TRL 7 and above — Conduct large-scale, long-term demonstrations of final product-level prototypes for (1) to (3) above in an actual environment, including in Kumakogen, Ehime

Demonstration completed

End of December 2026

[Post-social implementation immediate targets]

■ Capture 5% share (approx. 3.5 billion yen) of the Japanese market targeted at the Ministry of Land, Infrastructure, Transport and Tourism and local governments (estimated at 70 billion yen in 2031)

■ Automate and save labor in disaster information collection; achieve a system that can collect information swiftly across a wide area

Developer's Message (Future Vision)

■ By leveraging our proprietary communication technology, we will realize a system that can collect disaster information efficiently in both urban and mountainous areas while minimizing cost, and increase disaster management capabilities across Japan.

■ We will also contribute to achieving the Ministry of Land, Infrastructure, Transport and Tourism's goal of "preventing and mitigating disasters and strengthening national resilience," and to enhancing collaborative disaster prevention measures, exemplified by the river basin project involving the collective effort of relevant organizations and residents.

Foresttosea Co., Ltd.
Representative Director
Yoshiaki Tokita

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■ Company Website:https://satoyama-connect.jp/
■ Head Office: Kiyosumi-Shirakawa Forest Building, 3-7-11 Miyoshi, Koto-ku, Tokyo
■ Contact: fs_info@geowave.jp

Ministry of Land, Infrastructure, Transport and Tourism
(1) Disaster Risk Reduction and Infrastructure Management

Development and Demonstration of a Wireless Sensor Network Technology Enabling Large-Scale Implementation of Disaster and Infrastructure Management Services

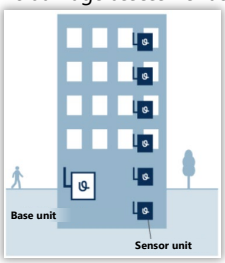
Sonas, Inc.

Large-scale technology demonstration:
March 2024–March 2027

Overview of Large-Scale Technology Demonstration

- Sonas will develop and conduct demonstrations of a high-quality wireless sensor network technology that helps reduce/save labor in disaster management and infrastructure maintenance work for public infrastructure, residential buildings, railway bridges, and other structures.
- By establishing comprehensive service platform capabilities covering installation, operation, troubleshooting, and regular maintenance support systems, it will promote full-scale adoption of monitoring services for disaster and infrastructure management.
- Demonstration testing and market deployment will begin with applications that have clear demand, e.g., seismic damage assessment and scouring monitoring.

Example configuration of a wireless sensor network using the company's UNISONet wireless technology (seismic damage assessment system)



Technology demonstration planned on urban expressways, bridges, and residential buildings

[Technology's features and sophistication level]

- Installation/operation support technology enabling robust network creation without technical knowledge
- Increased wireless performance, robustness, cloud integration, and hardware development

⇒Ultimately, build a highly reliable wireless sensor network technology platform that requires maintenance only about once every five years

[Outcome (illustrative only)]

Vibration sensor unit

[Post-social implementation immediate targets]

- Achieve around 4 billion yen in sales in five years in the field of seismic damage assessment and scouring monitoring
- Apply the technology to structures of various shapes, including bridges, tunnels, towers, and buildings

Development Schedule and Targets for Social Implementation

[Development targets]

- Can be installed and operated without technical knowledge
- Clarification of cost structure and performance constraints
- Unplanned on-site maintenance is unnecessary
- Simultaneous connection of approx. 10,000 sensors

2024: TRL 6 and above

- Enhance performance and functions of the wireless network deployment support technology
- Develop a cloud system
- Develop hardware

October 2025: TRL 7 and above

- Enhance wireless network reliability
- Sophisticate cloud system capabilities
- Improve hardware

Demonstration completed

End of March 2027

Developer's Message (Future Vision)

- Sonas is a startup that was founded with a strong commitment to contributing to disaster management and infrastructure maintenance. For the past seven years since its establishment, it has been developing and commercializing wireless vibration monitoring systems. As labor shortages become apparent, we are reminded of the potential contributions that monitoring can make and have a renewed sense of mission. Through this demonstration, we aim to further refine our technology and business, striving to become an indispensable presence in disaster management and maintenance for a range of infrastructure.

Sonas, Inc.
Representative Director and CEO
Sotaro Ohara

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Development and Demonstration of Temporary Power Supply Spots Using Flexible Solar Cells and Storage Batteries

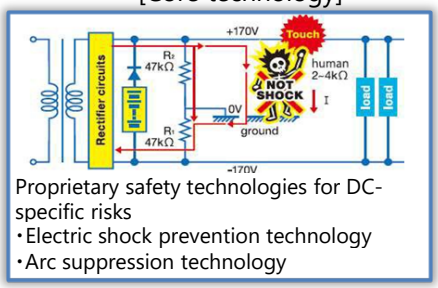
DC Power Vil. Corporation (representative)

Large-scale technology demonstration: March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- DC Power Vil. will develop installation methods for flexible solar cells and small wind power generators on outdoor lighting fixtures or other structures, develop solar and wind power sources and charge/discharge devices, and conduct a technology demonstration to develop temporary power supply spots using these technologies.
- The company will develop high-efficiency DC power sources to realize the use of high-quality renewable energy.

[Core technology]



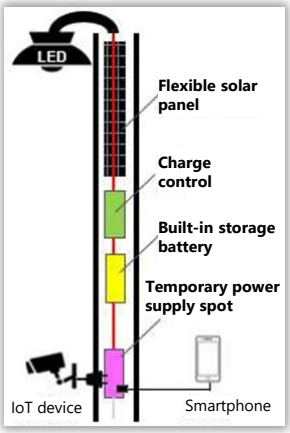
Proprietary safety technologies for DC-specific risks
・Electric shock prevention technology
・Arc suppression technology

[Technology demonstration location]

Demonstration testing of temporary power supply spots to begin in FY2024

DC LED lighting (Nov. 2023)

[Outcome (illustrative only)]



[Technology's features and sophistication level]

- Development of high-efficiency DC power sources
- System development for optimizing the utilization efficiency of renewable energy
- Proprietary safety technologies

⇒Develop temporary power supply spots to provide lighting and power sources as efficiently and safely as possible during power outages

Development Schedule and Targets for Social Implementation

[Development targets]

- Develop high-efficiency DC power sources equipped with proprietary safety technologies
- Withstand wind speeds of up to 60 m/s
- Establish installation methods for flexible PV

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Develop charge/discharge devices • Device matching • Simulation	• Weather resistance test • Wind speed resistance test • Structural review	• Public field demonstration Installation verification Operation verification

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Capture 10% (2.74 billion yen) of the electrical facilities market directly managed by the Ministry of Land, Infrastructure, Transport and Tourism (estimated at 27.4 billion yen in 2032)
- By implementing this product in society, contribute to the development of disaster management systems to secure power sources for small electrical devices even during disasters

Developer's Message (Future Vision)

- Once-in-a-few-decades large-scale natural disasters have become frequent occurrences. When they occur, loss of power (power outage) may cut off communication and information sources, leaving people isolated. To mitigate this risk, we aim to deploy temporary power supply spots throughout Japan.
- This will contribute to reducing damages caused by power loss during natural disasters.
- We aim to turn our energy poles for DC microgrids into critical societal infrastructure.

DC Power Vil. Corporation (right)
Mura, Haneda, Kido
Iwasaki Electric Co., Ltd. (left)
Ishikawa, Saeki, Owaki, Fujino

<Company Details>DC Power Vil. Corporation
■Company Website:https://dcpowervil.co.jp/
■Head Office: 5th Floor, Kagaya Building, 3-6-6 Shinbashi, Minato-ku, Tokyo
■Contact: mura@dcpowervil.co.jp

Development of Assessment and Maintenance Methods for Small and Medium Municipal Structures Using a Simple 3D Measuring Device

Basis Consulting, Inc.

Large-scale technology demonstration: 2024–2028

Overview of Large-Scale Technology Demonstration

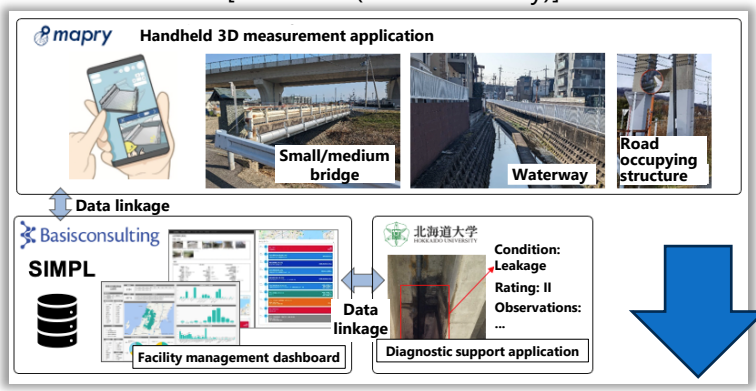
- Basis Consulting will develop a system for assessing infrastructure conditions and conducting maintenance using a digital twin. It integrates a 3D measuring device (mapry) and an infrastructure management system (SIMPL®) and links camera footage, 3D data, and attribute information, among other data. Furthermore, the company will develop an AI-powered diagnostic support application, with the aim of developing a one-stop system, covering data management to diagnostics.
- It will offer inspection tools and an infrastructure management system that are affordable and easy to use for municipal officials, consultants, and surveyors. Using a digital twin for social capital management will enhance local governance capabilities.

[Technology's features and sophistication level]

- An assessment and maintenance system specializing in small/medium infrastructure structures
- A simple, one-stop system for assessing structure conditions and maintenance

⇒Ultimately, provide a cloud service that even small municipalities can adopt with limited initial costs

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Develop a comprehensive system using a digital twin for managing various types of small/medium infrastructure structures

Linking SIMPL and mapry
- Develop solutions limited to bridges
- Design a measurement app for waterway management

2024: TRL 5 and above

Integration with diagnostic AI
- Expand managed facilities and features
- Integrate diagnostic reporting features

2026: TRL 6 and above

POC implementation
- Begin implementation in several municipalities
- Improve operability for TRL 8

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Aim for introduction of the system in 180 municipalities, equivalent to 10% of all municipalities, in 2032, five years after social implementation
- Expand the ecosystem by integrating SIMPL and deterioration diagnostic AI with third-party systems, and achieve annual sales of 2.75 billion yen in 2032
- Enable inspection operations to be completed locally to enhance local governance capabilities

Developer's Message (Future Vision)

- The aging of infrastructure that supports society, intensifying natural disasters, and the decreasing workforce are destabilizing the foundations of daily life. This situation has created an urgency to build sustainable systems to achieve resilient infrastructure.
- In particular, as a vast number of small/medium facilities are managed by local municipalities and budgets are limited, it is essential to have simple tools that can be used at low cost. Through this development, we intend to contribute to the realization of a sustainable society led by local municipalities and civil engineering professionals.

Basis Consulting, Inc.
Representative Director and President Yusho Ishikawa

<Company Details>
■Company Website:https://basisconsulting.co.jp/
■Head Office: 4th Floor, Suidobashi Konpira Kaikan, 1-5-11 Hongo, Bunkyo-ku, Tokyo
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Ministry of Land, Infrastructure, Transport and Tourism
(1) Disaster Risk Reduction and Infrastructure Management

Small/Startup Business Innovation Research

Development, Demonstration, and Commercialization of a Digital Twin Platform System and Infrastructure Foundation for Bridge, Tunnel, Road, and Other Infrastructure Maintenance

SYMMETRY Inc.

Large-scale technology demonstration: April 2024–March 2028

Overview of Large-Scale Technology Demonstration

- SYMMETRY will conduct a technology demonstration related to development of a system and infrastructure for processing infrastructure maintenance-related 2D/3D data and time-series big data in a scalable and efficient manner.
- This development will enable integration of UI/UX design that allows anyone to easily search, visualize, and share. It will also enable data updates.

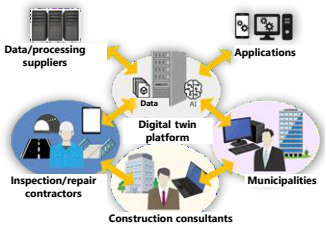
[Demonstration site] Kitsuki, Oita

[Technology's features and sophistication level]

- Develop a scalable and efficient operation data processing system
- Training data generation based on registered data and machine learning

⇒Ultimately, create training data from registered data and perform machine learning to automate inspection operations

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Capture 4.4% (19.2 billion yen) of the infrastructure maintenance technology and system market (estimated at 432 billion yen in 2035)
- By implementing the system in society, enable smooth information sharing and efficient decision-making by municipalities facing engineer shortages and by repair contractors

Development Schedule and Targets for Social Implementation

[Development targets]

2024: TRL 5 and above	2025: TRL 6 and above	2027: TRL 7 and above
• Create operation-related databases • Develop a viewer	• Integrate external data • Machine learning from registered data	
• Database • Web viewer • Mobile app	• External APIs • Create training data • Municipal demonstration	• Integrate external data • Machine learning • Municipal demonstration

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Japan faces major infrastructure maintenance challenges, including aging bridges, roads, and tunnels, a shortage and aging of engineers, and intensifying large-scale natural disasters. To find solutions to these challenges, we use digital twins, the latest 3D technology, and AI to facilitate municipalities' and repair contractors' efficient maintenance and preservation work (policy review, planning, and information sharing) as well as decision making.
- Through these efforts, we will contribute to reducing resource demands for infrastructure maintenance across the globe.

SYMMETRY Inc. Development team

<Company Details>
- Company Website:https://www.symmetry-inc.co.jp/
- Contact: Numakura, shogonu@symmetry-inc.co.jp
  Shimoda, y.shimoda@symmetry-inc.co.jp
- Head Office: 2-11-15 Kanda-Jinbocho, Chiyoda-ku, Tokyo

Ministry of Land, Infrastructure, Transport and Tourism
(1) Disaster Risk Reduction and Infrastructure Management

Small/Startup Business Innovation Research

Development and Demonstration of Technologies for Building a Nation That Can Withstand Disasters and for Wide-Area, Strategic Infrastructure Management

Aerosense Inc.

Large-scale technology demonstration: March 2024–March 2028

Overview of Large-Scale Technology Demonstration

*Vertical take-off and landing (VTOL) aircraft refers to an aircraft that takes off and lands vertically using rotary wings and cruises using fixed wings.

- Aerosense will conduct technology demonstrations for the airframe, operation management, data management, and analysis systems using VTOL aircraft*, with a view to commercializing an automated remote road infrastructure inspection solution.
- Individual tests will be carried out in anticipated settings, alongside operational tests in an environment where outcomes are expected.

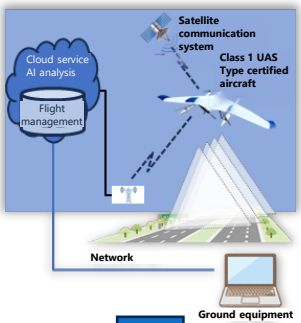
[Demonstration site] Over the Tokyo Metropolitan Expressway (illustrative only)

[Technology's features and sophistication level]

- Development of Class 1 UAS Type certified indigenous airframe (first for VTOL)
- Integration with a road operation management system; long-distance flight via satellite communication
- Road imaging, data collection, and analysis capable AI analysis system

⇒Ultimately, integrate all systems

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Capture 50% (approx. 7.6 billion yen) of Japan's road inspection market (estimated at 15.1 billion yen by 2032)
- Capture 30% (61.2 billion yen) of Japan's river inspection market (estimated at 204 billion yen by 2032)

Development Schedule and Targets for Social Implementation

[Development targets]

- Develop Class 1 UAS Type certification compliant aircraft
- Develop road maintenance management system and communication system for long-distance flights
- Develop road management and analysis system
- Integrate airframe and development systems with road management system

2023: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Integration of VTOL with operation management and road management systems • Develop AI detection model	• Develop prototype for mass production of VTOL • Client awareness-raising and PR • Tuning of AI detection model	• Validation through demonstration tests over the Metropolitan Expressway • Ensure VTOL quality and support systems

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- As infrastructure continues to age, there is a growing need for indicators to appropriately allocate limited budgets. Our ultimate goal is to achieve widespread adoption of our system, which will promote nationwide digital transformation of rivers and roads. We expect that the system will enable rapid assessments of disaster damage and contribute to faster recovery efforts. Furthermore, it is hoped that the system will be used not only in Japan but also around the world.

Aerosense Inc. Developers

<Company Details>
- Company Website: https://aerosense.co.jp
- Head Office: Tokyo Ferrite Building, 1-1-14 Tabata Shinmachi, Kita-ku, Tokyo
- Contact: contactus@aerosense.co.jp

Ministry of Land, Infrastructure, Transport and Tourism
(1) Disaster Risk Reduction and Infrastructure Management

From "Reactive Maintenance" to "Condition Monitoring Maintenance" River Condition Monitoring and Maintenance Using a Next-Generation Hydro-Aerial Vehicle (HAV)

Prodrone Co., Ltd.

Large-scale technology demonstration: 2024–2028

Overview of Large-Scale Technology Demonstration

- Through the development and demonstration of a Hydro-Aerial Vehicle (HAV) equipped with an underwater sonar survey system, Prodrone will propose a new approach for easily and accessibly assessing the scouring conditions of structures and maintain them more efficiently.
- By assessing the scouring conditions of embankments, bridges, and other structures quickly and at low cost, the company aims to shift from traditional reactive maintenance to preventive condition monitoring maintenance and optimize flood control operations.

[Current HAV]

[Technology's features and sophistication level]

- The drone will be able to land on water at the targeted location and perform surveys and imaging while traveling downstream to assess embankment conditions.
- It will be able to manage fast-flowing rivers and measure scouring, based on the flood flow velocity of large rivers.

⇒Ultimately, complete a highly accurate HAV for rivers

[Outcome (illustrative only)]

As of March 2024 (illustrative only)

[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

[Development targets]
- Maintain position on water surface
- Reduce the weight of commercial sonar survey system
- Develop flight planning software and make it compatible with drone applications for river management authorities

(Development, demonstration, and improvement of prototype for actual operation)
- Improve drone
- Enhance water surface mobility
- Improve positioning accuracy
- Improve sonar survey system
- Develop GCS

2024: TRL 5 and above

(Demonstration of prototype for actual operation)
- Integrated testing and improvements
- Design for mass production

2026: TRL 6 and above

(Development and demonstration of mass production model)
- Test mass production model
- Improve mass production model

2027: TRL 7 and above

Demonstration completed

End of March 2028

- Based on the ratios of cumulative infrastructure maintenance costs for preventive maintenance from FY2018 to FY2048, the market for rivers, dams, erosion control, coasts, and ports, equivalent to approx. 17%, is estimated at 3.91 billion yen.
The plan is to aim for orders amounting to about 2 billion yen, which is half of that amount. (Sources: "Estimation of Maintenance and Renewal Costs in Fields Overseen by the Ministry of Land, Infrastructure, Transport and Tourism (FY2018)" and "Underwater Drone Business Research Report 2022")

Developer's Message (Future Vision)

- Adequate inspections of public structures have been hindered by time and cost. HAV technology will allow such inspections to be conducted efficiently and with ease.
- Detecting hidden dangers in advance and shifting to preventive maintenance will help minimize disaster damage.

Prodrone CTO Kiyokazu Sugaki

<Company Details>
■Company Website: https://www.prodrone.com/jp/
■Head Office: 1-115 Nakahira, Tenpaku-ku, Nagoya-shi, Aichi
■Contact: moriuchi@prodrone.com

Using Data Science to Support Local Governments' Road Infrastructure Maintenance Cycles

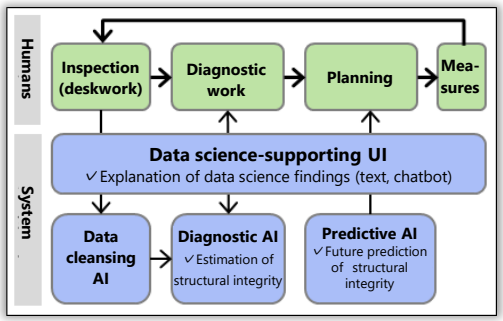
en, Inc.

Large-scale technology demonstration: March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- To promote the use of data science for road infrastructure maintenance operations, en will conduct demonstrations of a data science platform created through R&D at local governments and other relevant settings.
- Based on the demonstration results, usability will be improved for use in an operational environment, with a view to implementation in society.

[Core technology] Demonstrations considered in Hokkaido and Tohoku area

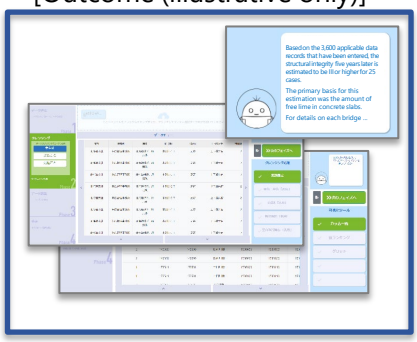


[Technology's features and sophistication level]

- Data cleansing AI
- Ontology for data science (vocabulary structure)

⇒Ultimately, develop a platform supporting data science

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Capture 5% (5.14 billion yen) of Japan's data science platform market for infrastructure maintenance (estimated at 102.8 billion yen in 2032)
- Make the platform multilingual and deploy internationally as an indigenous data science technology

Development Schedule and Targets for Social Implementation

[Development targets]

2024–2025: TRL 4 and 5
- Cleansing AI
- AI model processing management function
- User-friendly data science-supporting UI

- Data cleansing function
- Build analysis model
- Data science-supporting UI

2026–2027: TRL 6 and 7
- Usability improvement
- Data science results explanation UI
- Diversification of supported data

- Improve cleansing performance
- Update analysis model
- Improve UI function

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- By utilizing data science technologies and a data science platform, we will help make data and data science more accessible for road infrastructure maintenance operations.
- We aim to create homegrown, globally competitive technologies as part of the technologies that contribute to realizing Society 5.0, Japan's world-leading initiative, and implement them in society.

PIC of R&D Hasegawa

<Company Details>
■Company Website: https://en-ds.jp/
■Head Office: 12-2-1-608 Kitasanjonishi, Chuo-ku, Sapporo-shi, Hokkaido
■Contact: support@en-ds.jp

Development of Technology for Fully Automated 3D Modeling for Efficient Maintenance and Management of Public Structures (Roads and Rivers)

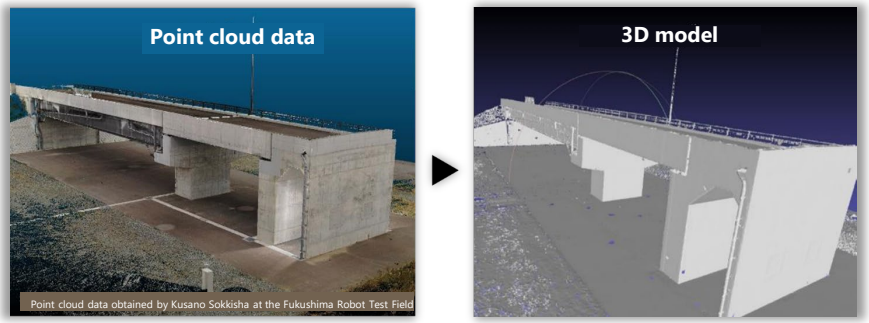
DataLabs, Inc.

Large-scale technology demonstration:
March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- DataLabs will develop technology for fully automating* the generation of 3D models from the point cloud data of structures.
- The company will define attribute information to be embedded and enable the creation of 3D models that can be used for maintenance operations. DataLabs will conduct demonstrations with a view to promoting the technology's use by municipalities.

[Core technology and outcome (illustrative only)]



[Technology's features and sophistication level]

- Technology for fully automating* 3D modeling from a point cloud data will be developed.
- The 3D models created from point clouds will be applicable to maintenance operations.
- Requirements for information embedded in models will be determined, enabling the creation of "models that can be used in actual operations."

Development Schedule and Targets for Social Implementation

[Development targets] • Create CAD models for as-built inspections of bridge substructures

(Develop constituent technology)
- Define CAD structure requirements for solidification
- Implement CAD output function in development environment

2024: TRL 5 and above

(Develop demo version)
- Provide as a web app
- Enable display of solid models

2026: TRL 6 and above

(Develop product version)
- Provide as a web app
- Enable the output of CAD models

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Create a market for current models (target: 3.5 billion yen in 2030) in the global BIM market (estimated at 3.5 trillion yen in 2030)
- Through fully automated modeling, contribute to the use of BIM/CIM throughout the construction cycle from design to maintenance

Developer's Message (Future Vision)

- We will develop technology for fully automating* the generation of 3D models from the point cloud data of structures, and create a society where 3D models can be used easily even in the maintenance phase.
- Due to a shortage of workers and increasing demand caused by aging infrastructure, improving productivity has become urgent in the construction industry. We will aim to solve these challenges.

DataLabs, Inc.
CTO Daisuke Sato, CEO Daisuke Tajiri, CFO Atsushi Joshin

*While our technology is designed for automatic functionality, it also allows users to make manual adjustments and modifications whenever necessary.

<Company Details>
- Company Website: https://www.datalabs.jp/
- Head Office: 8-6 Nihonbashi-Kobunacho, Chuo-ku, Tokyo
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Development and Demonstration of an Automated Creation and Updating System for 3D Urban Models

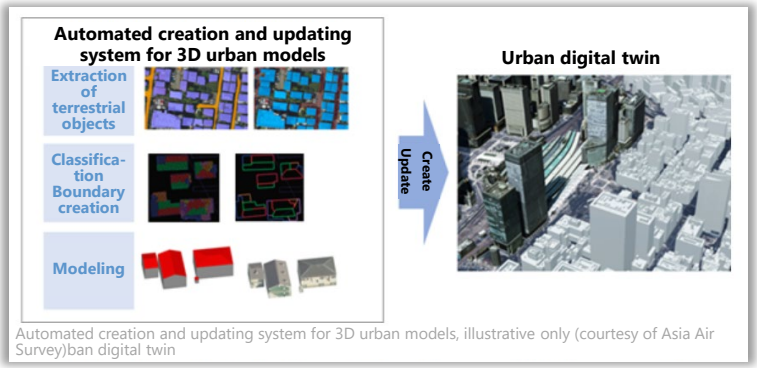
Realglobe Inc.

Large-scale technology demonstration:
February 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Realglobe will develop a product that will automatically create the "3D City Model" (PLATEAU) (urban digital twin data) being promoted by the Ministry of Land, Infrastructure, Transport and Tourism, and thereby, encourage the use of digital twin technology in society.
- There is a global demand for automated creation of urban digital twin data. This technology originating from Japan will tap into this demand and capture new market opportunities.

[Outcome (illustrative only)]



Automated creation and updating system for 3D urban models, illustrative only (courtesy of Asia Air Survey)ban digital twin

[Technology's features and sophistication level]

- Develop a system for automated creation of urban digital twins
- Develop a system for automated updating of urban digital twins

⇒Reduce the time and cost of creating and updating urban digital twins

[Post-social implementation immediate targets]

- The urban digital twin market in Japan is projected to grow to approx. 120 billion yen in 2027.
- After commercialization, promote the system's adoption by municipalities (approx. 1,700), infrastructure businesses (approx. 500), and digital twin platform providers (approx. 50, estimated) and drive the sustainable growth of the market.

Development Schedule and Targets for Social Implementation

[Development targets]

- Develop constituent technologies necessary for the automated generation of urban digital twins
- Launch services for the automated generation of urban digital twins

2023–2024: TRL 5	2025–2026: TRL 6	2027: TRL 7 and above
• Automated extraction of terrestrial objects and modeling (LOD2) • Automated assignment of building attributes • High-precision texture generation • Prototype development	• Automated extraction of terrestrial objects and modeling (LOD3) • Automated assignment of road and related attributes • Develop beta and service versions	• Resolve remaining issues • Performance enhancement, etc. • Version upgrade of the product services

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- This project will use AI to automate the creation and updating of 3D urban models that were previously done manually. Our goal is to develop technologies and provide services that make this possible. We expect that they will contribute to expanding the places for which urban digital twins are available, increasing the frequency of updates, and reducing the cost of urban digital twins that are anticipated to see an even higher demand in the future.


President Takahiro Ohata (front row, center)

<Company Details>
■Company Website: https://realglobe.jp/
■Head Office: Room 201, Yagi Building, 2-20-4 Kanda-Misakicho, Chiyoda-ku, Tokyo
■Contact: info@realglobe.jp (PIC of SBIR: Marugame)

Development of High-Precision Digital Twins Using AI Technology

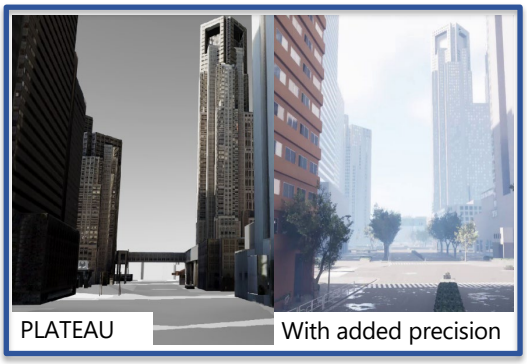
SpaceData Inc.

Large-scale technology demonstration:
February 2024–March 2028

Overview of Large-Scale Technology Demonstration

- A generative AI product will be developed, which will add ultra-high precision to the data of the "3D City Model" (PLATEAU) (urban digital twin data) being promoted by the Ministry of Land, Infrastructure, Transport and Tourism.
- Enormous costs have been dedicated to creating urban digital twin data. By introducing technology that generates this data efficiently, SpaceData aims to promote the adoption of urban digital twins in society and capture overseas markets.

[Demonstration site] A recreation of Shinjuku, Tokyo

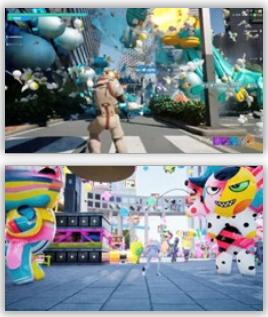


[Technology's features and sophistication level]

- Recreate PLATEAU's 3D urban models using AI
- Output digital twin data that will not degrade even when viewed up close

⇒Ultimately, generate and distribute high-precision digital twins of all areas of Japan for immediate use in game and metaverse development

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Advanced reproduction of entire landscapes
- Automation of asset generation
- Enhance AI's ability to express
- Nationwide coverage
- Ecosystem building

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
<Algorithm improvements> • Improve positioning accuracy • Enhance ability to express • Mass production of assets	<Expanded coverage> • Distribution environment for nationwide output data	<Distribution environment> • Website for distribution • Ecosystem building

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Capture 0.0036% (25 billion yen) of the global metaverse and digital twin markets (estimated at 698 trillion yen in 2037)
- Sell game-related products for companies and creators; offer services for both standard and customized versions; achieve revenue contributions of 5.6 billion yen over a period of five years following the initial five years for commercialization

Developer's Message (Future Vision)

- We will build a system that automatically creates worlds of AI and 3D computer graphics using satellite data and "real-world data" (e.g., satellite data, foot traffic, traffic volume, day/night, seasons, weather, plant distribution, and nighttime light levels).
- Through this system, we will drive advancements in the content industry, including game development, virtual reality, and video production, and promote progress in digital twin domains, such as urban development and automated driving.

CEO Katsuaki Sato

<Company Details>
- Company Website: https://spacedata.jp/
- Head Office: 5th Floor, JMF Shibuya Building 03, 2-11-1 Dogenzaka, Shibuya-ku, Tokyo
- Contact: https://forms.gle/C6QDnLMMqpeTbm6G9

Development and Social Implementation of a Next-Generation WebGIS Engine Compatible with 3D Urban Models

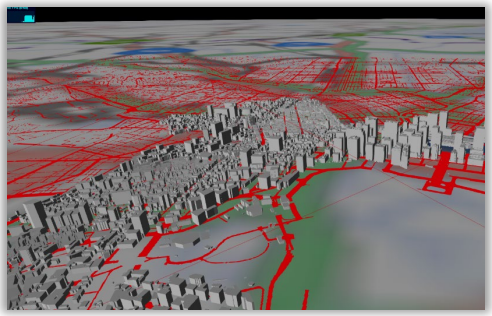
Eukarya Inc.

Large-scale technology demonstration: February 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Using homegrown technology, Eukarya will develop and productize (likely OSS) a WebGIS engine, which runs the "3D City Model" (PLATEAU) (urban digital twin data) being promoted by the Ministry of Land, Infrastructure, Transport and Tourism.
- By achieving smooth performance, stunning visuals, varied analytical capabilities, and other technological advances that make the engine stand apart from its predecessors, the company aims to encourage the use of urban digital twins in society and capture international markets.

[Prototype]

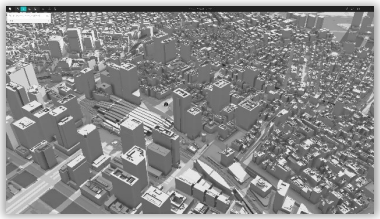


[Technology's features and sophistication level]

- (1) High-speed data processing with WebAssembly
- (2) Headless WebGIS engine

⇒Develop a WebGIS engine optimized for high-speed data rendering and heavy-load processing by fully utilizing hardware

[Outcome (illustrative only)]



Replace existing GIS engines, e.g., PLATEAU VIEW, and achieve high-speed data processing and high-quality rendering

[Post-social implementation immediate targets]

- Capture 8% (16.4 billion yen) of the Japanese 3D urban model market (estimated at 117 billion yen in 2032)
- Make the next-generation WebGIS engine available as an open source software and drive up the global use of 3D urban models

Development Schedule and Targets for Social Implementation

[Development targets]
- High-speed GIS data processing capabilities
- High-quality map rendering
- Multi-platform support

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above	End of March 2028
Development of alpha version • Develop core module • Develop rendering engine • Improve performance	Development of beta version • Feature enhancement • Algorithm optimization • Multi-platform support	Release of official version • Performance tuning • Feature improvement • Development of no-code tools	Demonstration completed

Developer's Message (Future Vision)

- We will develop a next-generation WebGIS engine, aiming to unleash the full potential of 3D urban models. This WebGIS engine will enable more beautiful 3D urban models and faster processing than existing engines, and is expected to bring about new services and solutions in various fields.
- By developing this engine, we will contribute to the growth of Japan's geospatial information industry and enhance its international competitiveness.

Co-founders
(Center: Representative Director and CEO)

<Company Details>
■Company Website: https://eukarya.io/
■Head Office: COREEBISU, 27th Floor, Yebisu Garden Place, 4-20-3 Ebisu, Shibuya-ku, Tokyo
■Contact: info@eukarya.io

Technology Development and Stable Supply of Low-Cost Flood Sensors

ZEROSPEC, Inc.

Large-scale technology demonstration: April 2024–March 2028

Low-Cost Flood Sensors

- Technology development and stable supply of low-cost flood sensors will contribute to speedy disaster response.
- No repeater — No repeater or other network device required*1
- No external power supply — No external power supply required; battery life of five years on a coin battery*2
- No installation work — No special construction work or qualifications required for sensor installation; easily installable by anyone

[Core technology]

(1) Insourcing of wireless modules
(2) Mold manufacturing for mass production
(3) Provision of simple base stations
Demonstration testing in Japanese municipalities to begin in FY2026

[Technology's features and sophistication level]

- By insourcing modules that use low-power, low-cost wireless chips, further extend longevity, reduce cost, and enable stable mass production
- Provides Sigfox*3 network with over 95% Japanese population coverage and simple base stations for demonstrations outside the coverage area

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- Capture a market of over 10,000 cumulative sensors (275 million yen) in the Japanese market in FY2026 and beyond
- Introduce flood sensors overseas in regions with frequent water disasters

Development Schedule and Targets for Social Implementation

[Development targets] • Ultra-low cost • Ultra-low power consumption • Mass production • Field expansion

2024: TRL 5 and 6	2025: TRL 6 and above	2026: TRL 7 and above
• Insourcing of wireless modules • Manufacturing of molds for mass production	• Final product assembly • Quality assessment	• Certification • Mass production • Expand demonstration fields • Demonstration testing assessment

Demonstration completed

End of March 2028

*1: Limited to areas where Sigfox is available.
*2: Assumes 60 flood detection communications a year and periodic monitoring (once a day).
*3: https://www.kccs.co.jp/sigfox/

Developer's Message (Future Vision)

- In response to increasing natural disasters caused by climate change, we have developed and offered the SUIJIN flood detection service that effectively addresses this social issue. While the ease of adoption has been well-received, the use of the sensor remains limited. As the developer, we were concerned. Therefore, we are working to achieve even lower costs and longer lifespans of the sensor to accelerate the sensor's adoption in society.

ZEROSPEC, Inc.
CEO Mitsuo Tada

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Development of a Next-Generation Flood and Landslide Disaster Prediction System Using Satellites and Physical Models

Gaia Vision Inc.

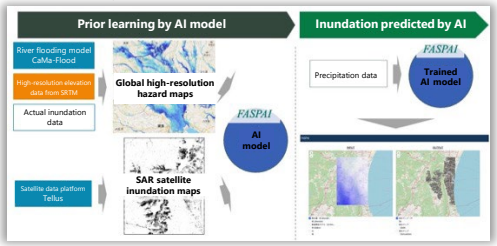
Large-scale technology demonstration: April 2024–March 2028

Overview of Large-Scale Technology Demonstration

- As flood and landslide disasters increase, owing in part to the effects of climate change, Gaia Vision will conduct a demonstration to use satellite data not only to make rapid and safe disaster assessments but also to predict disasters.
- With land surface and water dynamic simulations serving as foundational technologies, the company will develop a physics-based AI that performs high-speed, high-precision analysis of SAR satellite and other data. Using this AI, Gaia Vision will develop a flood and landslide disaster prediction system.

[Core technology]

Flood Assessment System using Physics-based AI (FASPAI)



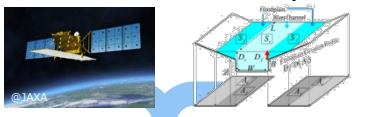
(Demonstrations planned in Nagano Prefecture and Sekikawa Village, Niigata Prefecture)

[Technology's features and sophistication level]

- Predict disasters using not only satellite data but also river and land surface models
- Develop AI trained on satellite data and physical models

⇒Ultimately, develop a flood and landslide disaster prediction and assessment system

[Outcome (illustrative only)]



SAR satellite | Physical river model

AI correction system

Flood/landslide predictions

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop a system for assessing and predicting flood and landslide disasters from satellite imagery
- Develop real-time solutions

(Development of constituent technologies and operational validation)
- Develop AI for correcting physical model biases
- Develop disaster estimation methods

2024: TRL 5 and above

(Evaluation and validation in individual testing environment)
- Prototype development and user demonstration

2026: TRL 6 and above

(Comprehensive validation and demonstration in standardized environment)
- Product development and user demonstration

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Target market for flood and landslide disaster prediction system: Estimated at 10% of the total market (2.05 trillion yen as of 2020)
- Achieve sales of 8.8 times (3.45 billion yen) the funding amount by capturing 0.3% of the market share by five years after project completion

Developer's Message (Future Vision)

- Disasters are becoming severer driven by climate change, increasing the risk of natural disasters year by year. Meanwhile, advances in disaster simulation technology, satellites, and AI are giving rise to technologies for disaster risk reduction and assessment. We will develop a disaster prediction system that integrates these technologies to support disaster management and recovery efforts.

Gaia Vision CEO Yuki Kita

<Company Details>
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- Contact: info@gaia-vision.co.jp

Development of a Flood and Landslide Disaster Support System Using SAR Satellite Data

Satellite Data Services Co., Ltd. (representative)

Institute for Q-shu Pioneers of Space, Inc. (co-proposer)
Hitechs Inc. (co-proposer)

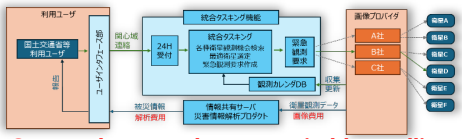
Overview of Large-Scale Technology Demonstration

Large-scale technology demonstration: March 2024–June 2027

- This project will develop a one-stop service from ordering various satellite data to analyzing images in the event of a large-scale disaster and for providing flood and landslide information within as little as 2.5 hours after imaging.
- It will also develop a service that calculates flood depth and inundation volume using DEM data from affected areas, along with basic information such as the number of flooded houses and affected populations derived from land infrastructure data, and provides this information to facilitate drainage operations.

[Core technology]

In the wake of a disaster, the system will semi-automatically select the most suitable satellite, capture emergency images, and infer flood and landslide locations and affected areas through single-image and differential analysis. Based on the findings, information necessary for disaster response will be visualized and provided.
Planned demonstration sites: Disaster-affected areas



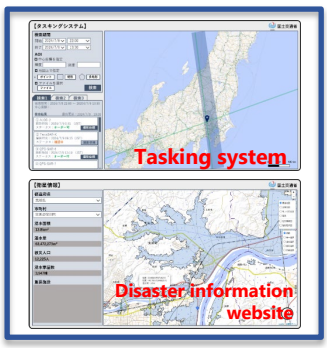
System that uses the most suitable satellite to capture images of the desired area

[Technology's features and sophistication level]

- Develop an integrated tasking system that allows requesting multiple satellite data from a single platform
- By simply requesting satellite imagery, provide visualized analysis information within 2.5 hours

⇒Ultimately, develop a service for the swift provision of damage information

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Build a tasking system integrating multiple satellites
- Develop standardized analysis methods
- Provide disaster information within 2.5 hours after imaging
  *SAR satellite imaging

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Tasking system	• Standardize flood analysis • Standardize landslide location analysis	• User interface <Inspection/disaster info> • Operational test

Demonstration completed

End of June 2027

[Post-social implementation immediate targets]

- Capture 100% (240 million yen) of Japan's disaster information market (estimated at 240 million yen in 2031)
- Begin deploying this technology overseas in 2029, and achieve sales of 500 million yen

Developer's Message (Future Vision)

- Even as large-scale disasters occur frequently, damage assessments continue to be time consuming, causing delays in rescue and relief efforts. Satellites excel in collecting wide-area data. We will develop a system that rapidly visualizes and provides high-precision information obtained from satellites and contribute to building a safe and secure society.
- Ordering satellite data has required complex procedures, making it difficult to receive data quickly. To solve this issue, we will develop an integrated tasking system and make satellite data more accessible.

Satellite Data Services Co., Ltd.
President and CEO
Kazutaka Kumeno

Institute for Q-shu Pioneers of Space, Inc.
President and Representative Director
CEO Shunsuke Onishi

Hitechs Inc.
Representative Director
Yoshihiro Shimosaka

<Representative Proposer> Satellite Data Services Co., Ltd.
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Development, Sophistication, and Actual Operation of a Meter Using Neutron Beams for Non-Destructive Inspection of Chloride Concentration in Concrete Bridges

Rans View Corporation

Large-scale technology demonstration: March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Rans View will carry out technology demonstrations of the non-destructive neutron salt-meter RANS-μ on bridges in Japan, and validate its effectiveness for preventive maintenance against chloride-induced deterioration of bridges.
- The company will verify whether the system has chloride concentration accuracy of 1 kg/m^3 or less, displays three-layer chloride data in depth, exhibits compact/lightweight standard design, and provides chloride concentration distribution along with steel reinforcement depth, simultaneously.

[Demonstration site] Nodamura, Kunohe, Iwate

[Technology's features and sophistication level]

- A completely non-destructive measurement of chloride concentration in concrete using neutrons
- The world's first such measurement conducted successfully on an outdoor, real-world bridge

⇒Ultimately, enable an all-weather model, a compact/lightweight design, and detection of chloride concentration distribution along with rebar/steel locations

[Outcome (illustrative only)]

Development Schedule and Targets for Social Implementation

[Development targets]

- Measurement accuracy 1 kg/m^3 or less
- Real-time display of three-layer chloride distribution
- All-weather, compact, lightweight
- Labor-saving, efficient assembly

2024: TRL 5 and above	2025: TRL 6 and above	2027: TRL 7 and above
• All-weather waterproof and dustproof model • Real time display of three-layer chloride distribution on site	• Large-scale demonstration on 50 bridges • Detection accuracy 1 kg/m^3 or less • Estimate depth of steel bar	• Large-scale demonstration on 70 bridges • Compact/lightweight standard design • 3D display of chloride and steel

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- The Japanese market for salt damage inspections is estimated to have a potential value of 17 billion yen (preventive maintenance against salt damage achievable by inspecting 8,700 bridges annually).
- In the future, non-destructive salt damage inspections are to be conducted on 3,000 or more bridges annually using RANS-μ.

Developer's Message (Future Vision)

- Preventive maintenance is essential for preventing bridge collapse accidents caused by salt damage, extending the service lifetime of bridges, and reducing maintenance costs. Preventive maintenance hinges on non-destructive inspection, notably, neutrons that can measure deep within the structure.
- We will address the infrastructure maintenance challenges facing society with a strong sense of mission and the world's first innovative technology.

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Development of a Digital Platform for Flexible Urban Infrastructure Management

UrbanX Technologies, Inc.

Large-scale technology demonstration:
March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- A declining population presents challenges for managing urban infrastructure. Therefore, to enhance their sustainability, UrbanX Technologies will develop a new method of infrastructure management using hundreds of thousands of dashcams across Japan, among other tools.
- This demonstration is aimed at developing software that integrates an AI-powered infrastructure inspection system, which infrastructure administrators, such as local governments, can use in their actual operations. (AI model development is outside the scope of this demonstration.)

[Technology (illustrative only)]

Demonstrations are planned in municipalities participating in the My City Report Consortium

[Technology's features and sophistication level]

- Develop software that can be used in actual infrastructure management operations
- Employ data from hundreds of thousands of dashcams nationwide

[Post-social implementation immediate targets]

- Utilize the outcome of this demonstration in the actual infrastructure maintenance operations of 30% of municipalities in Japan
- Speed up technology demonstrations for international use of this platform

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop a data platform to aggregate vast amounts of data
- Risk assessment

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Data collection platform • LGWAN compatible • Edge device software	• Risk assessment • 5 demonstrations and improvements	• 30 demonstrations and improvements

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- We will realize innovative infrastructure inspections using data from hundreds of thousands of dashcams across Japan, among other tools.
- We will develop software that is useful for the daily operations of infrastructure administrators.

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Technology Development and Server Implementation for More Efficient Daily Management of Pavements and Bridges and Faster Response to Disasters

SmartCity Research Institute Co., Ltd.

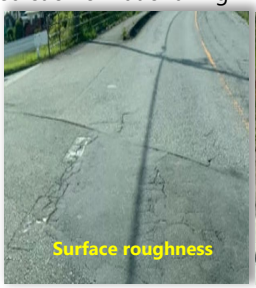
Large-scale technology demonstration:
March 2024–March 2028

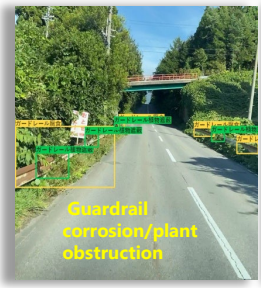
Overview of Large-Scale Technology Demonstration

- SmartCity Research Institute will enhance the accuracy of simplified road surface measurements, improve robustness under varying imaging conditions, and consider and validate hardware improvements.
- The company will quantify temporal changes in road deformations, and develop and validate methods for identifying and quickly detecting damage to structures that cannot be inspected visually.
- SmartCity Research will develop and validate remote and rapid damage assessment methods for pavements and bridge structures that cannot be inspected up close during disasters.

[Core technology]
Road surface survey technology:
GLOCAL-EYEZ

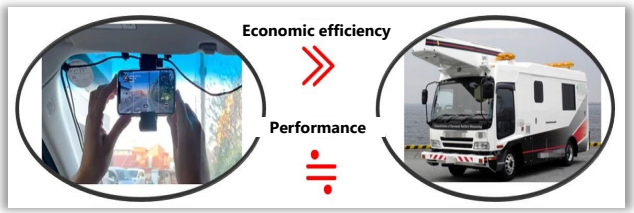
*Demonstration testing is planned on multiple roads, including local and prefectural roads starting with Aomori Prefecture, as well as national highways under the jurisdiction of national highway offices.





[Technology's sophistication level]

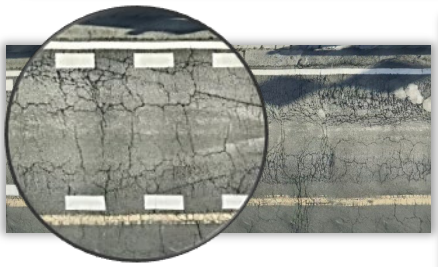
- Achieve the same accuracy as conventional road surface condition measuring vehicles
- Enable preventive maintenance through high-frequency measurements



- Passed all three pavement components of the FY2023 performance test for automatic road surface condition measuring devices conducted by the Public Works Research Center
- Ministry of Land, Infrastructure, Transport and Tourism Excellence Award of the Infrastructure Maintenance Awards (Technology Development Category)

- Infrastructure Maintenance Challenge Award, Japan Society of Civil Engineers
- Excellent Paper Award, Japan Road Conference
- Excellent Presenter Award, 78th Annual Conference of the Japan Society of Civil Engineers National Convention

- Registered with NETIS, NETIS registration number: KK-230048-A

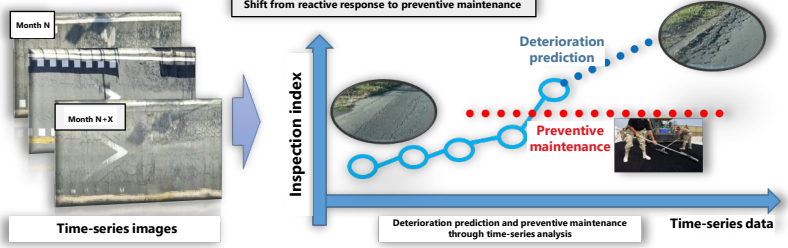


Generates high-quality road surface plans on a smartphone

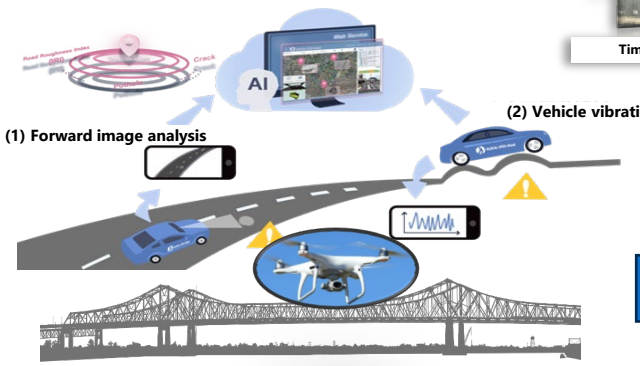
[Technology's features]

- ■ Improve robustness of simplified road surface measurements
- ■ Technology applications for quick detection of pavement deterioration
- ■ Technology applications for detection of bridge anomalies

⇒Ultimately, develop and implement multiple functions that contribute to solving challenges faced by road administrators, such as quick detection of road deterioration, efficient maintenance, and swift response during disasters



[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- ■ Capture 20% (2.5 billion yen) of Japan's road inspection market (12 billion yen in 2032) *Figures are estimates
- ■ Promote the technology's widespread adoption among road administrators in Japan, and contribute to more efficient daily management of pavements and bridges and faster response to disasters

Development Schedule and Targets for Social Implementation

[Development targets]

- Develop and implement an algorithm for optimizing measurement conditions
- Develop an algorithm for quick detection of damage to base/subbase course and floor slab
- Develop a bridge damage recognition method using drone imaging and AI

- Improve hardware
- Accelerate data transmission and reception
- Quantify time-series changes
- Drone image analysis etc.

2024: TRL 5 and above

- Improve constituent technology
- System implementation
- Field testing

2026: TRL 6 and above

- On-site demonstration testing
- Functionality and UI improvements
- System stability validation

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

■ Using the GLOCAL-EYEZ smartphone-based road survey cloud system we developed, SmartCity Research Institute has been supporting a series of maintenance operations of Japanese road administrators, including daily road management, inspections, and selection of repair works. With this project, we hope to further contribute to solving the challenges faced by road administrators in performing daily road management and responding to disasters.

CEO Boyu Zhao

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■ Contact: info@smc-tech.com

Ministry of Land, Infrastructure, Transport and Tourism
(1) Disaster Risk Reduction and Infrastructure Management

Small/Startup Business Innovation Research

Development of a System for Remote Monitoring of Road Infrastructure Soundness Using IoT Multi-Sensing Joint Measurement Fastening Devices

NejiLaw Inc.

Large-scale technology demonstration:
March 2024–March 2028

Demonstrations planned in Nagano and Fukuoka Prefectures

Overview of Technology

Conventional inspection methods

Visual inspection

Hammering inspection

Challenges
- Manual work requiring experience and intuition
- Some areas are difficult for people to access and inspect
- Labor shortage

Conventional sensors

Vibration | Acceleration
Strain | Image
Tilt | Load

Challenges
- Sensor installation is cumbersome
- Wired installation makes cabling unavoidable
- Longitudinal measurements are difficult
- Highly skilled specialists are essential for installation and inspection
- Significant installation errors may occur

1 Verify axial force while installing

Fastening workers and remote administrators can share the same information in real time.

2 Unmanned, remote inspection and monitoring

3 Multi-patented Fastening bolts allow stress sensing

- Integrate low-power circuitry and low-power wireless communication function
- Measure axial force during fastening
- No wiring required
- Collect stress information from fastening points

4 A world first precise stress sensing

Combining non-loosening screws and axial force sensing enables

*Conventional screws loosen. Axial force sensing is not possible with conventional screws.

5 Various conventional sensors in an all-in-one system

*Image acquisition is under development

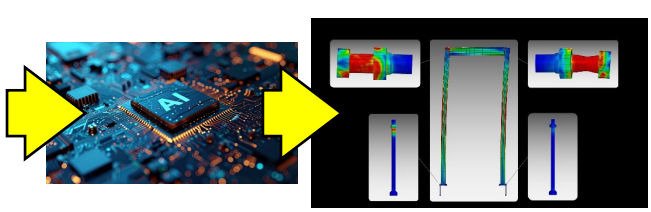
6 International patent Unsupervised automatic deep learning AI system

enables structural stress analysis
The stress distribution of the overall structure can be visualized based on the bolt axial force at fastening points

7 A world first Detect signs of metal fatigue

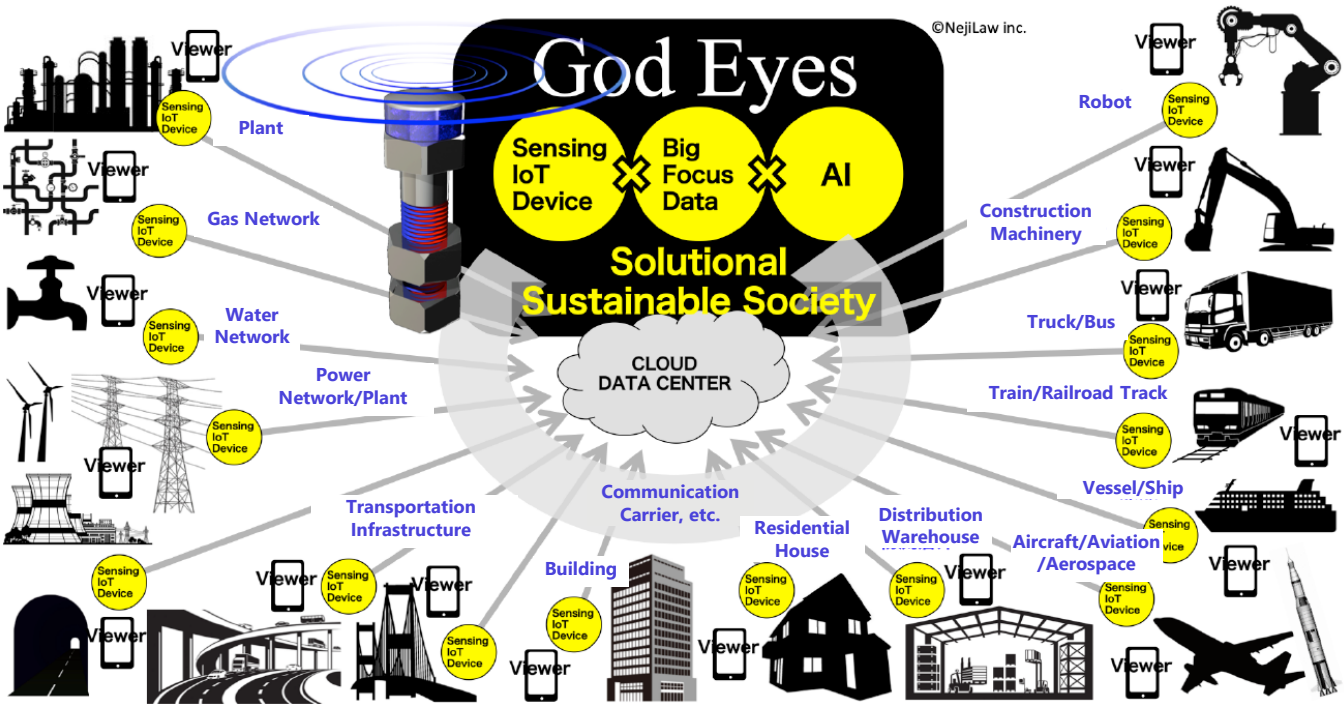
- Identify specific maintenance locations and timing ➡ Decrease maintenance costs
- Reduce and prevent accidents

smartNeji™



▲The stress distribution of the structure can be visualized based on the bolt axial force

▲Displayed on handheld terminal



▲Developed with various industrial sectors in mind

Development Schedule and Targets for Social Implementation

[Development targets]

- Design/develop IoT multi-sensing joint measurement fastening device
- Design/develop worker terminal activation modules
- Design/develop self-powered storage systems
- Design/develop inverse analysis system (stress distribution generative AI)
- Design/develop APIs

- Design sensor structures
- Design activation modules
- Design inverse analysis system
- Design APIs

2024: TRL 5 and above

- Create sensor structures
- Develop activation modules
- Develop inverse analysis system
- Develop APIs

2026: TRL 6 and above

- Use in infrastructure structures

2027: TRL 7 and above

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

■ Capture 1% (4.7 billion yen) of the anticipated Japanese remote monitoring market for road transportation infrastructure (estimated at over 430 billion yen per year)

Developer's Message (Future Vision)

President & CEO Hiroshi Michiwaki

■ From now on, Japan must pursue optimal solutions. And it will need to find solutions instantly. One way I can contribute through manufacturing is IoT. We have developed multi-sensing smart devices, including smartNeji, as well as the GodEyes system that analyzes and visualizes data collected from these sensors. Turning screws and components into sensors, this IoT system directly captures forces, vibrations, and heat transmitted between objects through the screws and other connectors and collects this data on wireless communication networks. The system can be applied to infrastructure, structures such as buildings, vehicles such as automobiles, and much more. By adopting smartNeji and other smart devices across Japan and the world, it will become possible to collect monitoring data of structures such as bridges and buildings in specific locations, combined with multi-dimensional big data like ground conditions and wind. By reflecting this data into the other Earth, i.e., a digital twin, we can remotely assess infrastructure soundness and other conditions comprehensively in specific locations.

■ This system will help address the shortage of inspection personnel and identify problem areas even if a disaster occurs.

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Development of a Road Inspection Support and Traffic Disruption Information System Using SAR Satellite Data

Satellite Data Services Co., Ltd. (representative)
Institute for Q-shu Pioneers of Space, Inc. (co-proposer)
Hitechs Inc. (co-proposer)

Large-scale technology demonstration: March 2024–June 2027

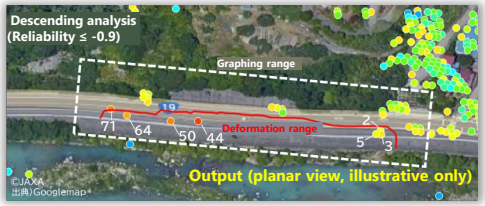
Overview of Large-Scale Technology Demonstration

- This project will develop a service for conducting satellite monitoring of long, wide-area road earthwork structures that require regular manned inspections and providing risk level screening information for the inspection areas.
- It will develop a one-stop service from ordering various satellite data to analyzing images in the event of a large-scale disaster and for providing traffic disruption information within as little as 2.5 hours after imaging.

[Core technology]

Provide preemptive information on the deformation of the observed road network obtained through time-series interferometric analysis

Planned demonstration sites: Nagano and Yamaguchi Prefectures

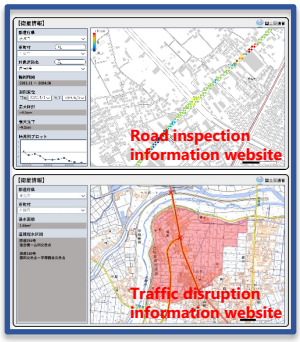


[Technology's features and sophistication level]

- The world's first interferometric analysis using high-resolution images captured by small SAR satellites
- Standardized flood and landslide disaster area analysis developed jointly by six companies with disaster analysis experience

⇒Ultimately, develop a service that reduces road inspection labor and swiftly provides disaster information using satellites

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Develop a standardized method suited for road inspections (5 companies)
- Reduce the cost of inspection information
- Provide disaster information within 2.5 hours after imaging
  *SAR satellite imaging

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Tasking system	• Road earthwork structure analysis model • Pavement surface analysis model	• User interface <Inspection/disaster info> • Operational test

Demonstration completed

End of June 2027

[Post-social implementation immediate targets]

- Capture 24% (480 million yen) of the Japanese satellite observation market for road inspections (estimated at 2 billion yen in 2031)
- Begin deploying this technology overseas in 2029, and achieve overseas sales of 100 million yen or more in 2031

Developer's Message (Future Vision)

- As infrastructure continues to age, it will require immense costs to maintain them in a sound condition. We aim to implement in society technology which, by leveraging the broad coverage of satellites, is expected to reduce maintenance costs and help address labor shortages caused by a declining birthrate and aging population.
- In the event of large-scale disasters, damage information is essential for rescue and relief efforts. Yet, the use of satellite data has been limited. This project seeks to swiftly provide highly valuable information.

Satellite Data Services Co., Ltd.
President and CEO
Kazutaka Kumeno

Institute for Q-shu Pioneers of Space, Inc.
President and Representative Director CEO
Shunsuke Onishi

Hitechs Inc.
Representative Director Yoshihiro Shimosaka

<Representative Proposer> Satellite Data Services Co., Ltd.
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Improving Road Management Efficiency by Increasing the Accuracy of Location Information Using Small SAR Data Based on HD Maps

Dynamic Map Platform Co., Ltd. (representative) **Synspective Inc.**

Overview of Large-Scale Technology Demonstration

Large-scale technology demonstration: March 2024–March 2028

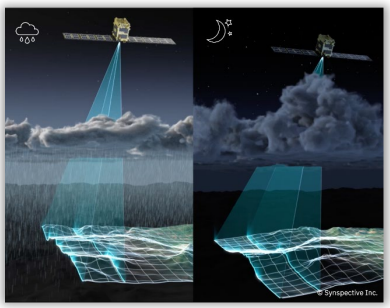
- High-definition maps (HD maps) will be utilized to achieve high positional accuracy of SAR data. This project will use this dataset to develop technology that extracts road deformations and build a spatial information management system for managing the extracted data.
- With the use of a small SAR satellite constellation, the developed technology will be demonstrated on Japan's national highways across a wide area.

[Technology's features and sophistication level]

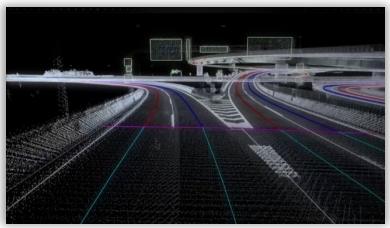
- Correct SAR positioning data using high-precision 3D maps utilized by automated vehicles
- Various information integrated through a spatial information management system; develop a tasking interface

⇒Utilize the technology for maintenance and management of extensive road networks and for analysis in the event of disasters

SAR data (illustrative only)



HD map (illustrative only)



Development Schedule and Targets for Social Implementation

[Development targets] Develop SAR data with high positional accuracy
- Develop technology for extracting road surface and surrounding deformations
- Develop road management system integrated with other spatial information, and develop a UI that enables the specification of observation areas

2024: TRL 5 and above	2025–2026: Up to TRL 6	2027: TRL 7 and above
• Develop technology for correcting and improving the accuracy of SAR positioning data	• Develop road deformation extraction technology • Create spatial information management system	• Large-scale demonstration

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Adoption of the developed technology by 15 organizations administering national highways and expressways
- Expand the technology's use to overseas road administrators, automotive companies, map app companies, etc.

Developer's Message (Future Vision)

- SAR data enables remote sensing of a wide area without being affected by the weather or time of day. By using HD maps to improve positional accuracy, we believe this technology can contribute to more efficient road infrastructure management. We are engaged in this project aiming to provide services that will have significant impact, both for preventive maintenance of social infrastructure as a disaster preparedness measure, and for rapidly assessing damage and promoting recovery efforts in times of disaster.

<Company Details> Dynamic Map Platform Co., Ltd. (representative)
- Company Website: https://www.dynamic-maps.co.jp/index.html
- Head Office: 2-12-4 Shibuya, Shibuya-ku, Tokyo
- Contact: Ichimura.Mitsuhiro@dynamic-maps.co.jp

<Company Details> Synspective Inc.
- Company Website: https://synspective.com/jp/
- Head Office: 3-10-3 Miyoshi, Koto-ku, Tokyo
- Contact: toogu@synspective.com

Development of a Nationwide Real-Time Traffic Flow Analysis System Combining AI Cameras and Automobile Probe Data

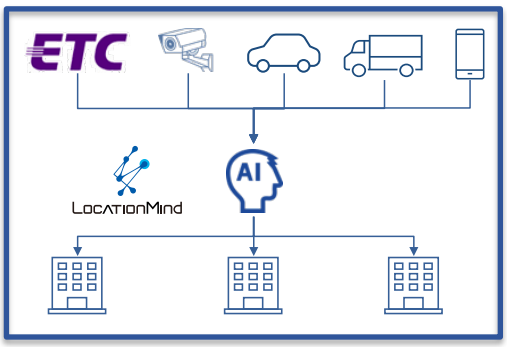
LocationMind Inc.

Large-scale technology demonstration:
March 2024–March 2028

Overview of Large-Scale Technology Demonstration

- ETC 2.0 data, AI camera data, automobile probe data, mobile GPS data, and other data will be combined to achieve real-time estimation of traffic conditions and volumes.
- LocationMind will develop short-term ensemble forecasting technology for traffic conditions to provide highly reliable traffic forecasts for traffic anomalies, such as large-scale disasters.
- The company will use accumulated data to evaluate service levels based on various road uses.

[Data measurement, processing, and evaluation demonstrations planned in various regions]



[Technology's features and sophistication level]

- Technology combining multiple data for estimating movement patterns and demand
- Technology for short-term forecasting and simulation of the movement and staying patterns of people and vehicles

⇒Using diverse data, build a real-time, integrated road traffic analysis platform

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

[Development targets]
- Real-time (RT) data processing
- Short-term ensemble forecasting
- Traffic condition measurement using AI cameras
- Service level (SL) evaluation method and technology

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Confirm performance of RT processing and forecasting technology • Demonstration of daytime traffic count using edge processing • Implementation and visualization of basic SL evaluation methods	• Stable operation of RT processing and forecasting technology • Robustness evaluation against changes in AI camera measurement environment • Improve and expand SL evaluation	• RT traffic volume monitoring through integrated use and processing of automobile probe data and AI camera-measured traffic volume • Operation of short-term forecasting and SL evaluation system

Demonstration completed

End of March 2028

- Capture 1% (3 billion yen) of Japan's advanced traffic management system market (estimated at 370 billion yen in 2033)
- By implementing this system in society, contribute to smooth road traffic management in the event of traffic anomalies and to the development of a service-level-oriented road network

Developer's Message (Future Vision)

- This system enables road traffic monitoring using ETC 2.0 data, along with AI camera and automobile probe data. By combining the characteristics of the respective big data, we aim to build a platform that achieves real-time traffic monitoring, short-term forecasting, and road service level evaluation.
- This will contribute to addressing challenges and creating value for future road management and network development.

Director and CTO
Ryosuke Shibasaki

<Company Details>
■Company Website: https://locationmind.com/
■Head Office: 4th Floor, PMO Kanda Tsukasamachi, 2-8-1 Kanda-Tsukasamachi, Chiyoda-ku, Tokyo
■ Contact: inquiry@locationmind.com

System for Routine Port Structure Inspections Applying Small AUVs

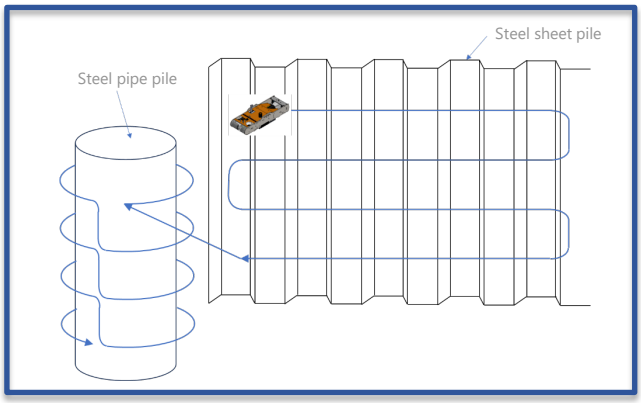
FullDepth Co., Ltd.

Large-scale technology demonstration: 2024–2028

Overview of Large-Scale Technology Demonstration

- FullDepth will develop and conduct a technology demonstration of a system using small, lightweight autonomous underwater vehicles (AUVs), which will allow port administrators to perform periodic inspections and diagnostics as part of the preventive maintenance cycle.
- Target structures: Caissons, sheet piles, pier (steel pipe pile)-type vertical structures

[Outcome (illustrative only)]



[Technology's features and sophistication level]

- Develop a low-cost, small, lightweight hovering-type AUV that can be operated by a small team
- Simultaneously recognize the position of target structures and itself through sensor fusion combining affordable sensors
- Autonomous navigation technology for observing target structure surfaces comprehensively

Development Schedule and Targets for Social Implementation

[Development targets]
- Visual survey of underwater sections of port structures
- On-site operations handled by a small team (2–3 people)
- Specialized skills unrequired due to automation

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Develop AUV demonstration unit • Develop navigation support application	• Develop navigation software tailored to target structures	• Develop navigation software tailored to complex structures

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Achieve sales of at least 1.6 billion yen within five years of project completion
- Encourage 570 port administrators, etc. in Japan to introduce the AUV system developed by this project

Developer's Message (Future Vision)

- Both underwater infrastructure and divers are aging in Japan and around the world. By conducting inspections and preventive maintenance before problems arise, we will contribute to preventing accidents and reducing the total cost of infrastructure maintenance.
- We will develop automated inspection technologies using cable-free AUVs suitable for inspections of complex underwater structures.

FullDepth Co., Ltd. CTO
Eijiro Ohashi

<Company Details>
- Company Website: https://fulldepth.co.jp/
- Head Office: University of Tsukuba Industrial Liaison and Cooperative Research Center Building, 1-1-1 Tennodai, Tsukuba-shi, Ibaraki
- Tokyo Office: Higashi Nihonbashi 1st Building, 2-8-4 Higashi-Nihonbashi, Chuo-ku, Tokyo
- Contact: https://fulldepth.co.jp/contact 03-5829-8045

Autonomous Non-Destructive Inspections with Underwater Adhering Drones

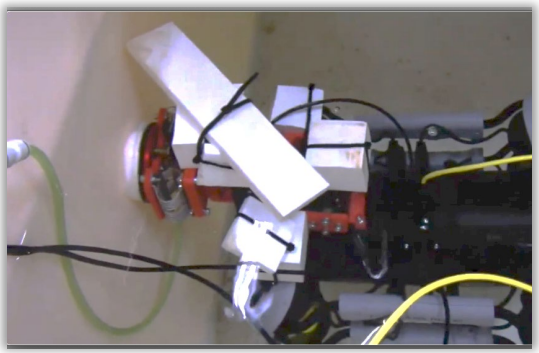
Universal Hands, Co., Ltd.

Large-scale technology demonstration: January 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Universal Hands is developing an underwater adhesion drone (remotely operated vehicle, or ROV) to tackle the challenges posed by aging port infrastructure.
- The company will perform non-destructive inspections of steel pipes and sheet piles at port mooring facilities.
- Beyond visual inspections, the drone will enable inspections requiring applied reaction force.

[Underwater drone adhered to a wall surface]

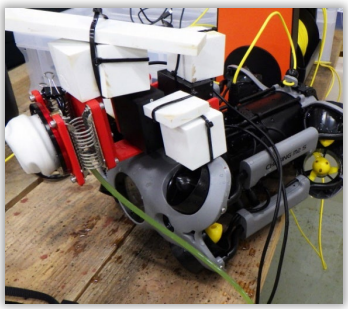


[Technology's features and sophistication level]

- Grab anything! Versatile hands!
- Secure tightly to the inspected object! Improve measurement accuracy!

⇒For preventive maintenance of port facilities!
Can be applied to offshore wind power plants, dams, and other facilities!

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Secure 1% of the global port maintenance market, projected at 90 billion yen by 2033 (target: 900 million yen).
- Develop a new inspection method to tackle the shortage of divers.
- Capture 1% of extended markets, including overseas ports (600 billion yen), offshore wind power, and dams (target: 6 billion yen).

Development Schedule and Targets for Social Implementation

[Development targets]
- Achieve underwater adhesion
- Integrate cleaning functionality
- Thickness inspection
- Anode inspection

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Achieve underwater adhesion • Implement underwater cleaning functionality • Conduct evaluation of the experimental unit	• Underwater adhesion and movement • Thickness inspection • Anode inspection	• Autonomous mobility • Multi-unit support • Autonomous inspection

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Driven by a desire to develop robots like never before, we have been conducting R&D of versatile robotic hands and wall-adhering mobility robots.
- Ports constitute a key infrastructure for Japan, a nation surrounded by the sea, and the aging of ports is becoming a serious issue. We will contribute to society by helping resolve the challenges facing ports, which handle over 90% of Japan's import and export cargo.
- We will aspire to apply our technology to a wide range of uses, including inspections of ship bottoms and offshore wind power plants.

Universal Hands, Co., Ltd.
Shimizu (left), Fujimoto (right)

<Company Details>
■Company Website: https://sites.google.com/g.kobe-kosen.ac.jp/kobe-kosen-robotics
■Head Office: 8-3, Gakuen-higashi-machi, Nishi-ku, Kobe-shi, Hyogo
■Contact: kcct-ts8@g.kobe-kosen.ac.jp

Large-Scale Demonstration of Avatar Robot Aimed at Fundamentally Resolving Labor Shortages in Airport Operations

avatarin Inc.

Large-scale technology demonstration:
January 2024–March 2028

Overview of Large-Scale Technology Demonstration

For resolving labor shortages in airport operations, avatarin will:

- Conduct a demonstration of a large-scale introduction of avatar robots in remote customer support services
- Conduct a demonstration of resource sharing between airports using avatar robots
- Optimize the operational environment for tasks performed by remotely controlled avatar robots, etc.

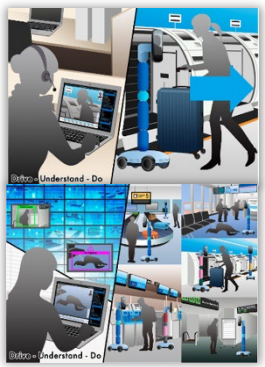
[Demonstration site (illustrative only)]Aichi Prefecture

[Technology's features and sophistication level]

- Operations remotely controlled through a large-scale introduction of avatar robots at airports
- Resource sharing between geographically distant airports

⇒Ultimately, a large-scale introduction of avatar robots at airports will enable remotely controlled operations between airports and resolve labor shortages in the aviation industry

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Operations performed by a total of 100 avatar robots deployed in multiple areas of an airport
- Remotely controlled operations at several geographically distant and unfamiliar airports
- Optimal workplace environment for avatars performing actual operations in real-world conditions

2023: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Simultaneous connection of 20 robots in a laboratory environment • Validate and improve robot maneuvering • Create an operation room and data measurement system	• Improve large-scale robot operations • Validate and improve robot maneuvering • Optimize data measurement and operations in an actual environment	• Improve large-scale robot operations • Validate and improve robot maneuvering • Optimize data measurement and operations in an actual environment

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Open a new market for remotely controlled robots in the global remote passenger service market (682.7 billion yen in 2023), and capture 0.7% (4.8 billion yen) of the market following project completion

Developer's Message (Future Vision)

- We will move quickly to develop services using avatar robot technology to resolve labor shortages at airports, ensuring we stay competitive with global companies.
- Under this project, we will steadily conduct technology development and validation at Japanese airports, aiming to export this Japan-origin infrastructure to overseas aviation organizations.

CEO Akira Fukabori (center)

<Company Details>
- Company Website: https://about.avatarin.com/
- Head Office: 5th Floor, Nihonbashi IT Building, 3-3-9 Nihonbashi-Muromachi, Chuo-ku, Tokyo
- Contact: info@avatarin.com

Development of the "VIPS" Airport-Wide Information Aggregation Platform

Dynamic Map Platform Co., Ltd.

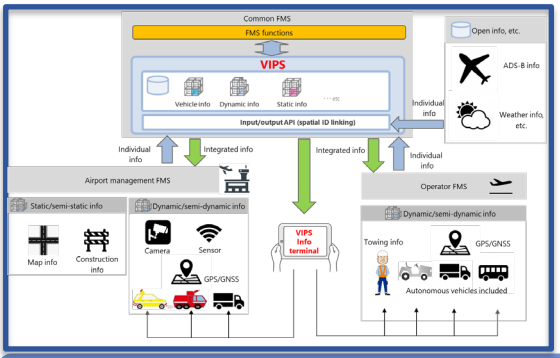
Technology development and large-scale demonstration: FY2023–FY2026

Core Technology

- Dynamic Map Platform will develop a system that integrates airport-wide information called Various Information Port System (VIPS).
- Information necessary for operating mobility services in airport restricted areas will be organized and aggregated, helping eliminate the technical barriers to the introduction of automated vehicles in society.
- By connecting to control and operation management systems, VIPS becomes a platform for sharing the movement and status of not only automated vehicles but also objects and people in an airport.

[Overview of development]

Demonstrations planned at Haneda and Narita Airports

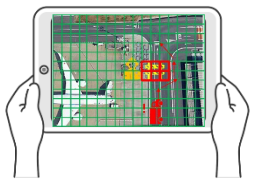


[Technology's features and sophistication level]

- Develop VIPS to share movement and status of objects and people in an airport
- Develop a VIPS information terminal suitable for the display of shared information

⇒In the future, connect VIPS to control and operation management systems and evolve it into a platform for sharing the movement and status of objects and people in an airport

[Outcome (illustrative only)]



[Post-social implementation immediate targets]

- Capture 30% (3 billion yen) of the market for major global airports (estimated at 10 billion yen in 2031)
- By implementing VIPS in society, contribute to reducing the labor and improving the efficiency of airport ground handling operations and help overcome the technical barriers for using automated vehicles in airports

Development Schedule and Targets for Social Implementation

[Development targets]
- Development of VIPS
- Individual validation of use cases
- Large-scale demonstrations in airports

Simulated environment evaluation	Use cases evaluation	Large-scale demonstration
• Develop VIPS software • Develop VIPS terminal • Static validation	• Develop VIPS software • Develop VIPS terminal • Use case validation	• Develop VIPS software • Large-scale technology demonstration • Integration with common FMS
2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above

Demonstration completed

End of March 2026

Developer's Message (Future Vision)

- Ground handling workers are in shortage, not only in Japan but also globally. By adopting the information integration system developed through this project for the various technologies to achieve more efficient, automated airport operations, efficient and safe airport operations will be realized, regardless of whether they are automated or manual. We will aim to standardize data integration methods and establish international standards for dynamic maps.
- Our company will continue to contribute to advanced airport operations beyond FY2027.

PM: General Manager Yuichi Ochi (second from right)

<Company Details>
- Company Website: https://www.dynamic-maps.co.jp/company/overview/index.html
- Head Office: 12th Floor, Nextsite Shibuya Building, 2-12-4 Shibuya, Shibuya-ku, Tokyo
- Contact: 03-6459-3445

Development and Demonstration of Technologies Related to Optimization of Inspections and Surveys of Port Facilities Using Drones

Prodrone Co., Ltd.

Large-scale technology demonstration: FY2024–FY2026

Overview of Large-Scale Technology Demonstration

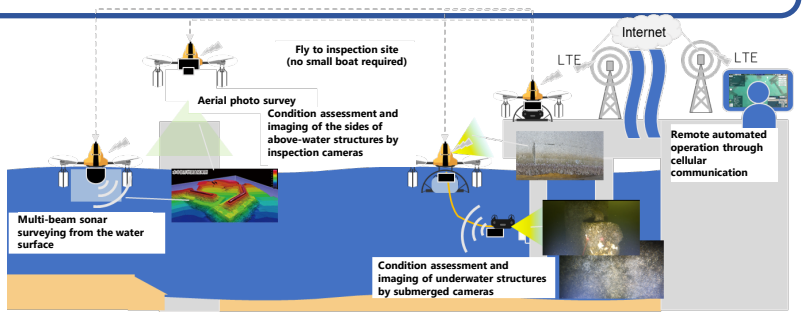
■ Prodrone will develop a drone fuselage, a remote operation management system, and an AI-powered data management and inspection system aimed at more efficient and less costly inspections of port facilities, and aims to deliver solutions that align with the needs of port facility management as quickly as possible.

[Technology's features and sophistication level]

■ A Hydro-Aerial Vehicle that can inspect both underwater and above-water structures of port facilities will be developed. By using an acoustic positioning system, the drone will have highly accurate positioning even underwater, and therefore, more precise autonomous navigation even when submerged in water.

■ In addition to enabling one-stop operations through automated integration of aerial, surface, and underwater functions, the system uses 3D data of port facilities to facilitate the creation of drone operation plans for port facility inspections.

■ A data management and analysis system to collect and analyze imaging data of port facilities will be developed. The reporting of anomaly detection by humans and AI will be automated to realize more efficient post-inspection processes.



[Post-social implementation immediate targets]

■ In the future, reduce cost by approx. 40% for small-scale inspections and approx. 60% for large-scale inspections compared to conventional inspection methods

■ The market is expected to expand to over 3.7 billion yen in 2027. The aim is to capture approx. 50% share of the port facility inspection market and promote the adoption of drone inspections.

Development Schedule and Targets for Social Implementation

[Development targets]
- 15 kg payload, 20 min. flight time
- Seamless creation of operation plans
- Equip with 3D sonar, capable of round trips up to 3 km
- Better organized inspection data

2024: TRL 5 and above
- Develop aerial drone unit, underwater drone unit base, and acoustic positioning system
- Develop prototype of integrated operation management system
- Define requirements and finalize specifications for developing a data management and analysis system

2026: TRL 6 and above
- Complete physical system integration
- Improve underwater drone mobility performance
- Develop prototype of operation planning functions using 3D data
- Visualize malfunction locations on maps
- Trial development of port reporting functions

2027: TRL 7 and above
- Commercially deployable
- Can be linked with port management systems
- Can generate reports automatically

*Clear underwater imaging is difficult due to high turbidity and requires cleaning of wall surfaces. Therefore, this proposal excludes underwater AI analysis and focuses on above-water analysis.

Demonstration completed

End of March 2027

Developer's Message (Future Vision)

■ We aim to make port facility inspections more efficient and less costly.

■ We will deliver solutions that meet the needs of port facility management by enabling one-stop operations through automated integration of aerial, surface, and underwater functions, alongside using 3D data of port facilities to facilitate the creation of drone operation plans.

■ We aim to automate the reporting of anomaly detection by humans and AI, optimize post-inspection processes, and achieve safe and efficient management of port facilities.

PRODRONE
CTO Kiyokazu Sugaki

<Company Details>
■ Company Website: https://www.prodrone.com/jp/
■ Head Office: 1-115 Nakahira, Tenpaku-ku, Nagoya-shi, Aichi
■ Contact: moriuchi@prodrone.com

Technology Development and Demonstration for Optimizing Port Facility Inspections and Maintenance Using Drones and Creating a Visualization System Capable of Assessing Port Facility Conditions During Disasters

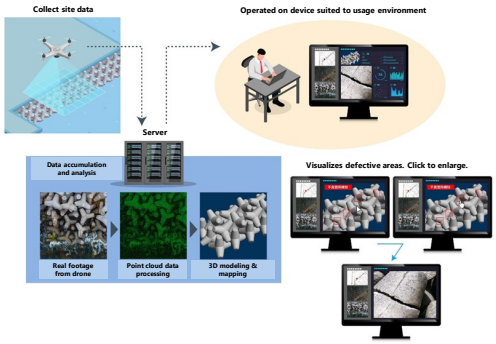
DAOWORKS Co., Ltd.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- DAOWORKS will conduct a technology demonstration of a system that uses drone-based sensing to optimize port facility inspections and maintenance. The company will offer solutions to societal challenges, such as the aging of port facilities and the shortage of engineers and technicians for inspections and surveys.
- DAOWORKS will develop a risk visualization system to enable rapid assessment of the situation in the event of disasters.

[Outcome (illustrative only)]



[Technology's features and sophistication level]

- Develop a remote inspection system using image data (SfM)
- Visualize risks, such as damage and displacement, using 3D data
- Develop a system to support repair planning by port administrators

⇒Develop a drone-based inspection and maintenance service that is not dependent on sensing hardware

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop a remote inspection system that can substitute 3D-LiDAR with cameras
- Visualize risks, such as damage and displacement, using 3D data

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• (3D-LiDAR) 3D information reconstruction • (Camera) 3D information reconstruction • 3D visualization of point cloud data	• Technology for increasing data collection capacity • Develop machine learning models for detecting deterioration and displacement • Create simulation environment	• Identify damage and displacement using cameras • Skills to expand machine learning models • Report of evaluation results

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]
- Capture 0.3% (800 million yen) or more of the market for drone inspection services (estimated at 270 billion yen in 2032, including inspection services for non-port infrastructure)
- By implementing this drone service in society, increase the inspection frequency for aging infrastructure and contribute to promoting preventive maintenance

Developer's Message (Future Vision)

- By implementing this technology in society, DAOWORKS will contribute to addressing global challenges, such as aging infrastructure facilities and the shortage of inspection engineers and technicians, and promote preventive maintenance that ensures safer and more reliable use of public infrastructure by people across the globe. In addition, we will create a system for faster situation assessment during disasters, which will support disaster recovery efforts on the ground.
- To realize this future vision, we have signed a partnership agreement with Hokkaido University, Panasonic Advanced Technology Development Co., Ltd., and Nippon Data Service Co., Ltd., and are driving activities as the lead startup in this initiative.

DAOWORKS Co., Ltd. CEO Kazuaki Yoshida (second from right)

<Company Details>
■Company Website: https://daoworks.co.jp/
■Head Office: 2nd Floor, Gifu East Rising 24, 1-17 Takasago-cho, Gifu-shi, Gifu
■Contact: kazy39@daoworks.jp

Development of an Automated Port Facility Inspection System Using Drones

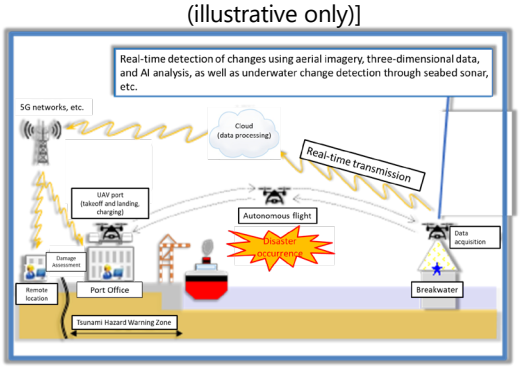
Flight PILOT Co., Ltd. (representative)

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- Flight PILOT will conduct a technology demonstration of an "Automated Port Facility Inspection System Using Drones," which inspects port facilities through remote and automated operations of drones, with drone ports serving as base stations.
- Using duct-type drones with high fuselage performance, the system will automate port facility inspections and surveys in both normal and disaster situations, and thereby, increase efficiency and reduce costs.

[Automated port facility inspection system (illustrative only)]



[Technology's features and sophistication level]

- Develop a patented duct-type drone with high wind resistance, waterproofing, and dustproofing performance
- Develop an automated port facility inspection system that is integrated with drone ports and an operation management system

⇒More efficient and less costly port facility inspections and surveys through automation

Ultimately, apply this system to inspections of other facilities, opening new prospects for infrastructure inspections globally

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- 1.5 billion yen in sales five years after project completion
- By implementing this UAV in society, optimize the maintenance of port facilities and offer an innovative approach that uses cyber-secure drones to improve disaster response

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop cyber-secure drones
- Design and operate drone ports
- Develop operation management system
- Demonstration of port facility inspections
- Compatibility with disasters

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
(Initial prototype development and basic functionality testing) • Design and develop drones • Design and develop drone ports • Design and develop operation management system	(System testing in actual environment) • Manufacture drones • Construct and set up drone ports • Build operation management system	(System demonstration and final evaluation) • Demonstration of port facility inspections • Testing for compatibility with disasters • Final testing for commercial application

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- By integrating drone technology that revolutionizes maintenance and inspection of port facilities with robust security systems, we aim to build a sustainable and safe societal infrastructure. Notably, we are using advanced sensor technology that operates with high precision and certainty even in a harsh environment to enable automated inspections of port facilities, aiming to minimize human risks and achieve efficient and economical facility management.
- In doing so, we will transform the future of port facilities, deliver new value to society, and contribute to extending the lifespan of infrastructure.

Flight PILOT Co., Ltd. CEO Takayuki Kawakami

<Company Details>
■Company Website: https://www.a-area.jp/
■Head Office: 179-8 Nagasaka, Emukae-cho, Sasebo-shi, Nagasaki
■Contact: TEL: 0956-80-4625 E-mail: info@a-area.jp

Use of Drones and Development of AI-Based Video Analysis for Streamlining and Speeding Up Port Inspections and Patrols

NTT e-Drone Technology Corporation (representative)

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- This large-scale demonstration is aimed at streamlining and speeding up port inspections and patrols.
- NTT e-Drone Technology will make maximum use of drones with obstacle avoidance features and fixed-wing drones to realize inspections and patrols of wide-ranging vast port facilities.
- In addition to using drones, the company will develop and implement new AI technologies for detecting infrastructure deterioration and suspicious individuals, etc.

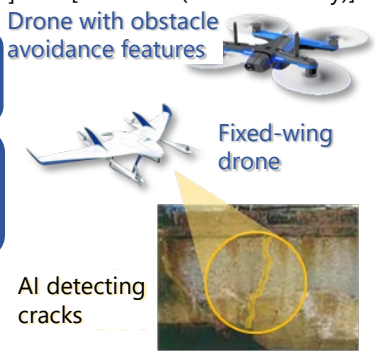
[Demonstration site] Higashi-Ogishima, Kanagawa

[Technology's features and sophistication level]

- Efficient and speedy inspections and patrols using multiple drone models
- Development and social implementation of AI technologies customized for the port environment

⇒Realize efficient operation of drones suited to port conditions and achieve AI-based digital inspections and patrols

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]
- Configure flight method
- 70% AI detection rate
- Applicable to multiple ports
- Ensure AI accuracy in a range of conditions

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• AI model development and testing	• System integration and model optimization	• Additional tests tailored to the actual environment
• Validation of drone usefulness in port inspections	• Demonstration of drone use in varying port conditions	• Specify drone utilization methods for actual use
		• Comprehensive validation of the AI system

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Introduce the technologies in Japan's large-scale ports (estimated at 130 million yen in 2028)
- Horizontal deployment in Japan's infrastructure inspection market (8.7 trillion yen in 2024) and overseas infrastructure maintenance market (200 trillion yen in 2024)

Developer's Message (Future Vision)

- This project combines drones and AI technologies to achieve the digital transformation of ports.
- Demonstrations meaningful for society will be conducted by drawing on the characteristics of NTT e-Drone Technology, Red Dot Drone Japan, and Aerosense.
- Through this demonstration, we will contribute to streamlining and speeding up inspection and patrol operations.

NTT e-Drone Technology Corporation
PM Tabei (left), Developer Sato (right)

<Company Details>
- Company Website: https://www.nttedt.co.jp/
- Head Office: 2-4-23 Kitahara, Asaka-shi, Saitama
- Contact: omakase_edrone@nttedt.co.jp

Port Platform Development Project

Aidea Inc.

Large-scale technology demonstration: FY2024–FY2026

Overview of Large-Scale Technology Demonstration

- The platform will assist approach (in-port) maneuvers by capturing real-time meteorological/oceanographic conditions and small boat and other vessel movements in the port and sharing this information with incoming vessels.
- Even without the installation of expensive equipment on vessels, the platform will determine the positional relationship between vessels and quays and provide real-time information to relevant parties to help cover the blind spots of tugboats, etc.

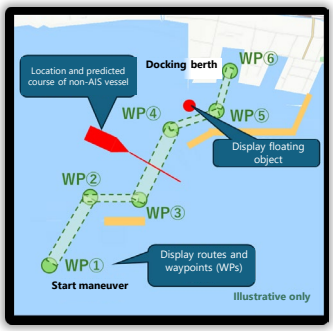
[Demonstration testing candidate site] Kushiro, Hokkaido

[Technology's features and sophistication level]

- Image maritime objects by integrating images from multiple radars
- Employ a SaaS model using existing equipment and affordable sensors

⇒Vessels will only need to install an information terminal. The platform will notify risk information to vessels sailing in the port and prevent accidents from occurring.

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Develop a system for acquiring and sharing comprehensive in-port movement information to assist approach maneuvers
- Develop a system that measures the precise positional relationship between vessels and quays in real time and shares it with relevant parties with little delay, and assist docking and undocking maneuvers

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Approach maneuver assistance • Docking/undocking maneuver assistance • Implement features and on-site testing	Integrated maneuver assistance demonstration (year-round technical testing at the demonstration port)	Integrated maneuver assistance (aiming for year-round operational testing at the demonstration port)

Demonstration completed

End of March 2027

[Post-social implementation immediate targets]

- Offer port platform features that can be introduced in ports at a low cost and on a small scale
- Consider introducing the model domestically and internationally, and achieve annual sales of approx. 1 billion yen five years after project completion

Developer's Message (Future Vision)

- Expectations for a modal shift are increasing the demand for domestic coastal shipping, necessitating productivity and safety improvements in port operations. This project aims to create and commercialize a platform that collects information on risks in a port and notifies it to navigating vessels.
- Through our existing maritime platform Aisea, our company will promote digital transformation in the shipping industry, while contributing to productivity and safety improvements in port operations by using this platform.

Aidea Inc.
CSO/CFO Tomoyuki Suzuki

<Company Details>
- Company Website: https://aidea.biz/
- Head Office: 22nd Floor, JR Shinjuku Miraina Tower, 4-1-6 Shinjuku, Shinjuku-ku, Tokyo
- Contact: Strategy_G@aidea.biz

Development of Safe and Efficient Docking/Undocking Technology Using the New Maritime Digital Communication Standard "VDES"

Coastal Link Corp.

Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- Coastal Link will develop the "Port VDES Broadcasting System," the "Vessel Docking and Undocking Information Support System," and the "Automated Docking and Undocking Device (for vessels and quays)" in an integrated manner.
- The company will conduct indoor testing and demonstration in water for the developed products to achieve safe and efficient docking and undocking.

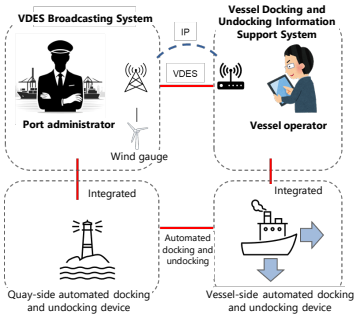
[Demonstration site] Suo-oshima, Yamaguchi

[Technology's features and sophistication level]

- Convenient system for information sharing using the new maritime communication standard, VDES
- Automated docking and undocking based on data on wind, which has significant impact

⇒Ultimately, achieve full system integration and automated docking and undocking in water

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

Integrate the "Port VDES Broadcasting System," the "Vessel Docking and Undocking Information Support System," and the "Automated Docking and Undocking Device (for vessels and quays)" to operate in water

2025: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
(Port VDES Broadcasting System) (Vessel Docking and Undocking Information Support System) • Laboratory scale validation	(Automated Docking and Undocking Device) • Tank experiments • Demonstration in water	(Systemwide) • All system components operate in an integrated manner in water

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Capture a 1.9 billion-yen share of the global maritime communication market within five years
- By implementing this system in society, contribute to shifting from traditional analog, inefficient voice radio communication to digital maritime communication that enables efficient coordination between various organizations and devices

Developer's Message (Future Vision)

- A single maritime accident can have ripple effects on precious human lives, vast assets, and the marine environment of a wide area. Such tragic incidents constantly occur even now.
- By connecting disparate radio equipment, frequencies, and types of signals used in maritime communication, we aim to provide a unified maritime digital communication infrastructure and realize a safe and resource-rich maritime society.

Coastal Link Corp. CEO
Tomoki Takimoto

<Company Details>
- Company Website: https://coastal.link
- Head Office: G's BASE FUKUOKA, 1-3-41 Daimyo, Chuo-ku, Fukuoka-shi, Fukuoka
- Contact: https://coastal.link/contact/

Development of Railway Inspection Solutions Using Drones Adapted to the Railway Environment

Liberaware Co., Ltd. (representative)

Large-scale technology demonstration: April 2024–March 2028

Overview of Large-Scale Technology Demonstration

- Liberaware plans to develop autonomous drones to replace human patrols at railway sites and aims to deploy digital twin services for data management and optimization of maintenance operations.
- The company aims to improve safety and address labor shortages by replacing patrols with drones, while boosting operational efficiency and productivity through the adoption of digital twin services.

[Project visual]

[Technology's features and sophistication level]

- Provision and operational management of safe and reliable drones that contribute to more efficient patrols at railway sites
- Time-series management of maintenance operations using digital twins

⇒Safety and productivity enhancements

[Outcome (illustrative only)]

[Post-social implementation immediate targets]

- We aim to capture approximately 20% of Japan's projected drone-based inspection market, valued at an estimated 214.5 billion yen by 2028, equating to around 43 billion yen.

Development Schedule and Targets for Social Implementation

[Development targets]

TRL 5: Verification of system operating status and remote handling with safety in mind
TRL 6: Demonstration in a test facility (simulating railway operational conditions, etc.)
TRL 7: Demonstration in an actual environment

- Define requirements
- Develop system

2024: TRL 5 and above

- Demonstrations in separate conditions

2026: TRL 6 and above

- Demonstrations in standard conditions

2027: TRL 7 and above

Demonstration completed

End of March 2028

Developer's Message (Future Vision)

- Maintenance of railway infrastructure has been impacted by aging systems, increasingly severe natural disasters, and population decline. We aim to explore safe and highly productive solutions for maintenance operations, applicable to both routine and emergency scenarios.
- In this project, we will develop systems based on insights from an actual railway operator, JR East (a consortium member).
- We intend to deploy our solutions not only domestically but also internationally and contribute to the maintenance of infrastructure in the railway industry.

Liberaware Co., Ltd. CEO Hongkyu Min

<Company Details>
- Company Website: https://liberaware.co.jp/
- Head Office: 6th Floor, Fujimoto Daiichi Seimei Building, 3-3-1 Chuo, Chuo-ku, Chiba-shi, Chiba
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Technology Demonstration Related to Rail Facility Maintenance Using Lasers and Other Optical Technologies

PhotonLabo Co., Ltd.

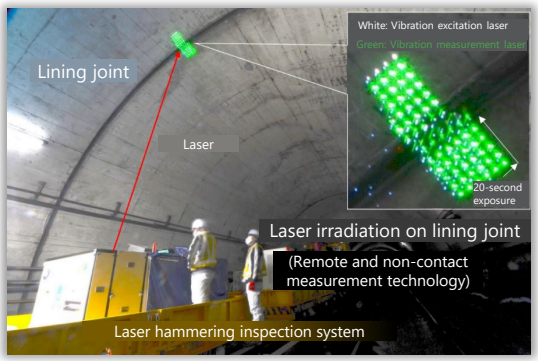
Large-scale technology demonstration:
April 2024–March 2028

Overview of Large-Scale Technology Demonstration

PhotonLabo will conduct a technology demonstration using lasers with the goal of making rail facility maintenance more efficient and labor saving.

- The company will conduct a technology demonstration of preventive maintenance, in which physical and chemical degradation of facilities is determined remotely and without contact using digital inspections and degradation evaluation AI.
- PhotonLabo will conduct a technology demonstration of both train operating environment inspection and digital twin management.

[Preliminary demonstration site] Yokohama, Kanagawa

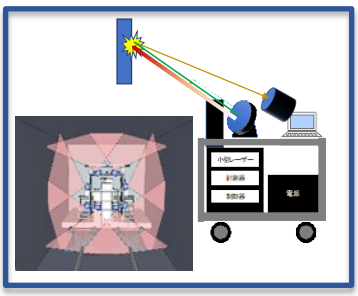


[Technology's features and sophistication level]

- Use lasers to simultaneously measure physical (structural changes) and chemical (composition changes) degradation, remotely and without contact
- Inspect the safety of a train's operating environment with high precision and reliably using lasers, and manage it digitally

⇒Develop a digital maintenance system using two types of precision measuring device

[Outcome (illustrative only)]



Development Schedule and Targets for Social Implementation

[Development targets]

- Develop a compact laser hammering and spectroscopic system (Physical and chemical degradation inspection using light)
- Develop a laser-based clearance inspection system (High-precision and reliable digital inspection using light)

2024: TRL 5 and above	2026: TRL 6 and above	2027: TRL 7 and above
• Define requirements • Basic design • Functional validation experiments using individual devices	• Complete prototype • Performance validation experiments using test specimens • Collaborate with railway companies	• Begin social implementation of the actual product at railway sites • Performance improvements through on-site application

Demonstration completed

End of March 2028

[Post-social implementation immediate targets]

- Capture 35% share (10 billion yen) of Japan's market for mechanized inspection of infrastructure structures (estimated at 28 billion yen in 2035)
- As the number of maintenance engineers decline due to an aging population, etc., implementing this technology in society will become a powerful solution for the social issue of rapidly aging infrastructure.

Developer's Message (Future Vision)

- Maintenance is performed to ensure the continued safety and security of railways, which are a lifeline of society. PhotonLabo has been entrusted with the important mission of implementing the latest technologies developed by national research institutes in society to contribute to addressing railway maintenance, a critical social issue. We will dedicate ourselves to establishing both technological achievements and methodologies, recognizing that using deep tech (in this project, technology leveraging the diverse capabilities of photons) to solve societal challenges is strategically indispensable for Japan.

PhotonLabo Co., Ltd. CEO
Shigeru Kogure

<Company Details>
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- Head Office: Room 106, Wako RIKEN Incubation Plaza, 2-3-13 Minami, Wako-shi, Saitama
- Contact: info@photon-labo.jp

Field Trials of Beacon Services and Development of a Behavior Estimation Platform

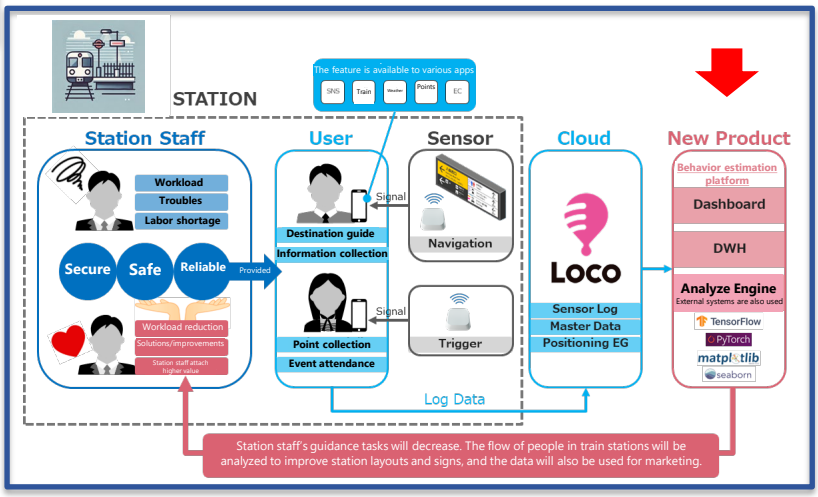
Beacrew Inc.

Large-scale technology demonstration: April 2024–March 2027

Core Technology

- Beacrew will carry out field trials of destination guidance services integrating beacons, variable message signs, and smartphone apps, and will develop an artificial intelligence (AI) that machine-learns behavior logs obtained from the field trials, along with facility and surrounding area information.
- This AI will be used to extract facility characteristics (what tends to occur when and where) and create a behavior estimation platform that can be used to identify that facility's issues. Ultimately, this will contribute to improving train station facilities and reducing the workload of station staff, thereby enhancing the safety of train stations.

[Overall system to be developed]



Demonstration testing planned at some JR West stations

[Technology's features and sophistication level]

- Accumulate people's location data and estimate behavior at those locations
- Based on the estimated behavior, extract what is prone to occur in that location, i.e., the characteristics of that location

[Post-social implementation immediate targets]

- Implement similar systems at rail service companies and public facilities, and propose ways to make facilities continuously accessible
- Explore ways to utilize a location's characteristic and issue data collected during normal operations to improve facility guidance during disasters

Development Schedule and Targets for Social Implementation

[Development targets]
- Develop a behavior estimation platform
- Conduct field validation of variable message signs and visualize the flow of people using behavior logs
- Using the behavior estimation platform, identify facility issues and make improvements in a continuous loop

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
• Develop system • Install beacons and variable message signs • Promote beacon sharing	• Validate variable message signs • Visualize human flow using beacons	• Using the visualized information, measure the effectiveness of facility convenience improvements • Considerations for improving visitor behavior • Discussion with other rail service companies

Demonstration completed

End of March 2027

Developer's Message (Future Vision)

- We will create a continuous loop of using the behavior estimation platform and improving facilities based on its analysis results. Our ultimate goal is to eliminate congestion and long lines at facilities as much as possible.
- We seek to reduce the workload of facility staff (e.g., train station attendants) and allow them to focus on services that must be performed in person, such as assisting seniors or other users requiring help.
- The facility characteristics analyzed during normal operations will be used to improve facility guidance and staff assignments during disasters.

Beacrew Inc. CEO

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■Contact: support@beacrew.jp

Ministry of Land, Infrastructure, Transport and Tourism
(3) Safe and Secure Public Transportation and Related Systems

Small/Startup Business Innovation Research

Building of a Certifiable Integrated Development-Operations Framework for Autonomous Driving Systems and Development of a Corresponding Autonomous Driving Package

TIER IV, Inc. (representative)

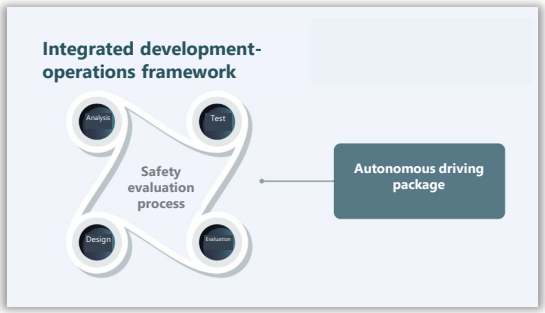
Large-scale technology demonstration: FY2024–FY2027

Overview of Large-Scale Technology Demonstration

- Leveraging the insights gained from past projects with the government, we will form a consortium with key companies and organizations involved in the autonomous driving sector. Our aim is to develop and demonstrate technologies that will contribute to the government's goal of introducing autonomous driving mobility services in over 100 locations by the fiscal year 2027.
- We will develop frameworks for evaluating the safety of autonomous driving and create corresponding autonomous driving packages.

[Overview of technology]

Aim to conduct technology demonstrations in the Tokyo waterfront and Shiojiri, Nagano, etc.



[Technology's features and sophistication level]

- Leverage/integrate insights from previous government projects and expertise of consortium members
- Develop a framework and package for evaluating autonomous driving safety and achieve related services and social implementation

⇒Ultimately, aim to establish an environment where regional stakeholders and others who wish to utilize autonomous driving can easily access the necessary autonomous driving technologies to contribute to social implementation

[Outcome (illustrative only)]

Integrated development-operations framework
- Level 4 vehicle/system design and development process
- Safety evaluation methodology/process
- Implementation of Level 4 autonomous driving services
- Feedback of operational data into development

Autonomous driving package
- Vehicles compatible with Level 4 autonomous driving
- Safety evaluation methodology and simulation environment
- Operation management systems for autonomous vehicles
- Operational manual for autonomous driving mobility services
- Various tools

Development Schedule and Targets for Social Implementation

[Development targets]
- Package: Consortium members respectively develop vehicles, systems, and tools and conduct their own demonstrations and regional demonstrations to achieve implementation and practical application
- Framework: Create through iterative trial and refinement based on insights gained from regional demonstrations using the developed outcome

Second half of 2024: TRL 5 and above	Second half of 2024–first half of 2026: TRL 6 and above	Second half of 2026–2027: TRL 7 and above	Demonstration completed
• Create an autonomous driving package prototype • Create a concept for the integrated development-operations framework	• On-road demonstrations with safety personnel in 5 or more locations • Create a draft framework	• On-road demonstrations without safety personnel in 25 or more locations • Complete the development of the framework	**End of March 2028**

[Post-social implementation immediate targets]

- Contribute to Japan's regional public transportation autonomous driving market
- The consortium aims to gain 50% of Japan's regional public transportation autonomous driving market (estimated at 82 billion yen in 2032)
- By spreading the effects beyond the consortium, we try to contribute to offering "autonomous driving mobility services at 100 or more locations by FY2027" as well as achieving an autonomous driving society in the future

Developer's Message (Future Vision)

- We will develop and release an integrated development-operations framework that can be utilized for autonomous driving system certification.
- We will develop and commercialize an autonomous driving package compatible with this framework and accelerate the social implementation of Level 4 autonomous driving.

[Consortium members]

TIER IV, BOLDLY, ASMobi, MONET TECHNOLOGIES INC., 神奈川工科大学 KANAGAWA INSTITUTE OF TECHNOLOGY, 交通安全環境研究所 National Traffic Safety and Environment Laboratory

<Company Details> TIER IV, Inc. (representative)
- Company Website: https://tier4.jp/
- Head Office: Open Innovation Complex of Nagoya University, 1-1-3 Meieki, Nakamura-ku, Nagoya-shi, Aichi
- Contact: shuhei.yoshida@tier4.jp

J-Startup

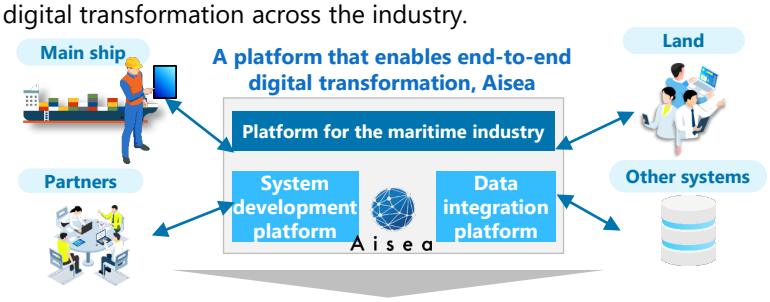
Development and Demonstration of a Versatile Shipping Data Integration Platform and Problem-Solving Features

Aidea Inc.

Large-scale technology demonstration: FY2024–FY2026

Overview of Large-Scale Technology Demonstration

- Aidea will develop and conduct demonstration of a data integration platform for aggregating and using various data of the shipping industry, along with a set of features for solving industry challenges (e.g., carbon neutrality, safety improvement, and workstyle reform).
- The company will make significant functional enhancements to an existing platform with individually developed features to achieve greater versatility. Through social implementation, Aidea aims to promote open innovation and digital transformation across the industry.

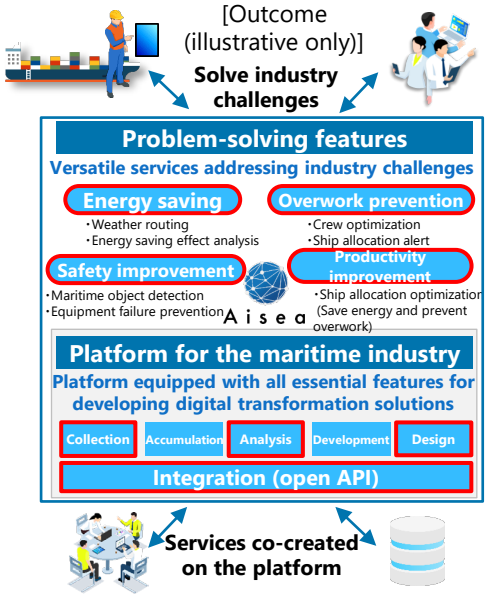


[Technology's features and sophistication level]

Data integration platform
Significantly expand platform features to promote open innovation, including the development of open APIs and versatile tools for analyzing accumulated data

Problem-solving features
Significantly expand services that contribute to solving industry challenges, such as carbon neutrality, safety improvement, and workstyle reform, through enhancing existing features and developing new ones

Make major enhancements, leveraging the technologies and expertise accumulated during the development processes of each feature, and evolve it into **a more versatile industry platform**



[Post-social implementation immediate targets]

Development Schedule and Targets for Social Implementation

[Development targets]
- A more versatile data integration platform
- Develop versatile problem-solving features

2024: TRL 5 and above	2025: TRL 6 and above	2026: TRL 7 and above
(Data integration platform) • Design open APIs • Build design system (Problem-solving features) • Define requirements • Develop prototype	(Data integration platform) • Vessel data collection and API integration demonstration (Problem-solving features) • Develop versatile version features • Demonstration testing	(Data integration platform) • Final demonstration for release (Problem-solving features) • Demonstration of operational feasibility in an actual environment

Demonstration completed

End of March 2027

- Capture 10% (3.5 billion yen) of the Japanese shipping digital transformation market (estimated at 35 billion yen in 2040)
- Generate multiple solutions through collaboration with partners on the data platform

*Demonstrations will focus on the navigation operations of sailing vessels.

Developer's Message (Future Vision)

- The shipping industry is a critical social infrastructure supporting Japan's economy, yet it faces numerous challenges such as environmental adaptation and labor shortages. Our company has been developing Aisea to contribute to the industry's sustainability and growth by solving these challenges through digital transformation.
- In this project, we will significantly evolve Aisea into a more versatile platform and, together with our partners, drive the industry's digital transformation forward with open APIs.

Planning Manager Mamoru Ozaki of the Business Strategy Office

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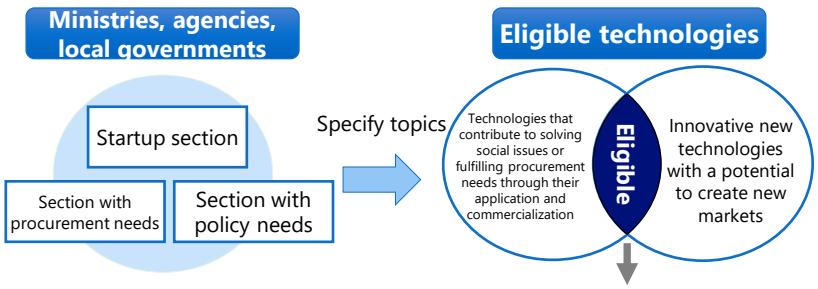
- Contact: info@aidea.biz

SBIR Program

About the Program

The Small/Startup Business Innovation Research (SBIR) System is designed to encourage innovation creation in Japan through promoting R&D of startups and other small businesses and facilitating the implementation of their products in society.

This Program includes subsidies and similar funding provided by the government for R&D topics specified based on policy needs. Solicitation topics for subsidies are specified based on the policy issues and procurement needs of participating ministries, agencies, and other government entities. These subsidies fund early-phase development of technologies that require significant time and funding to commercialize, as well as the development of technologies of which the government would be a primary user.



Eligibility *The above-mentioned subsidies

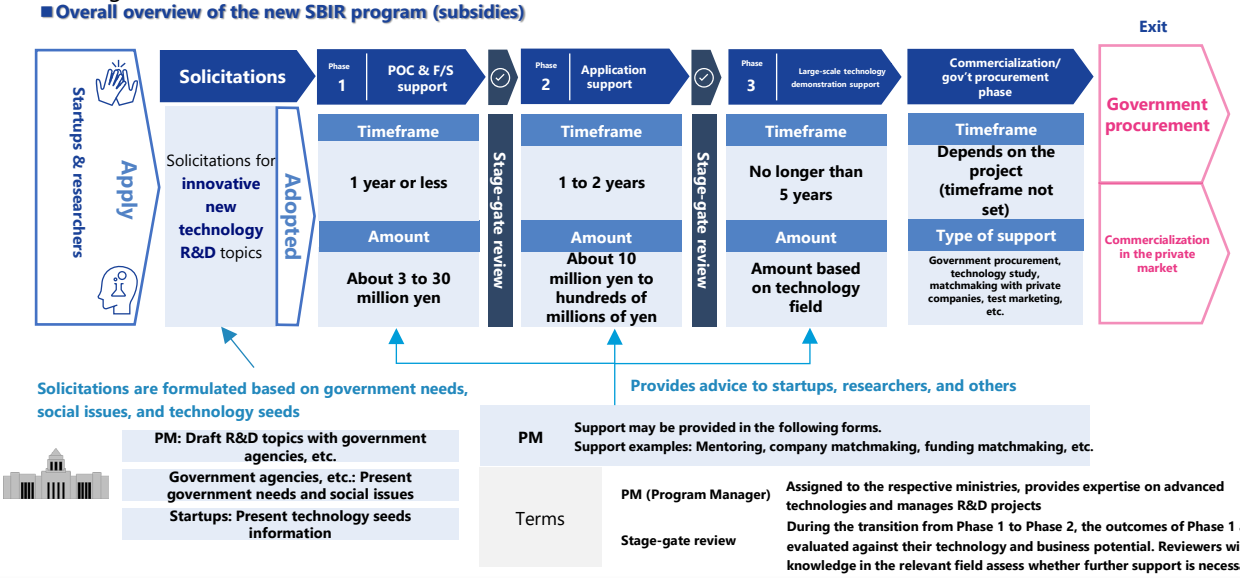
Main requirements*1	Startups (SMEs)	Researchers
	• **R&D-oriented startup (SME)** • **As a rule, established within 15 years** (*Including J-Startup and J-Startup Local selected startups) • **Companies registered in Japan** • Decision-making and R&D hub is located in Japan	• **Affiliated with a research institution in Japan and are able to conduct R&D at the said institution** • **The lead researcher is the inventor of the technology seed** or **was involved in its invention** • Meet **either of the following requirements**: – Aiming to commercialize the technology seed through **entrepreneurship** – Considering **technology transfer to SME** to commercialize the technology seed*2

*1 Application requirements vary by R&D topic. Please refer to the solicitation guidelines of the respective organizations.
*2 Permission for technology transfer will vary by project.

Funding Overview *The above-mentioned subsidies

Support is provided through a multi-phase selection process: feasibility study (FS) of business ideas (“Phase 1”); R&D for technology application (“Phase 2”); and large-scale technology development and demonstration in advanced technology fields (“Phase 3”). Various support is offered to carry out projects seamlessly from basic research to commercialization and encourage the commercialization of R&D outcomes.

■**Overall overview of the new SBIR program (subsidies)**



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Small/Startup
Business
Innovation
Research