

Award-Winning Cases

2026

in the Seventh Space Development
and Utilization Award



Virtual Science Communicator

KITASHIRAKAWA Kakapo

PR Character for the Seventh Space Development
and Utilization Award

*Taking on New Challenges
to Open Up Space.*



Congratulatory Message



Congratulations to all the outstanding recipients of the Seventh Space Development and Utilization Award.

The domain of human activity is expanding into outer space in earnest, extending beyond Earth and its orbit to the lunar surface and beyond. The “space systems” consisting of satellites, etc. deployed in outer space contribute not only to national security but also to solving various challenges on Earth, and have become social infrastructure that supports richer economic and social activities.

The global space industry is predicted to grow into an industry worth over 150 trillion yen by the 2030s, so it will serve as a powerful engine for driving Japan’s future economic growth. In order to maintain and strengthen the independence in space activities that Japan has built up as a “leading space nation” and achieve further growth, it will be necessary to increase public-private investment in the space industry, and respond to the situation without missing a single opportunity.

The Takaichi Cabinet has launched a “Headquarters for Japan’s Growth Strategy,” regards the aerospace field as a strategic area for investment in crisis management and growth, and is promoting the formulation of concrete growth strategies. In the space field as well, after ensuring business operators’ foreseeability, it will promote proactive Public Private Partnership (PPP) investments to put Japan’s space industry on a strong growth trajectory.

I sincerely hope that all of the award recipients will continue to work at the forefront of Japan’s space industry and become powerful engines for driving space development and utilization. I wish all the Space Development and Utilization Award recipients continued good health and further success.

March 17, 2026

Prime Minister *TAKAICHI Sanae*

Congratulatory Message



Congratulations to all the recipients of the Seventh Space Development and Utilization Award.

This year’s Space Development and Utilization Award expanded the opportunities for winning awards by introducing a new “Regional Special Award” to recognize initiatives that contribute to solving regional challenges, revitalizing local communities, and pursuing appealing urban development through space development and utilization. From among the many entries, the Awards were awarded to cases that had achieved outstanding results in areas such as the development and utilization of innovative technologies, industrial development, and regional revitalization.

Services provided by space systems, such as communications, observation, and positioning, have already become an integral part of our daily lives, and essential infrastructure for economic and social activities. Furthermore, the development and utilization of space has undergone a major shift from government-led to public-private co-creation, and we have entered an era in which private technological innovation and investment are driving the space field. Private-sector space development and utilization are becoming increasingly active in other countries, so international competition is growing more intense.

Against this background, Japan has positioned the aviation and space field as a strategic area in which the public and private sectors will work together to promote strategic investments in response to various risks and social issues, and has now begun to discuss growth strategies. As Minister of State for Space Policy, I will take the lead and work closely with the relevant ministries and agencies to vigorously advance space policies based on the growth strategies.

I extend my congratulations to all the award recipients, and sincerely hope that receiving their awards will prompt them to expand their activities even further and achieve even greater things.

March 17, 2026

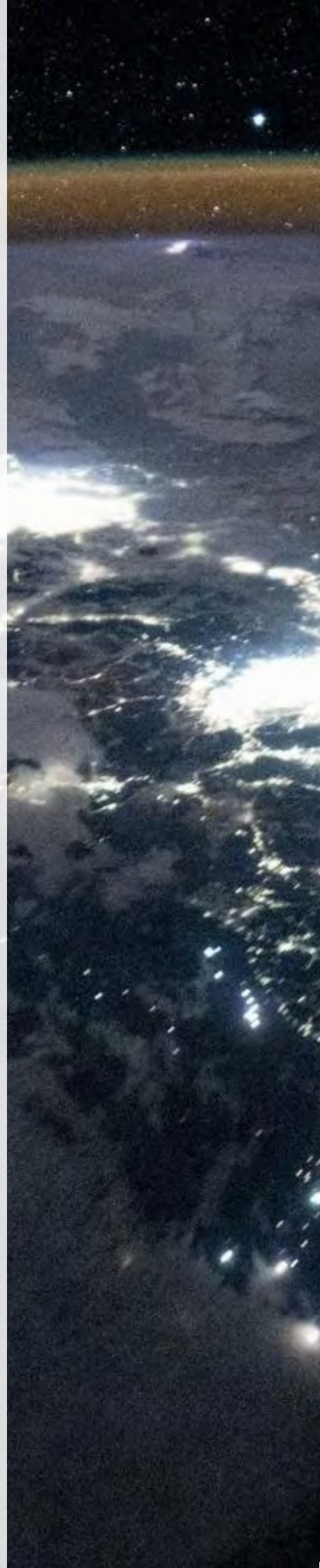
Minister of State for Space Policy *ONODA Kimi*

Award-Winning Cases

in the Seventh Space Development
and Utilization Award

Table of Contents

■ What is the Space Development and Utilization Award?	3
■ Eligibility	4
■ Types of Award	5
■ Selection Method	6
■ List of Award Recipients	7
■ Award-Winning Cases	
• Prime Minister's Award	9
• Minister of State for Space Policy Award	10
• Minister for Internal Affairs and Communications Award	11
• Minister for Foreign Affairs Award	12
• Minister of Education, Culture, Sports, Science and Technology Award	13
• Minister of Agriculture, Forestry and Fisheries Award	14
• Minister of Economy, Trade and Industry Award	15
• Minister of Land, Infrastructure and Transport Award	16
• Minister of the Environment Award	17
• Minister of Defense Award	18
• Japan Aerospace Exploration Agency President's Award	19
• Selection Committee Special Award	20
• Selection Committee Special Award	21
• Selection Committee Special Award	22
• Regional Special Award	23
• Regional Special Award	24





What is the Space Development and Utilization Award?

The purpose of this award system is to recognize outstanding success cases that have made significant contributions to the advancement of space development and utilization, and thereby contribute to furthering progress in Japan's endeavors in these areas and to fostering public awareness and understanding regarding them.

Eligibility

- 1 Individuals or organizations that are related to space, have provided space-related products and services, and have achieved results in terms of expanding the utilization of space
- 2 Individuals or organizations that are related to space, and have devised original space utilization methods, etc. that can be expected to contribute to future expansion of space utilization
- 3 Individuals or organizations that are in small and medium-sized companies, universities, etc., are related to space, have outstanding technologies, and are contributing to the development of Japan's space industry
- 4 Individuals or organizations that are related to space, engage in outstanding research and development or knowledge creation, and are contributing to space development and utilization
- 5 Individuals or organizations that are related to space, and are contributing to space development and utilization in areas such as education, public relations, and regional urban development
- 6 Individuals or organizations that are related to space, and are contributing to space development and utilization in areas that will lead, for example, to improving the safety and security of citizens or to solving social issues, such as space security, disaster prevention and mitigation, national resilience, and global issues

Types of Award

- 1 Prime Minister's Award**
Cases recognized as having achieved exceptionally outstanding results
- 2 Minister of State for Space Policy Award**
Cases recognized as having achieved particularly outstanding results
- 3 Minister for Internal Affairs and Communications Award**
Cases recognized as having achieved particularly outstanding results in terms of the development of information and communications, regional development, etc.
- 4 Minister for Foreign Affairs Award**
Cases recognized as having achieved particularly outstanding results in terms of maintaining a peaceful and safe international community, developing a favorable international environment, promoting international cooperation, etc.
- 5 Minister of Education, Culture, Sports, Science and Technology Award**
Cases recognized as having achieved particularly outstanding results in terms of the promotion etc. of science and technology and academic activities
- 6 Minister of Agriculture, Forestry and Fisheries Award**
Cases recognized as having achieved particularly outstanding results in terms of promoting space development and utilization in the fields of agriculture, forestry, and fisheries
- 7 Minister of Economy, Trade and Industry Award**
Cases recognized as having achieved particularly outstanding results in terms of promoting the space industry
- 8 Minister of Land, Infrastructure and Transport Award**
Cases recognized as having achieved particularly outstanding results in terms of promoting space development and utilization in the fields of land, infrastructure, and transport
- 9 Minister of the Environment Award**
Cases recognized as having achieved particularly outstanding results in terms of solving environmental issues, such as conserving the global environment, preventing pollution, and protecting the natural environment
- 10 Minister of Defense Award**
Cases recognized as having achieved particularly outstanding results regarding contributing to the safety and security of citizens (including disaster prevention), in terms of promoting space development and utilization in defense fields and in terms of stable use of outer space
- 11 Japan Aerospace Exploration Agency President's Award**
Cases recognized as having achieved outstanding results in terms of technologies for space development and utilization
- 12 Selection Committee Special Award**
Cases recognized as having achieved exceptionally outstanding results
- 13 Regional Special Award** Note: Newly established for this time
Cases that do not fall under Award ① through ⑪, but are recognized as having achieved outstanding results in terms of promoting space development and utilization in the areas of solving local issues, revitalizing local communities, and pursuing appealing urban development

Selection Method

After a preliminary screening by the relevant government ministries and agencies and the Japan Aerospace Exploration Agency, the Award recipients were selected through judgment by a selection committee composed of experts, etc.

Selection Committee

NAKASUKA Shinichi	Professor, Graduate School of Engineering, The University of Tokyo
ENDO Noriko	Professor, Research Institute, Waseda University
ONISHI Takuya	Astronaut, Japan Aerospace Exploration Agency
OGAWA Naoko	Deputy Director, Ippan Shadan Hojin Nippon Keizai Dantai Rengokai KEIDANREN
KURIHARA Mitsue	Chairperson and Representative Director, Value Management Institute, Inc. Senior Executive Fellow, Research Institute of Capital Formation, Development Bank of Japan Inc.
KOTAKE Naohiko	Professor, Graduate School of System Design and Management, Keio University Representative Director, Space Service Innovation Laboratory
KODAMA Shoji	Science Journalist
IDE Shinji	Counselor, Cabinet Secretariat, National Space Policy Secretariat
OGI Shintaro	Director, Space Communications Policy Division, Global Strategy Bureau, Ministry of Internal Affairs and Communications
TAKEUCHI Masayuki	Director, Space and Maritime Security Policy Division, Foreign Policy Bureau, Ministry of Foreign Affairs of Japan
UMEHARA Koji	Director, Space Development and Utilization Division, Research and Development Bureau, Ministry of Education, Culture, Sports, Science and Technology
ABE Naohito	Director, Technology Policy Office, Policy Planning Division, Minister's Secretariat, Ministry of Agriculture, Forestry and Fisheries
TAKAHAMA Wataru	Director, Space Industry Division, Manufacturing Industries Bureau, Ministry of Economy, Trade and Industry
ABE Shinji	Director, Technology Development and Promotion Office, Technology Policy Division, Policy Bureau, Ministry of Land, Infrastructure, Transport and Tourism
NAGAMORI Kazumasa	Director, Climate Change Observation Research Strategy Office, Policy Planning Division, Global Environment Bureau, Ministry of the Environment
NAKANOKA Sogo	Counsellor, Strategic Planning Division, Bureau of Defense Policy, Ministry of Defense
MIHO Kazuyuki	Director, Strategic Planning and Management Department, Japan Aerospace Exploration Agency

List of Award Recipients

Prime Minister's Award

Honda R&D Co., Ltd.

Japan's First Successful Launch and Landing Test of an Experimental Rocket Conducted by a Private Company

**Minister of State
for Space Policy Award**

**Taiki Town, Hokkaido Prefecture
SPACE COTAN Co., Ltd.**

Promoting "Space Town Development" Centered on the Hokkaido Spaceport

**Minister for Internal Affairs
and Communications
Award**

JDRS Project Team, Japan Aerospace Exploration Agency

A Practical-Level Optical Data Relay Satellite System Using High-Speed Optical Inter-Satellite Communications

**Minister for Foreign
Affairs Award**

SpaceData Inc.

International Rollout of a Digital Twin for Disaster Prevention Combining Satellites and AI in Collaboration with the United Nations and British Commonwealth of Nations

**Minister of Education,
Culture, Sports, Science
and Technology Award**

Production Team for the Special Exhibition "Deep Space"

Holding the Special Exhibition "Deep Space -To the Moon and Beyond-"

**Minister of Agriculture,
Forestry and Fisheries
Award**

LAND INSIGHT Co., Ltd.

Development of "Hojo DX," a Digital Transformation Service for On-Site Agricultural Policy Surveys, Created in Collaboration with Minami-Soma City

**Minister of Economy,
Trade and Industry Award**

**TADANO Kensuke and ODE Daisuke,
Aerospace Industry Collaboration Agency (AICA)**

From disaster-affected areas to space:
a space industry cluster model from Fukushima through public-private partnership

**Minister of Land,
Infrastructure and
Transport Award**

**YAMAMOTO Masashi,
Uemura Construction Co., Ltd.**

A space utilization model for remote construction and educational support using satellite communications

List of Award Recipients

Minister of the Environment
Award

Archeda, Inc.

Provision of MRV solutions for nature-based carbon credits

Minister of Defense
Award

Astroscale Japan Inc.

Inspection mission of an actual piece of space debris by "ADRAS-J" satellite

Japan Aerospace
Exploration Agency
President's Award

**ArkEdge Space Inc.
The University of Tokyo, Nakasuka, Funase, and Ikari Laboratory
Seiren Co., Ltd.**

DX of space systems through the establishment of a mass-production model of multipurpose 6U nanosatellites

Selection Committee
Special Award

Transformable Lunar Robot Team (SORA-Q)

Development and technical demonstration of Japan's first and world's smallest lunar robot, SORA-Q

MINAMIDE Masashi, The University of Tokyo

A New Frontier in Tropical Cyclone Prediction: All-Sky Data Assimilation of Geostationary Satellite Observations

**YAGIHASHI Hiroyuki, OGAWA Muneaki, and OUCHI Natsuko,
SKY Perfect JSAT Corporation**

World's first cross-border demonstration of 5G satellite communications toward the convergence of terrestrial and space communications

Regional Special Award

NPO Enjin Space Engineering Team (e-SET)

Regional manufacturing SMEs supporting small SAR satellite technology

ERA Katsuji, Yamaguchi Broadcasting Co., Ltd.

Development of a disaster-response FM radio broadcasting system utilizing disaster and crisis management alerts

Japan's First Successful Launch and Landing Test of an Experimental Rocket Conducted by a Private Company

Honda R&D Co., Ltd.

Overview of the case

In June 2025, the company used a reusable experimental rocket developed in-house to successfully conduct Japan's first-ever launch and landing test to reach an altitude of 300 m. The purpose of this test was to demonstrate elemental technologies necessary for rocket reuse, such as vehicle stability during ascent and descent and landing functions. The company successfully achieved the target operations for the launch and landing behavior of the rocket (altitude reached: 271.4 m; deviation from landing target: 37 cm; flight time: 56.6 seconds) and acquired data during ascent and descent.

Key points regarding receiving the award (Comments from the selection committee)

A successful test of a reusable rocket is a major achievement on a global scale, and can be expected to contribute significantly to expanding Japan's space transportation capabilities, ensuring Japan's independence in access to space, and strengthening its international competitiveness. Moreover, it is of tremendous significance for industrialization.

This case was highly commendable for successfully demonstrating launch and landing behavior and acquiring data during ascent and descent, and for demonstrating the elemental technologies for a sustainable space transport vehicle using a reusable rocket and renewable fuel.



Honda experimental sustainable rocket for launch and landing test

Specific results, etc.

1. Contributing to the creation of new fields in space development and utilization

This marks Japan's first successful launch and landing test of an experimental rocket conducted by a private company. Through this experiment, we acquired fundamental technologies for building systems that enable the reuse of vehicles and the application of renewable fuel as a propulsion source. And we have taken a step towards realizing a space transport vehicle that will play an active role in a future sustainable society.

This represents the first breakthrough in a major challenge toward expanding Japan's space transportation capabilities with guaranteed sustainability, and toward contributing to the creation and expansion of satellite utilization services originating from Japan.

2. Contributing to the expansion of the space development and utilization market

The expansion of Japan's sustainable space transportation capabilities resulting from this research and development can be expected to be highly competitive in the growing market for launching satellites into low Earth orbit, and to gain a market share accordingly. Regarding the system demonstrated in this experiment, which enables the application of reusable vehicle technology and renewable fuels as propulsion sources, overseas media and social media also had many expectant comments declaring Honda's successful challenge to be "an important step toward the sustainability of space technologies." This test has brought with it the potential to contribute to the global environment as a sustainable technology.

3. Contributing to the advancement of the economy and society

In today's society, huge amounts of data are being utilized, and the advancement of data utilization technology is accelerating day by day. On the other hand, while efforts to increase the proportion of sustainable energy in terms of supply are progressing, there is no clear prospect of a sustainable energy supply that can keep pace with the accelerating growth of data usage. This is making it increasingly difficult to balance the advancement of society through data technologies centered on AI, etc. with the achievement of a sustainable society. Against this background, utilization of data systems in space through the expanded use of satellites is anticipated, and demand for convenient rockets to

launch these satellites is expected to increase accordingly.

The sustainable rocket system demonstrated in this test, which enables the application of reusable vehicle technology and renewable fuels as propulsion sources, has the potential to contribute to addressing the above societal issues.

4. Contributing to technologies

There are only a few companies taking on the challenge of research and development toward sustainable rockets that are reusable and can use renewable fuels (biomethane / green methane), and Honda R&D Co., Ltd. is one of them. The system demonstrated in this experiment, which enables the reuse of vehicles and application of renewable fuels as propulsion sources, represents a crucial step toward achieving space transport vehicles capable of contributing to a sustainable future society. Furthermore, in this initiative, we developed an experimental vehicle that incorporated "essential functions required for reusable rockets," including a turbopump, engine gimbal, movable legs, and movable wings. Moreover, we developed those major technologies entirely in-house, and acquired the technical capabilities to design, prototype, and assemble them. As a mobility company that has developed a variety of products, primarily automobiles, we possess core technologies such as control and combustion. We leveraged these core technologies to advance this research. This method and approach to technological development is expected to continue contributing to research and development in space-related fields.

5. Contributing to the enhancement of citizens' understanding and to human resource development

This initiative demonstrated the potential for achieving an approach to promoting new development for Japan's manufacturing industry—which has grown through manufacturing—by developing personnel capable of taking technical capabilities cultivated in the automotive and motorcycle industries and applying them to new fields. The expansion of Japan's strengths in advanced manufacturing into new industries and the acquisition and development of talented human resources will be crucial points for maintaining international competitiveness, and the achievement of this approach can be expected to have significant value for the nation. Also, the success of this test was widely covered by various media outlets, through which it brought surprise, joy, and hope to people of all ages, from children to adults.



Promoting “Space Town Development” Centered on the Hokkaido Spaceport

Taiki Town, Hokkaido Prefecture / SPACE COTAN Co., Ltd.

Overview of the case

Over the 40 years since it was selected as a candidate site for the Hokkaido Aero-Space Industrial Base Project, Taiki Town, Hokkaido Prefecture has been leveraging its geographical advantages to work on “space town development.” Initially, the town’s focus was on attracting government experimental sites. However, after the enactment of the Basic Space Act accelerated private-sector participation in the space industry, the town itself began developing rocket launch sites that would be open to private-sector use. This is promoting sustainable town development with space at the core, and the town is taking on the challenge of creating a “space version of Silicon Valley” centered on Hokkaido Spaceport (HOSPO), and of establishing a space base that will be open to the whole world.



Key points regarding receiving the award (Comments from the selection committee)

For many years, the local community, companies, and other players have been working together on “space town development,” actively pursuing diverse activities such as developing and launching from rocket launch sites, capturing overseas demand, working toward international standardization of commercial spaceports, and fostering human resources. These contributions to promoting space development and utilization, economic and social development, and technological advancement are highly commendable. In the future, this town can be expected to develop into one of Japan’s leading private-sector rocket launch sites and spaceports.

Specific results, etc.

1. Contributing to the creation of new fields in space development and utilization

Taiki Town is making full use of its long years of experience in “space town development” and its unparalleled geographical advantages (including open ocean to the east and south, vast plains, and stable weather conditions) to push forward with the development of rocket launch sites that will be open to the private sector, and the LC1 launch site that is currently under development is due to be completed in FY 2026. In addition, SPACE COTAN was selected for the Space Strategy Fund’s Phase 1 in January 2025, and development of fundamental technologies has begun toward achieving a next-generation launch site capable of launching multiple types of rockets at a high frequency. This is expected to enable unprecedented flexibility and efficiency in terms of the launch site’s operations. These initiatives are pioneering challenges that will support the business development of rocket development companies and in addition, promote the integration of related industries and the establishment of supply chains, and drive the growth of Japan’s space industry as a whole.

2. Contributing to the expansion of the space development and utilization market

Based on the concept of being a “broadly open launch site,” HOSPO actively invites rocket launches and experiments not only from domestic companies but from overseas ones as well. At HOSPO’s runway, a diverse range of experiments are conducted throughout the year, including ones involving unmanned aerial vehicles. Also, demand for HOSPO is increasing year by year. For example, the number of users and estimated economic impact had reached approximately 3.4 times their 2019 levels by 2024. In July 2025, the Taiwan-based JSPACE launched a suborbital rocket from HOSPO, achieving Japan’s first-ever rocket launch funded by foreign capital. HOSPO has also commenced discussions with multiple domestic and international operators regarding launches, and will continue to play a role as a place for contributing to the expansion of Japan’s space development and utilization market. Furthermore, the next-door JAXA Taiki Aerospace Research Field is home to scientific balloon experiments and a diverse range of other research and development activities, so Taiki Town has become a crucial region that underpins Japan’s aerospace research and development infrastructure.

3. Contributing to the advancement of the economy and society

HOSPO is being utilized as an aerospace-related research and development field for a diverse range of experiments, and is being used by companies, universities, and various other entities as a site for researching and developing new technologies that will contribute to future advancements in terms of industry, society, daily life, and administration. In addition, Taiki Town and SPACE COTAN have held the “Hokkaido Space Summit” every year since 2021, doing so jointly with other relevant organizations. This event serves as a platform

where people involved in space affairs, related companies, and research institutions from Japan and overseas come together to contribute to regional economic revitalization, industrial promotion, and network formation. HOSPO is not just a research and development base, but is also playing an important role in regional development and the formation of a space industry ecosystem.

4. Contributing to technologies

Taiki Town is supporting the promotion of research and development activities in Japan by developing facilities that serve as infrastructures for research and development and providing them to companies, universities, and various other research and development institutions. In addition, SPACE COTAN is working on research and development through the Space Strategy Fund project, and in collaboration with Taiki Town, it signed a memorandum of understanding in October 2024 with eight commercial spaceports across five continents (including HOSPO) regarding international cooperation on commercial spaceports, and commenced discussions toward establishing international standards for commercial spaceports. Consequently, there are high expectations that the technologies developed will provide the bedrock for formulating domestic and international standards and specifications. In addition to providing a common infrastructure necessary for space development by private companies, etc., HOSPO’s initiatives will also contribute to enhancing Japan’s technological competitiveness in the space field and to the formulation of international standards and specifications.

5. Contributing to the enhancement of citizens’ understanding and to human resource development

Taiki Town holds special classes taught by researchers at each school every year, and is also developing an environment where children can engage with space on their own. In addition, under a cooperation agreement with JAXA, the town is carrying out educational activities through JAXA, and since 2016, it has been holding “Aerospace School,” an event where high school students from all over Japan learn about space in earnest. Furthermore, Taiki Town and SPACE COTAN are promoting the development of next-generation human resources through problem solving-based learning. For example, they have been conducting an inquiry-based learning program that is set in HOSPO since 2023, and some 700 high school students have taken part in it to date. HOSPO’s runway is lent to students free of charge and provides an environment where university students, etc. can take on research and development challenges within limited budgets. Taiki Town has been keeping these initiatives going for a long time, and has steadily achieved results not only in terms of educational activities utilizing space, but also in terms of developing the next generation of human resources.

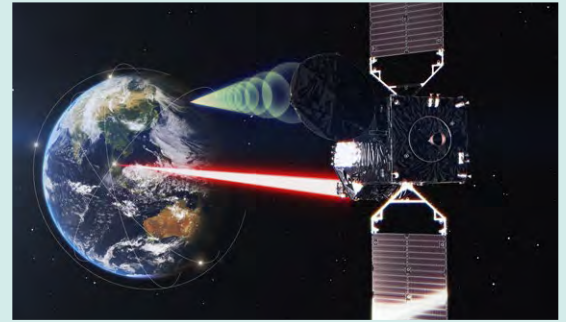


A Practical-Level Optical Data Relay Satellite System Using High-Speed Optical Inter-Satellite Communications

JDRS Project Team, Japan Aerospace Exploration Agency

Overview of the case

The recipients of this award developed an optical data relay satellite system and successfully demonstrated data relay, including optical inter-satellite communications between geostationary orbit (GEO) and low Earth orbit (LEO). The system uses a newly developed, world's-fastest optical inter-satellite communications technology that enables high-volume data transmission from Earth observation satellites and highly responsive command operations for disaster observation. Currently, it is making contributions as part of the space communications infrastructure. For example, it is being used to regularly transmit high-resolution SAR observation data from the "DAICHI-4" satellite. Gbps-class optical inter-satellite communications technology—a key technology for which there is fierce competition worldwide—has been achieved for the long-distances between GEO and LEO with a communication quality suitable for practical use.



Optical data relay satellite
(Conceptual illustration of an in-orbit satellite)

Key points regarding receiving the award (Comments from the selection committee)

Successfully developing the world's fastest optical inter-satellite communications technology for the long distances between GEO and LEO satellites with a communication quality suitable for practical use is a highly commendable achievement.

It is highly commendable that the system enables high-volume data transmission from Earth observation satellites and highly responsive command operations for disaster observation, and is currently contributing as a part of the space communications infrastructure by regularly transmitting high-resolution SAR observation data from "DAICHI-4."

Specific results, etc.

1. Contributing to the creation of new fields in space development and utilization

The development of space communications has been a history of gaining new realms within limited frequency ranges. Optical communications can use virtually unlimited bandwidth by using electromagnetic waves with frequencies approximately 10,000 times higher than conventional radio waves. In addition, because the communications interference is significantly lower, communications systems that are resistant to jamming and interception can be achieved. However, achieving them requires a high level of technological prowess. For example, you need to be able to continuously track and point at communications partners with an angular precision of 10 μ rad or less while up in orbit, where temperature fluctuations are severe. The award recipients reliably captured the target satellite over distances of more than 42,000 km between GEO and LEO, established a communications system capable of continuous pointing-at and tracking, and achieved stable high-speed optical communications at a speed of 1.8 Gbps. In addition, by introducing this optical inter-satellite communications technology into a data relay satellite system that uses geostationary satellites as communications bases to significantly extend communications times, they turned it into a complete high-speed data relay system. Consequently, the bottleneck in data transmissions from Earth observation satellites in LEO to the ground has been overcome, and an essential technology for space broadband communications has been acquired.

2. Contributing to the expansion of the space development and utilization market

This system was not just a demonstration, but was also achieved to a level that would enable use as a practical infrastructure. Private businesses are entering the optical space communications business, and knowledge and technologies based on this development are expected to be used.

In addition, high-latitude stations overseas near the Arctic and Antarctic have previously been used to receive observation data from Earth observation satellites, but using data relay satellites will mean that receiving stations can be established within Japan. In recent years, the significant increase in the number of Earth observation satellites has caused major issues in terms of congestion and frequency interference at high-latitude stations. Against this background, two key points can be used to appeal to service users: being able to avoid using overseas institutions' receiving stations and, therefore, avoid these issues as well, and being able to ensure a higher level of security.

Furthermore, optical space communications are expected to develop beyond data relay satellite systems to also play roles in fields such as LEO communications satellite constellations and lunar and Mars exploration.

3. Contributing to the advancement of the economy and society

The high-resolution (3 m to 10 m) and wide-swath (100 km to 200 km) SAR observation data from "DAICHI-4" is expected to play important roles not only in understanding the situation after a disaster, but also in the early detection of abnormalities such as volcanic activity and landslides. In addition to being used as a high-volume communications line for transmitting daily observation data from "DAICHI-4," the optical data relay satellite system also enables real-time transmissions of imaging

commands and downlinking of observation images. It will therefore be a powerful tool for reducing latency when conducting emergency observation during disasters. In fact, successful demonstrations have been carried out for real-time transmission of observation data for 30 minutes, and for operations that simulate emergency disaster observation. The system, including the ground systems, has achieved an overall operational achievement rate of 97.6% or higher (as of the end of September 2025), which means it has sufficient performance for practical use. Furthermore, optical inter-satellite communications can also be applied to security-related uses and uses where securing frequencies is difficult (such as LEO communications satellite constellations), so they are expected to create new space businesses.

4. Contributing to technologies

Gbps-class high-speed optical inter-satellite communications between GEO and LEO have been achieved—something that only two agencies worldwide (the ESA and NASA) have managed to do. In particular, although Europe has taken the lead, this system offers significant advantages over it. For example, it uses the 1.5 μ m wavelength band—a region that poses high technical difficulties, but is used in terrestrial optical fiber communications, and has characteristics such as possessing outstanding development potential and being eye-safe. Optical inter-satellite communications technology is an essential technology for building high-speed communications infrastructure—something that countries all around the world are making it a priority to acquire. Establishing a practical-level optical inter-satellite communications technology between GEO and LEO poses high technical difficulties, and successfully doing so signifies the acquisition of a key technology that will be essential for future space development and utilization. This achievement features the advantages of optical communications—for example, broad bandwidth, compact and lightweight equipment, interference resistance (including resilience), and outstanding compatibility with a future communications technology, namely, quantum communications. It therefore has the potential to open up new application fields.

5. Contributing to the enhancement of citizens' understanding and to human resource development

In terms of the spread of awareness, reports such as the following have been published in the media:

Nikkei Online Edition, January 24, 2025

NEC and JAXA have successfully transmitted images to the ground via satellite relay

Page 14, morning edition, NIKKAN KOGYO SHIMBUN, January 24, 2025

JAXA and NEC have achieved high-volume, real-time transmission via optical inter-satellite communications

Page 3, morning edition, Dempa Publications, January 27, 2025

NEC and JAXA have transmitted high-volume observational data via the world's fastest inter-satellite optical communications

Nikkei Online Edition, 6:54 p.m., January 23, 2025

NEC and JAXA have achieved high-speed optical communications between satellites, and received images on the ground
(Plus 12 other articles)



International Rollout of a Digital Twin for Disaster Prevention Combining Satellites and AI in Collaboration with the United Nations and British Commonwealth of Nations

SpaceData Inc.

Overview of the case

In collaboration with the United Nations Office for Outer Space Affairs and the British Commonwealth of Nations, an integrated digital twin that combines AI and satellite data and was developed in Japan has been implemented in the pacific-island nation of Tonga, the African nation of Ghana, and the Central and South American nation of Trinidad and Tobago. The system presented the damage caused by disasters such as rises in sea level and floods visually in 3D, and supported the national and local governments' disaster countermeasures. As a technical partner for the joint declaration issued by the United Nations Office for Outer Space Affairs and the British Commonwealth of Nations in June 2025, this initiative has taken on the challenge of collaborating on disaster management and emergency response in countries worldwide and on supporting sustainable development in developing countries, and of presenting a new model for international cooperation that will see Japanese space AI startups working alongside international organizations.



Case of a digital twin for disaster prevention combining satellites and AI rolled out in collaboration with the United Nations and British Commonwealth of Nations

Key points regarding receiving the award (Comments from the selection committee)

The following points are all highly commendable: collaborating with the United Nations to develop an integrated digital twin combining AI and satellite data to simulate flood damage and visualize risks; implementing it in Tonga, Ghana, and Trinidad and Tobago; and also contributing to Japan's international cooperation.

This project clearly focuses on a solution that uses AI to generate 3D city models through space utilization, and is highly commendable for contributing to disaster relief in developing countries.

Specific results, etc.

1. Contributing to the creation of new fields (building national resilience) in space development and utilization

In September 2024, a joint project was launched with the United Nations Office for Outer Space Affairs with the aim of contributing to disaster response support and the utilization of space technology through an integrated digital twin that uses satellite data and AI. Tonga suffered a tsunami disaster in 2022. Working with the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), the company generated a high-precision digital twin of that country, then ran simulations of the impact a flooding disaster will have. This contributed to the development of natural disaster countermeasures and the improvement of opportunities for disaster prevention drills and education. In June 2025, the United Nations Office for Outer Space Affairs and the British Commonwealth of Nations signed a joint declaration to accelerate the utilization of space technology for sustainable development. This joint declaration was prompted by the company's achievements (technical implementation of 3D flood simulation and risk visualization using satellite data and AI) in the British Commonwealth of Nations member states Ghana and Trinidad and Tobago starting in January 2025.

2. Expanding the space development and utilization market and implementing satellite data in society for collaborative development fields

After starting a joint project with the United Nations Office for Outer Space Affairs in September 2024, the company began providing the AI-based digital twin technology to other countries, with a focus on developing ones. In particular, prompted by its provision to Tonga, requests for implementation were received from over 20 countries, including Thailand, Malaysia, the Philippines, Brazil, and Sri Lanka. Based on this track record, in April 2025, the company was entrusted by the Ministry of Land, Infrastructure, Transport and Tourism to conduct a project titled "Research work on building an urban digital twin using satellite data to promote town development DX," which targeted Southeast Asia, etc. In August 2025, it used the Space Strategy Fund to provide flood simulation results for the purpose of raising awareness of flood damage in Thailand. Through these contributions, based on the June 2025 joint declaration by the United Nations Office for Outer Space Affairs and the British Commonwealth of Nations, opportunities for Japan-led initiatives were created such as proposing the use of satellite data as a disaster response support scheme for small-island developing countries vulnerable to climate change and natural disasters, for the 56 member states of the British Commonwealth of Nations, and for other countries as well.

3. Contributing to the advancement of robust national infrastructure across the world

With disasters such as torrential rains, earthquakes, and landslides occurring frequently all

around the world, the ability to quickly and accurately grasp the situation and make decisions under extreme conditions is essential. However, conventional disaster prevention infrastructure had limitations in terms of accurately perceiving the conditions on the ground, as it was difficult to get a three-dimensional grasp of the complex, multilayered structures of buildings, transportation networks, and flows of people. This achievement uses SpaceData Inc.'s patented technologies (notably, AI technology for generating 3D city models from satellite data) to integrate multimodal data into a single system through AI analysis that combines satellite data, GIS, meteorological information, and more. This has enabled high-precision 3D spaces to be generated, something that was difficult to achieve with conventional technologies. Consequently, a variety of disaster conditions can now be reproduced and verified even in normal times, making it possible to grasp in advance the differences in the progression of damage depending on structures, topography, and social dynamics, and to identify bottlenecks in people's evacuations and in industrial networks. This has contributed to the development of a resilient national infrastructure that will comprehensively support not just adapting to climate change and responding to natural disasters, but also maintaining national core infrastructure, establishing immediate response systems for large-scale and complex disasters, and ensuring that social infrastructure continues to function.

4. Contributing to the enhancement of citizens' understanding and to human resource development

The company spread word of the technology widely both domestically and internationally as a cutting-edge project combining space and AI. The case of Tonga was presented at the United Nations Summit of the Future and the United Nations Office for Outer Space Affairs' Space4Water project in September 2024, and at the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space (COPUOS) in February 2025. In addition, the cases of Ghana and Trinidad and Tobago were presented at a side event of the main committee meeting of COPUOS in June 2025, and were posted on the official website and report for "The Ninth Tokyo International Conference on African Development (TICAD 9)" held in Japan in August 2025, and also on the Cabinet Office's official website in September 2025. Information was also presented at the United Nations Office for Outer Space Affairs' Space4Ocean Alliance in June 2025 and at the United Nations Global Service Centre (UNGSC)'s digital twin workshop in November 2025.

In terms of developing next-generation human resources, at TICAD 9 in August 2025, practical knowledge using satellite data was provided through demonstration classes on space education for elementary and junior high school students in Kenya, Rwanda, and Japan, the holding of which was prompted by this achievement. The increased opportunities to use and learn from satellite data contributed to sparking interest in STEM, raising the level of disaster prevention literacy, and expanding the breadth of learning.



The Special Exhibition “Deep Space -To the Moon and Beyond-”

Production Team for the Special Exhibition “Deep Space”

Overview of the case

The special exhibition “Deep Space -To the Moon and Beyond-” was held at the Miraikan - The National Museum of Emerging Science and Innovation from July 12 to September 28, 2025, and at the Toyota City Museum from October 18, 2025 to January 18, 2026. It is one of Japan’s largest-ever space exhibitions where visitors can experience humankind’s new challenges in space. In collaboration with space research institutions and companies such as JAXA, the National Astronomical Observatory of Japan, and The University of Tokyo, the event presented the current state of Japan’s space industry all in one place. The exhibition featured a full-scale model of the world’s first “crewed pressurized rover,” the actual “Soyuz spacecraft” that came back from space, and genuine samples from the asteroids Itokawa and Ryugu. In all, it attracted some 220,000 visitors. A survey of visitors at the Tokyo venue revealed a satisfaction rate of 96.7%, with people in their teens and twenties accounting for 48% of respondents. This showed that the event made a significant contribution to promoting understanding of space development and human resource development among the younger generation.



Crewed pressurized rover (Full-scale model)

Key points regarding receiving the award (Comments from the selection committee)

Featuring various spacecraft, rockets, and more (including a full-scale model of a crewed pressurized rover), the event provided a high level of experiential value. This exhibition received high praise from large numbers of visitors, and can be highly commended for widely giving something back from and publicizing the achievements of space development by industry, academia, and government, and for contributing to the promotion of science and technology.

It is highly commendable for sparking interest in deep space among large numbers of people, and conveying scientific information widely.

Specific results, etc.

1. Contributing to the creation of new fields in space development and utilization

Through collaboration with JAXA and other relevant organizations, the exhibition produced and publicly displayed the world’s first full-scale model of the “crewed pressurized rover,” a crewed lunar surface rover currently under development in Japan. In addition to ordinary visitors, many researchers and engineers from Japan and overseas came to see the event, making it a place that connected research and society. Furthermore, a full-scale model of an “H3 Launch Vehicle” fairing was created, giving visitors an opportunity to experience its actual size. In addition, a model of the “Lunar Dielectric Analyzer (LDA)” was created through collaboration with The University of Tokyo, and together with display panels featuring currently serving astronauts and exhibition videos, the forefront of the “Artemis program” was conveyed. The exhibition featured an actual “Soyuz spacecraft” that had come back from space and “real rocket parts that visitors could touch with their own hands.” The hands-on experiences that gave visitors a “real sense of space” were a huge hit.

Private-sector space development was also presented by adding exhibitions from private companies, through collaboration with the SPACETIDE Foundation and the Space Liner Association. This gave the younger generation an opportunity to include space as an option for their own futures. These cross-disciplinary initiatives represented an unprecedented challenge and made a significant contribution to the creation of new fields in space development and utilization.

2. Contributing to the expansion of the space development and utilization market

The exhibition attracted approximately 220,000 visitors, and many of them commented that now they had learned about careers in space, they wanted to include them in their own future career options. In a survey of visitors at the Tokyo venue, people in their teens and twenties accounted for 48% of all respondents. Directly reaching the generation that will lead future space development and exploration is a major achievement. The exhibition presented initiatives in the private-sector space industry, including small satellites, observation services, and rocket development. This gave an easy-to-understand picture of the market’s current state and future outlook. Through social media posts and articles, interest in the space industry spread beyond visitors, and a

social infrastructure was built with a view toward market expansion.

3. Contributing to the advancement of the economy and society

The event was held as a comprehensive exhibition that crossed the boundaries between science, education, and culture. Through models of the currently in-operation Advanced Land Observing Satellite-4 “DAICHI-4” (ALOS-4) and the Quasi-Zenith Satellite System “Michibiki” and panels explaining practical applications in weather forecasting, smartphones, car navigation systems, agriculture, and disaster response, the event gave visitors an opportunity to “feel space close to them” in society and daily life. Numerous media outlets presented space development through the exhibition, contributing to improving space literacy in society as a whole.

4. Contributing to technologies

The full-scale model of the “crewed pressurized rover” was the world’s first-ever public display of the vehicle. In addition to letting visitors really feel Japan’s technical prowess, it created new value for research institutions and engineers as well. In the field of astronomy, the achievements and latest missions of the “Subaru Telescope,” the “ALMA telescope,” the X-Ray Imaging and Spectroscopy Mission “XRISM,” and more were presented. The exhibition video “Mars Tour” used the latest data to clearly explain Mars’s unique environment and Jezero crater through video and audio. These initiatives are of enormous significance in that they have demonstrated ways to “give society something back from research achievements” through exhibitions and the media, and have thereby widely raised awareness of the social value of technology.

5. Contributing to the enhancement of citizens’ understanding and to human resource development

All the explanatory panels included furigana (phonetic Japanese characters) and English translations, and an audio guide and quiz panels for children were provided to ensure that people of all ages would be able to learn as they had fun. Many visitors commented that learning about space had been a moving experience, and that they had gained an understanding of topics related to it. The event presented space as a field that is accessible to all, providing strong support both for developing the next generation of human resources and for furthering understanding.



Development of "Hojo DX," a digital transformation support service for agricultural field surveys in collaboration with Minamisoma City

LAND INSIGHT

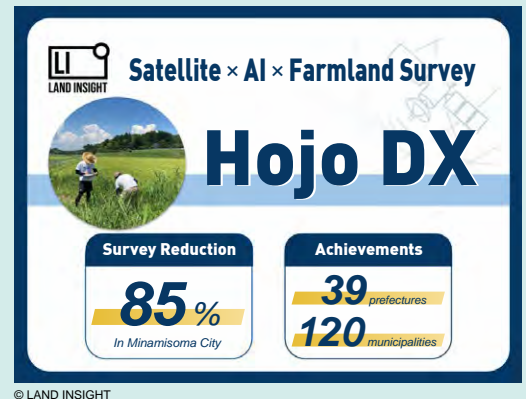
Case Overview

We co-developed "Hojo DX," a service that utilizes satellite data and AI technologies to address the long-standing burden of crop planting verification on farmland (visual inspection requirements) such as aging workforce, labor shortages, and heatstroke risks, faced by Minamisoma City in Fukushima Prefecture. As a result, the city achieved the remarkable outcome by reducing the number of personnel required for on-site verification work by approximately 85% (FY2025 results). Building on this success, the service has expanded to initiatives (demonstrations and implementation) in 120 municipalities across 39 prefectures nationwide. This is an example of the social implementation of space utilization as a standard model for administrative DX that contributes to solving urgent issues facing local governments.

Key points regarding receiving the award (Comments from the selection committee)

By utilizing satellite data and AI to automatically and accurately identify crop planting conditions on farmland, the initiative improves the efficiency of on-site verification work and significantly reduces the burden on administrative staff. Beginning with its introduction in Minamisoma City, Fukushima Prefecture, the service has expanded to 120 municipalities across 39 prefectures nationwide, demonstrating substantial achievements. This aspect is highly commendable.

Its high technological level and contribution to improving administrative efficiency are highly regarded nationwide, including a 60% reduction in personnel required for on-site verification work (Minamisoma City, FY2024 results).



© LAND INSIGHT

Concrete Results

1. Contribution to creating new areas for space development and utilization

This initiative is a new challenge that utilizes satellites to address urgent issues faced by Japan's agricultural administration and local communities. Due to the declining and aging population, securing survey personnel has become difficult. In addition, "on-site visual inspections" under extreme heat have been common practice, posing safety risks to survey staff engaged in farmland verification. We approached this issue from space in collaboration with Minamisoma City and co-created a service that replaces on-site surveys with satellite data and AI analysis. This initiative ensures the safety of survey staff while dramatically improving operational efficiency, opening up a new area of space utilization in agricultural administration. The innovation in this case goes beyond simply introducing new technology. Following the Ministry of Agriculture, Forestry and Fisheries' policy revision allowing the use of satellite data, Minamisoma City became one of the first local governments to implement this approach and served as a pioneering case of analogue regulation reform led by the Digital Agency. The Minamisoma Model, which achieved both technological development and regulatory reform, has the potential to significantly transform the future of local administration as a co-creation GovTech model that uses space to address regional issues and drive national regulatory reform.

2. Contribution to expanding the space development and utilization market

Our "Hojo DX" service has created a new frontier of space utilization, the "GovTech market," and driving its expansion. Starting with co-creation with Minamisoma City in Fukushima Prefecture, implementation and demonstrations have rapidly expanded to more than 120 municipalities across 39 prefectures nationwide. Supported by national regulatory reforms, both the number of contracts and sales are increasing.

According to estimates by the Digital Agency, the cost of on-site surveys related to farmland management amounts to approximately JPY 82 billion annually nationwide. In response to this large potential market, we provide satellite solutions that reduce personnel and operational costs, and we expect to secure a significant market share in the future. Furthermore, this successful model of municipal DX can be applied beyond Japan to infrastructure inspection and disaster prevention fields overseas facing similar challenges, such as labor shortages. It has great potential to contribute to solving administrative challenges on a global scale.

3. Contribution to the advancement of the economy and society

"Hojo DX" is a prime example of how space utilization can fundamentally transform public administration and contribute to solving social issues.

It goes beyond merely addressing immediate challenges, such as heatstroke risks and labor shortages. The essential contribution of this initiative lies in freeing administrative staff from demanding on-site surveys and reallocating the human resources created to higher value-added tasks. For instance, it enables staff to focus on strategic work that previously received limited attention, such as planning agricultural promotion policies and providing management guidance to farmers.

In other words, space utilization is not simply a tool for efficiency; it enables administrative work to

advance from "maintenance" to "development." This is essential to realizing sustainable agriculture and local communities in Japan.

4. Contribution to technology

"Hojo DX" combines advanced AI technology with the capability to implement solutions in society to meet the strict requirements of administrative operations, opening up new horizons for space utilization technologies.

1. Development of a high-precision AI model capable of supporting administrative work

To capture crop growth cycles, over 100 features are extracted from multiple satellite images taken at different times, achieving a high accuracy of over 95% for the major crops of rice, wheat, and soybeans. In addition, from FY2025, analysis of vegetables such as broccoli has also been implemented in Minamisoma City.

2. Technical reliability enabling national regulatory reform

This high level of accuracy and operational stability led Minamisoma City to carry out a fundamental review of its on-site verification work and encouraged the national government to promote the use of satellites as a best practice for improving its efficiency. This case demonstrates that space technology can become a standard solution for local administration.

3. Contribution to knowledge accumulation for the future

Nationwide expansion will lead to the accumulation of knowledge and data on space utilization in administrative fields, including agricultural policy. It will accelerate further improvements in AI model accuracy and the development of diverse applications, such as wide-area surveys of farmland and agricultural production and disaster countermeasures, thereby making a significant contribution to the development of space utilization in Japan.

5. Contribution to promoting public understanding and human resource development

This initiative has broadly demonstrated the social value of space development and utilization from three perspectives: (1) promoting public understanding, (2) contributing to regional revitalization, and (3) nurturing the next generation of human resources.

1. Presenting a case of social implementation of space utilization

This case, in which regional issues were addressed using space technology, was widely reported through channels such as Digital Agency news and conveyed to the public the understanding that space supports everyday life.

2. A model case of regional revitalization through space business

The relocation of the company's headquarters to Minamisoma City is a pioneering example of a space company becoming rooted in a local community, creating employment, and contributing to community development.

3. Investment in the next generation

Through lectures at agricultural schools, practical knowledge on the use of satellite data is shared with future agricultural professionals. This directly contributes to developing the human resources who will support the future of agriculture and to sustainable regional communities and agriculture.



From disaster-affected areas to space: a space industry cluster model from Fukushima through public-private partnership

TADANO Kensuke and ODE Daisuke, Aerospace Industry Collaboration Agency (AICA)

Case Overview

This case is based on the "Fukushima Space Conference" and established a public-private partnership model linking post-disaster recovery with the promotion of the space industry. The conference was held offline and limited to in-person participation. Many people involved in the space industry visited the city, which was forced to evacuate due to the tsunami damage and nuclear accident caused by the Great East Japan Earthquake. Seeing the vast coastal land damaged by the tsunami firsthand, they recognized the potential of the space sector to create new industries and contribute to regional recovery. Further discussions on concrete measures led to the acceptance of demonstration projects and the establishment of R&D bases and factories.



Residents looking up at the sky in a tsunami-affected area

Key points regarding receiving the award (Comments from the selection committee)

As part of post-disaster recovery, this initiative has created new flows of people and opportunities for industrial creation, which is highly commendable.

By forming a community that brings together industry, academia, government, and the private sector, it promotes both recovery in disaster-affected areas and the development of the space industry. As a result, eight space startups have established bases in the area, attracting private investment and conducting rocket launch demonstrations. These achievements in building a space development hub are highly commendable.

Concrete Results

1. Contribution to creating new areas for space development and utilization

The vast land designated as a disaster hazard area, where housing reconstruction was restricted following the Great East Japan Earthquake, was linked to the space industry's challenge of "a shortage of demonstration sites." By reframing it as "an optimal location for rocket launches," this initiative enabled the early realization of suborbital demonstrations, contributing to regional recovery. In addition, a community sharing the same vision was established to turn this idea into reality. The "Fukushima Space Conference" was intentionally limited to in-person participation, fostering strong trust between the public and private sectors and functioning as a foundation for collaboration. Discussions at the conference on challenges facing Japan's space industry led to cooperation among government, research institutions, companies, and local residents, resulting in approximately JPY 10 billion in new private investment.

2. Contribution to expanding the space development and utilization market

Eight space startups and four new space-related R&D bases have been established in Fukushima and factory construction for mass production underway. Furthermore, in 2025, Mitsubishi Logistics began full-scale operations of "MLCSPACELAB," Japan's largest space-focused incubation facility, further accelerating the industry cluster.

The location of the space industry is also having ripple effects on the regional economy. Through relationships built at the conference, a new supply chain for space-related parts procurement has been established with approximately 30 local companies in Fukushima. Interest in the disaster-affected coastal region is increasing both domestically and internationally, including visits by companies from Japan and overseas.

3. Contribution to the advancement of the economy and society

The "Fukushima Space Conference" has grown into a major event, attracting more than 400 participants from across Japan to Odaka Ward in Minamisoma City, a community of 3,800 residents.

Rocket Launch Demonstration Project: Through its acceptance, the project generated a total of 440 overnight stays in the disaster-affected area, bringing significant economic benefits to the local community. It also demonstrated the potential of the area as a suitable launch site facing the Pacific Ocean.

Satellite Data Utilization: It demonstrated that satellite data can reduce the burden of crop conversion verification on farmland. This also led to the relaxation of visual inspection requirements and became a case of reviewing analogue regulations.

Incubation Facility Location: The largest facility in Japan specializing in the space industry has been established and incorporated into the blueprint for industrial development under the Fukushima Innovation Coast Framework, a guideline for post-disaster recovery. The initiative is also expanding into broader industry clustering across the Tohoku region through collaboration with Noshiro City and Kakuda City, where JAXA's demonstration bases are located.

4. Contribution to technology

In the transportation sector, securing sites for demonstrations and factories has been an urgent issue, traditionally handled by operators themselves through negotiations with landowners. Demonstrations also required coordination with government agencies and private organizations for as many as 30 procedures. By supporting much of this burden at the regional level, space companies are now able to focus on research and development, improving the efficiency of R&D and demonstrations. This public-private framework for addressing issues and the administrative support system have been highly regarded by space startups, which note that "administrative decision-making proceeds at the same speed as venture companies." The rocket launch demonstration was realized in just 11 months after its possibility was suggested at the first conference.

5. Contribution to promoting public understanding and human resource development

The "Fukushima Space Conference" has generated strong demand for study visits and training sessions. To deepen understanding of the background behind why vast land areas emerged along the coast, activities in which disaster survivors themselves guide visitors are also emphasized. At the conference, local residents with different perspectives also participated as speakers, sharing challenges in implementing science and technology in society and discussing engagement with local communities.

During rocket launch demonstrations, local high school students observe the assembly process and participate in follow-up outreach classes. At local childcare centers, children who once built trains and robots with blocks now build and launch rockets, growing up in a world where rockets are a normal part of life.



A space utilization model for remote construction and educational support using satellite communications

YAMAMOTO Masashi, Uemura Construction Co., Ltd.

Case Overview

We retrofitted a remote operation system to a 3DMC backhoe (a hydraulic excavator that supports work through 3D control), enabling high-precision construction from anywhere in Japan using mobile networks and a commercially available game controller. We also developed a mobile office vehicle equipped with a commercial satellite communication service, which can be used for road clearance and unmanned construction during disasters. At our demonstration site (UNICONFIELD), we have accepted more than 300 students and other participants, also contributing to education. This is an innovative model that applies space communication technologies to social infrastructure and contributes to addressing labor shortages and strengthening regional disaster prevention.

Achieving high-precision remote construction through the integration of 3DMC, remote technology, satellite communications, and Wi-Fi



Integration of 3DMC backhoe, remote operation technology, and satellite communication technology ©UNICON

Key points regarding receiving the award (Comments from the selection committee)

By integrating high-precision remote construction technology, enabled by retrofitting a backhoe with a remote operation system for operation from anywhere in Japan, with a mobile office vehicle equipped with satellite communications, the initiative is expected to make a major contribution to disaster-site construction, where communications are difficult to secure and conditions are hazardous.

It is also highly evaluated for its active commitment to human resource development through training for students and young engineers and by providing opportunities to experience new ways of working using space communications.

It is further highly regarded for utilizing commercial satellite communication services and commercially available game controllers, while also promoting human resource development by widely introducing these technologies to students and others.

Concrete Results

1. Contribution to creating new areas for space development and utilization

By integrating a 3DMC backhoe, remote control technology, satellite communications, and wide-area Wi-Fi, we have achieved high-precision "ultra-remote construction" even in areas without mobile coverage. In 2022, it equipped a mobile office vehicle, in operation since 2017, with a commercial satellite communication service. In May 2023, it introduced a retrofit remote operation system for 3DMC backhoes and secured a communication radius of 300 m using wide-area Wi-Fi antennas. By combining satellite communications and local wireless networks, line constraints were reduced, and a shaping accuracy of ± 2 cm was achieved in test construction. Commercial game controllers were adopted to enable an intuitive and easy-to-learn operating system. In 2023, it opened its demonstration field, "UNICONFIELD," and accepted 120 visitors in FY2023, 210 in FY2024, and more than 300 in FY2025. It also signed a comprehensive emergency response agreement with Shintotsukawa Town, Hokkaido, establishing an initial response system using satellite communications.

2. Contribution to expanding the space development and utilization market

A remote construction package using commercial satellite communication services has been proposed since FY2023, expanding market awareness through exhibitions and demonstrations. At the 2024 International Construction and Survey Productivity Improvement Expo (CSPI-EXPO), a public demonstration successfully remotely operated an unmanned construction machine in Hokkaido from Makuhari Messe over a distance of about 900 km. At the 2025 Construction Technology Exhibition, a remote operation trial was conducted from Osaka over approximately 1,150 km, with 110 participants over four days. The initiative also participated in on-site verification by the Ministry of Land, Infrastructure, Transport and Tourism, and demonstrated practical application in FY2025 MLIT construction projects through remote excavation and transport operations. In terms of safety, an excavator proximity alert AI, including automatic web camera control and tracking, was developed in collaboration with a startup, achieving both reduced manpower and risk reduction. These initiatives were featured on television and in construction industry newspapers and led to the Japan Construction Machinery and Construction Association's "Japan Construction Machinery and Construction Grand Prize (Regional Award)" and the FY2025 Infrastructure DX Award Excellence Award (i-Construction / Infrastructure DX Promotion Consortium Member Initiatives Category).

3. Contribution to the advancement of the economy and society

The initiative presents a model that socially implements space communications and contributes to improving the sustainability of construction production in regional areas facing labor shortages and aging populations. Stable communications in areas without mobile coverage make it possible to choose "construction methods that keep people away" from hazardous locations and disaster sites, contributing to faster initial response and improved safety. Through disaster drills under municipal agreements, operational procedures assuming secured communications, including satellite communications, were made concrete. From FY2026, discussions with local governments will begin on using communication technologies for bird flu response, with the aim of future unmanned operations.

4. Contribution to technology

Previously, remote control operation required dedicated lines to ensure stable video transmission, resulting in high costs, while communication quality could not be secured in areas without mobile coverage, making operation difficult. Dedicated controllers for heavy machinery are expensive, and required time to master. This technology combines commercial satellite communication services and wide-area Wi-Fi, simplifying communications on-site. The use of commercial game controllers reduced operating system costs, and integration with 3DMC backhoes demonstrated high-precision remote construction (± 2 cm). It demonstrated the "scalability of a low-cost, high-precision solution that can also operate in areas without mobile coverage" and be adopted by regional construction companies.

5. Contribution to promoting public understanding and human resource development

Through tours and training at UNICONFIELD, six-month internships, and collaboration with universities, satellite communications and remote construction were translated into learning and hands-on experience. At the annual disaster prevention experience event, construction disaster prevention technologies using satellite communications were introduced to over 300 elementary, junior high, and high school students, promoting understanding through hands-on experience in "operating construction machinery with a game controller." A study tour was also held for 27 parents and children affected by the Noto Peninsula earthquake, raising awareness of the technology as one directly connected to social issues. In addition, participation in the Transport Digital Business Council (TDBC) and the e-Construction Machinery® Challenge is promoting solutions to industry challenges and broadening the human resource base. Going forward, the plan is to promote disaster response package projects through collaboration between multiple regions and accelerate the social implementation of space communications.



Provision of MRV solutions for nature-based carbon credits

Archeda, Inc.

Case Overview

Archeda develops MRV (Measurement, Reporting, and Verification) solutions for nature-based carbon credits (including ARR, REDD+, and AWD), using satellite data and AI analysis for forests, farmland, and mangroves. By providing end-to-end support from identifying suitable project sites to the analyses required for PDD (Project Design Document) preparation and monitoring, Archeda reduces the burden on carbon project developers from conventional field surveys and manual processes. This contributes to greater efficiency in the carbon credit creation process and improved transparency and reliability of credits.



Key points regarding receiving the award (Comments from the selection committee)

Archeda developed an MRV platform using satellite data and provided end-to-end support from data provision to analysis, thereby simplifying and streamlining the credit creation process. It is highly commendable that this has enabled more carbon project developers to leverage satellite data and issue high-integrity credits with greater transparency and reliability.

This initiative expands the use of satellites beyond greenhouse gas monitoring and climate change analysis into the field of carbon credits as financial and social infrastructure, and is also significant from the perspective of environmental administration.

Concrete Results

1. Contribution to creating new areas for space development and utilization

With the expansion of the carbon credit market, there is growing demand for reliable credit creation. However, conventional methods face limits in terms of labor and cost, and satellite data has also been difficult for carbon project developers to use due to its technical complexity. This initiative aims to simplify and streamline the credit creation process by developing an MRV solution that utilizes satellite data and providing end-to-end support from data provision to analysis. This will enable more developers to use satellite data and issue credits with greater transparency and reliability. The initiative expands the use of satellite data into the new field of carbon credits as financial and social infrastructure, representing a challenge that significantly enhances the economic value of satellite data.

Archeda aims to support the creation of 25 projects by FY2027 and 240 by FY2030 (2% global market share), contributing to annual CO₂ reductions of approximately 6.7 million tons.

2. Contribution to expanding the space development and utilization market

Outside Japan, Archeda currently supports a total of nine nature-based carbon projects across five Asian countries, including the Philippines, Vietnam, Indonesia, Cambodia, and Laos. The projects span a wide range of types, including ARR (afforestation), REDD+ (forest conservation), AWD (intermittent irrigation), and mangrove restoration. Since its founding, demand for MRV solutions leveraging satellite data has continued to grow, and sales for the current fiscal year are projected to increase by approximately 250% year-on-year for the second consecutive year. Archeda is also advancing collaboration with government agencies and local universities across Asia, strengthening partnerships with local partners through MoU signings. Going forward, Archeda will continue promoting the social implementation of MRV solutions powered by satellite data and contribute to expanding the space development and utilization market by deploying Japan-originated technologies globally.

3. Contribution to the advancement of the economy and society

This initiative utilizes satellite data to contribute to the advancement of the domestic carbon credit market. It aims to address challenges in carbon project development — including project site selection and securing cost efficiency and reliability in monitoring — through MRV solutions powered by satellite data. This makes it possible to provide low-cost, scientifically based monitoring to businesses that have not been able to fully leverage satellite data, contributing to

the growth of a transparent and sound carbon credit market.

Collaboration with local governments and research institutions is already underway — the Kyoto Prefecture ZET-valley project has conducted surveys on forest CO₂ absorption. The initiative has also attracted strong public attention, including coverage in Nikkei GX (July 2025) under the headline "Using Satellites to Observe Forest Ground Surfaces and Improve Credit Calculation Accuracy." Archeda has also been selected for the NEDO SBIR Promotion Program under the Ministry of the Environment's "ClimateTech Using AI" theme and is working to improve REDD+ monitoring accuracy. Furthermore, Archeda has been selected for the Ministry of Economy, Trade and Industry's "Global South Future-Oriented Co-Creation Project Subsidy" and is recognized as a ClimateTech initiative powered by satellite data.

4. Contribution to technology

The MRV solution developed by Archeda is based on monitoring technologies compatible with diverse carbon credit methodologies, including ARR, REDD+, AWD, and blue carbon. This technology analyzes changes in forests, farmland, and other areas using satellite data, AI, and statistical methods, enabling quantitative visualization of baselines, deforestation risk, AGB (above-ground biomass), and paddy field flooding conditions — while improving efficiency, cost-effectiveness, and reliability compared with conventional methods. Demonstrations are currently underway in Southeast Asia, and six patents have already been obtained.

5. Contribution to promoting public understanding and human resource development

Through media coverage and speaking engagements in Japan and overseas, Archeda communicates the environmental and economic value of satellite data, contributing to greater public understanding of carbon credits and sustainable societies.

▼ Presentation Record

Presentations at COP29 and COP30, APRSAF-31, the Japan-ASEAN Symposium, the JAXA 30th Anniversary Symposium on Earth Observation Data Utilization, and many other events.

▼ Awards and Media Coverage

- Awards: the Focus Systems Award at "Ecotech Grand Prix 2023," the Grand Prize at the "Earthkey Pitch Award," and the WeWork Award at the international startup event "RAMEN TECH 2025," and others.
- Major media: Weekly Toyo Keizai's 2024 edition of "Amazing Ventures 100," "Nikkei GX," Shogakukan's "DIME," and Kushiho Shimbun, and others.



Inspection mission of an actual piece of space debris by "ADRAS-J" satellite

Astroscale Japan Inc.

Case Overview

This initiative, conducted as Phase I of the Japan Aerospace Exploration Agency's (JAXA) Commercial Removal of Debris Demonstration (CRD2), demonstrated RPO technology for safely and precisely approaching and inspecting a target object, which is required for on-orbit services that enable debris mitigation and a circular space economy. Targeting an actual piece of debris in orbit, it achieved a world-first success in approaching to 15 m below the debris from long range, fly-around observation, and verification of collision avoidance functions, marking major progress toward realizing on-orbit services and space sustainability.

Key points regarding receiving the award (Comments from the selection committee)

The world-first success of ADRAS-J in close approach to and close-range imaging of debris is highly commendable, as it established technologies with potential not only for future debris mitigation but also for space situational awareness.

Debris removal technology itself is an extremely important technology that all of humanity should work on, and this mission is highly valued as marking its first step.



Image of the ADRAS-J mission

Concrete Results

1. Contribution to creating new areas for space development and utilization

The technology to safely and precisely approach and operate around target objects is a fundamental technology common to on-orbit services such as debris removal. "Approaching" may sound easy, but in reality it is extremely difficult. In low Earth orbit, where objects move at ultra-high speed, RPO technology for non-cooperative objects, which cannot provide positional information or control attitude, is a new and undeveloped technology of extremely high difficulty. To the best of our knowledge, this is the world's first initiative of its kind. One of the causes of the space debris issue is that space development has long followed a "disposable culture." After launch, only operation was possible, and without technologies for on-orbit servicing or maintenance, objects remained in orbit after completing their missions. Astroscale's on-orbit services aim to fill this gap as a "roadside service in space," addressing not only debris removal but also on-orbit situational awareness and satellite refueling. None of these are possible without the ability to safely approach specific objects. Being able to approach safely expands the scope and possibilities of operations in space. By succeeding in safe approach to and precise control around actual debris, this mission marked an important step toward shifting space development from a "disposable" model to a "circular" one and pioneering new possibilities ahead of the rest of the world.

2. Contribution to expanding the space development and utilization market

The world-first success in approaching debris to within 15 m and obtaining clear images has attracted wide attention and generated many inquiries. Furthermore, as countries seek to improve their ability to monitor threats and deter adversaries, national security agencies are increasingly recognizing and taking interest in the benefits and potential of on-orbit services using RPO technology. The technologies and achievements gained through this mission will be applied to future missions, further strengthening its presence in the global market as a core technology supporting space sustainability.

3. Contribution to the advancement of the economy and society

Our daily lives and economic activities, including traffic control, disaster

monitoring, positioning, logistics, and communications, are supported by satellite services, and approximately 40% of the SDG targets rely on the use of Earth observation and global navigation satellite systems. In order to continue benefiting from these services, it is essential to preserve and improve the environment of Earth's orbit, where satellites operate. In recent years, however, the increasing number of satellites and debris has raised orbital density, leading to more collisions and near misses. On-orbit services are attracting attention as a solution to this space-scale problem, and this mission marked a major step toward their realization by demonstrating the RPO technology for safely approaching target objects, which is at the core of on-orbit services.

4. Contribution to technology

This mission was carried out as Phase I of JAXA's Commercial Removal of Debris Demonstration (CRD2), which aims to demonstrate technologies for large-scale debris removal. Since RPO technology for non-cooperative objects, which cannot provide positional information or support attitude control, had no precedent within the scope of publicly available information, development began from scratch. The RPO technology developed and demonstrated with JAXA's cooperation combines, for example, hardware equipped with multiple cameras and sensor systems with software featuring proprietary algorithms for safe approach to target objects using that hardware. These are just a few of the many technologies involved, but together they made it possible to determine the distance to and positional relationship with the target debris, demonstrate collision avoidance functions, and safely approach it.

5. Contribution to promoting public understanding and human resource development

Through publicity activities for this mission, Astroscale has communicated the debris problem and its efforts to address it to the world. Furthermore, by releasing actual images of debris taken by ADRAS-J at result briefings jointly held with JAXA and other events, this mission drew strong interest not only from industry stakeholders but also from non-space industries, various media outlets, and the general public. In this respect, this mission helped make the debris problem feel more immediate and widely conveyed that a "world-first" effort to solve it is underway "from Japan."



DX of space systems through the establishment of a mass-production model of multipurpose 6U nanosatellites

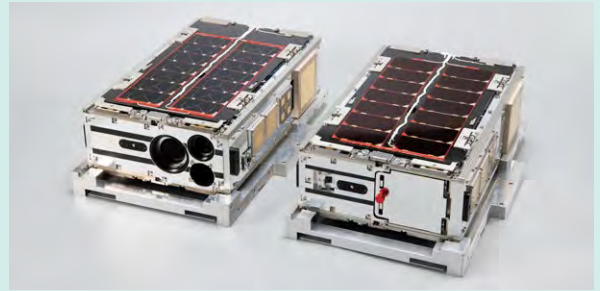
ArkEdge Space Inc.

The University of Tokyo, Nakasuka, Funase, and Ikari Laboratory

Seiren Co., Ltd.

Case Overview

ArkEdge Space has achieved semi-mass production of a versatile and general-purpose 6U nanosatellite model, including advanced applications developed by the University of Tokyo, and built a technological foundation (Aegs, Ocea, and ArkEdge Insights®) that integrates satellite development, operation, and utilization with standard IT technologies. This enabled high-mix, low-volume production using a highly reliable bus system and rapid mission demonstration. This system facilitates participation by non-space industries and contributes to the expansion of the overall space industry, while also creating a data utilization market that helps address diverse social issues.



General-purpose 6U nanosatellites with multiple on-orbit demonstrations underway

Key points regarding receiving the award [Comments from the selection committee]

It is highly commendable that, by establishing a mass production model through linking the development, operation, and utilization of nanosatellites with standard IT technologies, this initiative encourages participation by those with limited space experience and is expected to support wider adoption in the future.

It is also highly commendable that this digital transformation of space systems through a mass production model for multi-purpose 6U nanosatellites has already been put into practice, with mass production underway and deployment advancing in Japan and overseas across diverse fields.

Concrete Results

1. Contribution to creating new areas for space development and utilization

Based on the research results of the University of Tokyo, ArkEdge Space has established an integrated system that provides a comprehensive range of services from satellite bus system development (Ocea) to ground station operation (Aegs) and data services (ArkEdge Insights), enabling high-mix, low-volume production of 6U nanosatellites. To date, the company has conducted in-orbit demonstrations of 11 6U satellites, including those based on the University of Tokyo research, and has a track record of operating and providing data for 17 satellites. Furthermore, it has developed semi-mass production technologies in collaboration with Seiren Co., Ltd., achieving a development and operation cadence of two satellites per quarter. A full-scale mass production system capable of further scaling is now in place.

Through these efforts, it has successfully demonstrated a wide range of advanced missions on orbit, including global AIS data acquisition, hyperspectral imaging, and IoT communications.

2. Contribution to expanding the space development and utilization market

In the one-year period through November 2025, the company launched and began operating nine 6U satellites, a record high for any Japanese institution or organization (according to the company's research), and successfully carried out a variety of missions. Currently, around 30 commissioned contracts and subsidized projects have been secured toward the realization of a constellation, and memoranda of understanding and other agreements have been concluded with more than 10 countries and organizations. In the future, the company has the capacity to expand to a scale of 100 satellites in response to demand, with the potential to significantly expand Japan's space market.

In the field of data utilization, the integrated platform "ArkEdge Insights" has begun pilot implementation not only with municipalities in Japan but also in Brazil and Fiji, and is being put into practical use as a government system in Paraguay. The company is also advancing collaboration with African countries, significantly strengthening its presence in the global market.

In addition, by involving automotive parts manufacturers and equipment manufacturers, as well as conducting on-orbit demonstrations of components made by Japanese startups, the initiative is creating opportunities for non-space industries to enter the market and helping broaden the base of the space market.

3. Contribution to the advancement of the economy and society

In the field of observation, the initiative is advancing environmental monitoring using hyperspectral satellites and building the foundation for marine digital transformation through global AIS data. IoT satellites have successfully collected data in areas where ground infrastructure is underdeveloped, contributing to bridging the digital divide and promoting international cooperation. "ArkEdge Insights" has established a freemium model that integrates proprietary data with AI processing technologies and open data. By providing affordable means of using space data to non-space industries and developing countries, including for agricultural and water resource management in Paraguay, it is contributing to advancement across multiple fields and to the achievement of the SDGs.

4. Contribution to technology

CubeSat technology was advanced to establish a highly reliable "6U general-purpose bus system." Complex missions such as large antenna deployment and hyperspectral imaging were achieved in a 6U size, dramatically expanding the potential of nanosatellites. A proprietary software suite (Aegs and Ocea), together with an open design, established a technological foundation that enables rapid participation from non-space fields. Furthermore, "ArkEdge Insights" integrates AI super-resolution and ground-based data. Verification using IoT data also contributes to improving the reliability of digital twins (measures against hallucinations). These technologies, backed by 10 patents, are accelerating industrial applications.

5. Contribution to promoting public understanding and human resource development

Through close collaboration with the University of Tokyo, the initiative established an industry-academia collaboration model that rapidly translates cutting-edge research into industrial applications. It also established an "open development system" that allows IT and non-space companies to participate at low cost, thereby expanding the scope of space utilization and contributing to the development of engineers who can immediately contribute. In addition, the nanosatellite YODAKA carried out a Tanka mission with high school students. Through a demonstration of transmitting and receiving Tanka in segments, the initiative established IoT communication technology that could also be useful during disasters. This initiative, which combines culture and technology, also has an educational effect of conveying the appeal of space development to the next generation. It presented a new form of space utilization that combines technology demonstration with next-generation human resource development.



Development and technical demonstration of Japan's first and world's smallest lunar robot, SORA-Q

Transformable Lunar Robot Team (SORA-Q)

Case Overview

The team developed SORA-Q, an ultra-compact and lightweight robot capable of stable lunar surface travel and autonomous control, by effectively integrating toy technologies and IoT devices, image sensors, and image processing technologies that had not previously been used in space with related space technologies. SORA-Q was installed on the Smart Lander for Investigating Moon (SLIM), which achieved Japan's first lunar landing, and accomplished the world's first "fully autonomous" lunar exploration. SORA-Q also captured and transmitted images of SLIM's post-landing condition and the surrounding environment, making a significant contribution to the success of the lunar landing mission.

Key points regarding receiving the award (Comments from the selection committee)

It is highly commendable that a toy manufacturer from a non-space industry entered the space sector and delivered significant results, thereby greatly broadening the range of companies participating in space development.

The technology that automatically selects and transmits the optimal image from multiple shots is highly commendable and will be valuable for future space data utilization. The widely reported image of the SLIM in an unexpected landing orientation, received on Earth, also helped raise public interest in space.



Image of SLIM and its surrounding environment captured and transmitted by SORA-Q on the lunar surface

©JAXA/TOMY/Sony Group Corporation/Doshisha University

Concrete Results

1. Contribution to creating new areas for space development and utilization

- The ultra-compact exploration robot capable of stable mobility after deploying wheels and stabilizers on the lunar surface was developed by focusing on miniaturization and lightweight technologies as well as transformation mechanisms cultivated in the toy industry. This enabled an exploration system that can be mounted on spacecraft with strict payload constraints using minimal resources.
- Leveraging the mission opportunity of the SLIM, it demonstrated technologies for lunar surface mobility, imaging, and data transmission using a fully autonomous robot that combines toy technology and commercial products. Through this space demonstration, the team gained development expertise and exploration technologies applicable to future lunar and Mars exploration, as well as the construction of crewed lunar bases.
- Images of the SLIM captured by SORA-Q were used to evaluate the accuracy of pinpoint landing technology and to support post-landing scientific observation operations, making a significant contribution to the success of Japan's first lunar landing mission.
- Beyond the space sector, it promoted Dual Utilization aimed at addressing social issues on Earth and enhancing industrial competitiveness, presenting a new model for space development and utilization. The lunar demonstration also highlighted the functionality and reliability of Sony's microcontroller boards, supporting wider product adoption.

2. Contribution to expanding the space development and utilization market

- At Doshisha University, a total of more than 30 students engaged in lunar rover research, with nearly 10 going on to work in the space industry. By continuing to participate in joint research with JAXA and in the Moonshot Project, these students have sustained meaningful contributions to space development.
- Following the lunar demonstration, Sony Group's microcontroller boards became widely recognized as a Japan-developed IoT development platform, leading to increased B2B inquiries.
- The space-qualified SORA-Q has attracted inquiries from international space agencies, including NASA, indicating strong potential for deployment in global space missions.

3. Contribution to the advancement of the economy and society

- The toy of SORA-Q released by TOMY Company, Ltd., "SORA-Q Flagship Model," sold out following the lunar demonstration, prompting additional production and the launch of related products, including Tomica Premium SORA-Q & SLIM, contributing to increased brand recognition and revenue growth in the consumer market.

- The lunar demonstration verified the low power consumption and reliability of the microcontroller board, and expanded its application in robotics by demonstrating use cases in AGVs (automated guided vehicles), drones, industrial equipment, and construction machinery.
- As a practical example of Dual Utilization, the project demonstrated the potential for technology transfer from space exploration to terrestrial industries, highlighting opportunities for broader market expansion.

4. Contribution to technology

- Successfully demonstrated lunar-surface exploration using an ultra-compact robot incorporating toy technologies and commercial products, acquiring development expertise applicable to future space missions. In particular, the team established exploration technologies related to mobility, image processing, communications, and autonomous control, with strong potential for large-scale, distributed exploration using multiple small robots.
- This project represents the first successful lunar demonstration through open innovation, serving as a model for future science and technology innovation.
- To maximize impact, results were actively disseminated through international conference papers, websites, social media, and press releases, promoting the sharing and broader adoption of technical knowledge.

5. Contribution to promoting public understanding and human resource development

- Lunar surface image of SLIM captured by SORA-Q was released through press conferences and press releases, widely sharing the results of Japan's first lunar landing and enhancing public interest and awareness of space development and utilization.
- The toy version of SORA-Q closely replicates the materials, size, and transformation mechanism of the flight model, enabling users to experience exploration missions at home via a mobile application. It also serves an educational role by fostering children's interest in the natural sciences.
- The toy version of SORA-Q has been distributed to over 100 educational institutions and featured in more than 70 lectures. It has also been introduced in Sony's ongoing workshops for primary and secondary students using microcontroller boards, creating learning opportunities in AI and robotics and promoting STEM education for future scientific and technological talent.
- SORA-Q has also been exhibited internationally, including at the Science Museum in the UK and CITE DE L'ESPACE in France, disseminating its results both domestically and internationally.

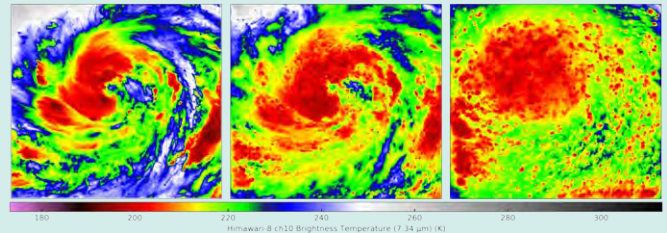


A New Frontier in Tropical Cyclone Prediction: All-Sky Data Assimilation of Geostationary Satellite Observations

MINAMIDE Masashi, The University of Tokyo

Case Overview

Tropical cyclone genesis and rapid intensification are governed by the "butterfly effect," in which even slight atmospheric disturbances are amplified, and have long been difficult to predict. This study developed a new technique enabling stable numerical weather prediction assimilation of cloud observation data from geostationary meteorological satellites, which had previously been difficult to utilize, achieving approximately a 20% reduction in tropical cyclone intensity forecast error. By unlocking the potential of geostationary meteorological satellites, it demonstrates improved accuracy in forecasting extreme weather, establishes a new frontier in tropical cyclone prediction, and contributes to disaster risk reduction.



Super Typhoon Nanmadol (2022) during its development phase observed by Himawari-8 (left), and simulation results (center: satellite plus conventional observations assimilation; right: conventional observations assimilation only). (Based on Minamide & Posselt, 2025)

Key points regarding receiving the award (Comments from the selection committee)

This research is highly valued for its scientific merit, and for demonstrating that integrating its results into operational forecasting can consistently improve tropical cyclone intensity prediction, thereby enhancing the value of weather forecasts and contributing to disaster risk reduction.

The development and verification of a new technique for stable assimilation into numerical weather prediction, achieving an approximately 20% reduction in forecast error, is particularly commendable for unlocking the potential of geostationary meteorological satellites and significantly advancing the accuracy of extreme weather prediction.

Concrete Results

1. Contribution to creating new areas for space development and utilization

Extreme weather events such as tropical cyclones and heavy rains develop rapidly in a short period of time and cause great damage to society, are inherently difficult to predict. Behind this lies the chaotic nature of the atmosphere, in which slight disturbances can be rapidly amplified. Overcoming this limitation in prediction requires precise representation of the inner-core structure of tropical cyclones and its assimilation into numerical weather prediction models. However, many of the typhoons that have a particularly large impact on Japan develop over the ocean, beyond the reach of ground-based observation networks, making direct observation of their inner-core structure difficult.

Geostationary meteorological satellites are in many cases the only means to fill these observational gaps. However, due to the limitation that infrared observations cannot penetrate clouds, observation information on cloud areas has not been fully utilized in numerical weather prediction. This study addresses this long-standing challenge by developing a new method to stably incorporate satellite data into numerical weather prediction while statistically correcting for cloud effects. By extracting and utilizing information that can be reliably inferred even in regions where direct observation is hindered by clouds, it demonstrates the feasibility of stable assimilation into numerical weather prediction systems. The novelty of this work lies in redefining cloud-affected observations from geostationary meteorological satellites, previously excluded, as a valuable resource for numerical weather prediction.

2. Contribution to expanding the space development and utilization market

This result demonstrates the usability of cloud-affected observations from geostationary meteorological satellites, which had not been fully utilized in numerical weather forecasting, and extends the value of existing satellite observation infrastructure. Geostationary meteorological satellites cover the entire globe as an observation platform, and this method is expected to be applicable across countries and operational forecasting centers worldwide, regardless of specific regions, phenomena, or satellite generations. By transforming previously underutilized large volumes of observational data into actionable resources, it broadens the scope of space data utilization and provides a foundation for future market expansion, including private weather and disaster prevention related services.

3. Contribution to the advancement of the economy and society

Tropical cyclones are particularly difficult to predict in their early stages, with conventional numerical forecasts tending to underestimate their development and often failing to predict them until just before intensification onset. This study

established a new method that assimilates all-sky observations from geostationary meteorological satellites, including cloud-affected areas, enabling more accurate representation of the inner-core structure of tropical cyclones from their early stages. As a result, the average error in tropical cyclones intensity forecasts has been reduced by approximately 20%, allowing earlier detection of signs of rapid intensification. This is expected to enhance both the confidence and lead time of decision-making in disaster response and societal operations, contributing to more rational disaster mitigation by reducing both under- and over-response.

4. Contribution to technology

"All-sky satellite data assimilation", which incorporates satellite data into numerical weather prediction models regardless of atmospheric conditions, has long been one of the most difficult challenges. This is because the presence of clouds causes nonlinear amplification of discrepancies between observations and model states, making calculations unstable under conventional error settings. This study redefined this problem from the perspective of error treatment and proposes two complementary approaches: Adaptive Observation Error Inflation (AOEI), which dynamically adjusts the reliability of observations, and Adaptive Background Error Inflation (ABEI), which expands model uncertainty according to conditions. By combining these approaches, a numerical weather prediction and data assimilation system capable of stable operation under all-sky conditions, including cloud-affected areas, was established and demonstrated.

This framework has broad applicability beyond geostationary meteorological satellites, as it systematically addresses the impact of observational operator nonlinearity on error. It is expected to extend to other satellite sensors and next-generation observation networks, expanding the utilization of satellite observation data and contributing to the advancement of numerical prediction and data assimilation methods.

5. Contribution to promoting public understanding and human resource development

Guided by the principle that "advancing space exploration deepens our understanding of Earth," the awardee has actively communicated the link between space technology and meteorological research to society. Through lectures, research supervision, and seminars both inside and outside the university, he has introduced the mechanisms of weather forecasting and the role of satellites in disaster prevention and everyday safety. By highlighting the connection between space technology and familiar meteorological phenomena, it fosters public interest in science and promotes greater awareness of disaster prevention across a wide range of generations.



World's first cross-border demonstration of 5G satellite communications toward the convergence of terrestrial and space communications

YAGIHASHI Hiroyuki, OGAWA Muneaki, and OUCHI Natsuko, SKY Perfect JSAT Corporation

Case Overview

SKY Perfect JSAT successfully conducted the world's first cross-border demonstration using 5G NTN (Non-Terrestrial Network), leading the creation of a new market that combines terrestrial and space communications, with results showcased at Expo 2025 Osaka, Kansai. Originating in Japan, the initiative advances international standardization and ecosystem development, presenting a concrete model for addressing societal issues, including economic security, both domestically and globally. Furthermore, through industry-academia-government collaboration in human resource development and the "Universal NTN™" vision, the company promotes a future in which space is recognized as accessible infrastructure.

Key points regarding receiving the award (Comments from the selection committee)

This cross-border demonstration between Japan and Singapore was the first in the world to show that 5G satellite communications using standardized technologies can operate at a practical level, demonstrating broad applicability across maritime transport, aviation, and disaster response, and is highly commendable.

The Universal NTN concept is outstanding, and the leadership in international standardization based on insights from the demonstration, together with the establishment of an open ecosystem to validate use cases, is also highly commendable.



Concept of Universal NTN™ and the Universal NTN innovation lab facilities

Concrete Results

1. Contribution to creating new areas for space development and utilization

As a member of an international joint research team, SKY Perfect JSAT successfully conducted the world's first cross-border demonstration between Japan and Singapore using 5G NTN (Non-Terrestrial Network), with the results also showcased at Expo 2025 Osaka, Kansai. Communications based on 5G mobile standards were achieved via the commercial geostationary communications satellite JCSAT-1C (Ku-band). This is a pioneering achievement that precedes the Ku-band standardization discussions in 3GPP (Third Generation Partnership Project). Key technical challenges with low TRL, including time synchronization and frequency coordination, were resolved through proprietary expertise, enabling near-operational validation. Going forward, the company will utilize this to realize "Universal NTN™" and accelerate research and development and international collaboration with the aim of commercializing it in 2028. The initiative demonstrates broad applicability in maritime transport, aviation, and disaster response, opening new frontiers in space utilization.

2. Contribution to expanding the space development and utilization market

5G NTN is an emerging field that integrates terrestrial and space communications to create new markets, including in regions without established mobile networks. This demonstration showed that satellite-based mobile communications can operate at a practical level across borders and infrastructure constraints, opening the way to meet demand in vulnerable areas such as maritime, aviation, and border regions. Amid growing demand for complementing and expanding terrestrial networks in areas such as connected vehicles, international logistics, and security, this achievement serves as a foundation for commercial deployment and contract expansion. Through collaboration with overseas businesses, the foundation for the global expansion of Japan-origin technologies has also been formed. Positioning satellite communications as part of the mobile network, this initiative represents a key milestone driving the growth of the space utilization market.

3. Contribution to the advancement of the economy and society

This result is a concrete example of how space communications can be used to advance social infrastructure. It is expected to serve as foundational connectivity for autonomous and remotely controlled systems such as autonomous vessels, remote

navigation, and connected vehicles. For transport and logistics requiring resilient wide-area connectivity, 5G NTN integrating satellite and terrestrial networks improves efficiency, safety, and real-time performance. The demonstration, conducted in cooperation with the Maritime and Port Authority of Singapore (MPA), contributes to the advancement of port and traffic management while also promoting Japan-origin technologies internationally. Given the increasing geopolitical risks, space utilization led by Japan can be regarded as a strategic achievement that enhances infrastructure autonomy and strengthens international connectivity.

4. Contribution to technology

The knowledge gained from the demonstration directly contributes to international standardization and the formation of a technological ecosystem. Since 2022, the company has participated in ARIB (Association of Radio Industries and Businesses), TTC (Telecommunication Technology Committee), and 3GPP (3rd Generation Partnership Project), advancing use case proposals and Ku-band specification development for 5G NTN. It has played a leading role in addressing challenges related to increasing EIRP values for terminal transmission power, enabling more efficient bidirectional communication between satellites and mobile devices. These contributions were officially approved in 3GPP Release 19 in September 2025 and incorporated into global standards. Furthermore, the company is advancing multi-orbit demonstrations with domestic and international partners through the "Universal NTN Innovation Lab." By integrating standardization, demonstration, and collaboration, it continues to lead technological advancement.

5. Contribution to promoting public understanding and human resource development

This achievement was widely covered by domestic and international media, promoting understanding of the significance and future potential of space communications. By demonstrating that everyday 5G can connect across borders via space, it brought space closer as a practical and accessible domain. "Universal NTN™" was also presented as a vision of optimal connectivity for all, further deepening understanding. The demonstration also involved diverse participants from industry, academia, and government, with young professionals gaining experience in international joint research and standardization activities, contributing to human resource development.



Regional manufacturing SMEs supporting small SAR satellite technology

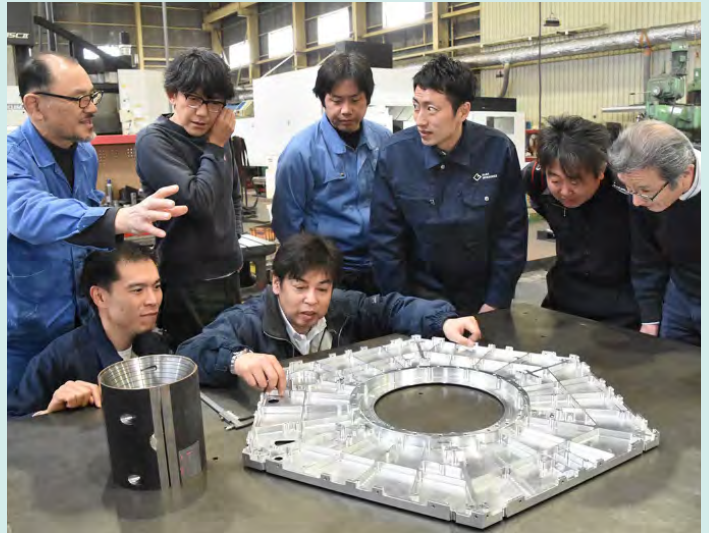
NPO Enjin Space Engineering Team (e-SET)

Case Overview

Manufacturing SMEs based in the Kurume region of Fukuoka Prefecture have entered the space business as a team, leveraging their respective strengths. They have collaborated from the conceptual stage in the production of QPS-SAR, a small SAR satellite developed by iQPS Inc. with world-class performance. As of the end of December 2025, 14 QPS-SAR satellites have been launched, and participating companies are working to establish mass production systems for components in preparation for future satellite constellation deployment. They are also actively engaged in developing the next generation of space talent, making a significant contribution to promoting the space business in the region.

Key points regarding receiving the award (Comments from the selection committee)

Manufacturing SMEs have entered the space industry by leveraging their respective strengths, supporting the development of small SAR satellites by iQPS Inc. and enabling the company to achieve global success. This initiative represents a strong role model for SME participation in Japan and is highly commendable for its contribution to the advancement of the regional space industry.



Development scene (Courtesy of iQPS Inc.)

Concrete Results

1. Contribution to creating new areas for space development and utilization

e-SET's entry into the space business is a highly distinctive case in which collaboration with Kyushu University enabled the accumulation of technology and expertise, the establishment of partnerships with regional startups, and ultimately participation in the manufacturing of small SAR satellites with world-class performance. The member companies brought their respective strengths to bear on the specifications required by iQPS Inc., iterating through extensive trial and error to identify feasible solutions, and provided strong support for the development of QPS-SAR in less than one year. Furthermore, rather than entering individually, SMEs formed a cross-industry team to achieve entry into the space sector. Their efforts began as early as 2007, ahead of the recent expansion of the space business environment, reflecting a forward-looking commitment. Sharing the vision of "establishing a space industry in Kyushu" with Professor Emeritus YASAKA of Kyushu University, founder of iQPS Inc., and his successor President Onishi, they have extended their activities beyond satellite manufacturing to include the development of next-generation talent, aiming to broaden the base of the space industry.

2. Contribution to expanding the space development and utilization market

Currently, most of the space-related products manufactured by e-SET member companies are supplied to iQPS Inc., and the expansion of QPS-SAR directly drives their business growth. A total of 14 QPS-SAR satellites had been launched by the end of December 2025, and in March 2025, iQPS Inc.'s new R&D facility, "Q-SIP," commenced full-scale operations. Ultimately, plans are in place to increase production from four to ten satellites per year, which is expected to further expand e-SET's revenues. Also, e-SET is advancing discussions on the importance of promoting to space-related companies its role in the QPS-SAR supply chain and its accumulated expertise in satellite component manufacturing. To this end, it is actively engaging in outreach activities, including participation in technology proposal events organized by Fukuoka Prefecture, aimed at acquiring new clients.

3. Contribution to the advancement of the economy and society

QPS-SAR, which e-SET is involved in manufacturing, offers world-class performance, and its data is expected to support a wide range of services.

Ultimately, the goal is a 36-satellite constellation enabling near-real-time observation of almost any location on Earth within an average of 10 minutes. In the future, this is expected to drive new services in areas such as disaster prevention and infrastructure management, contributing significantly to public safety and security. e-SET also actively promotes awareness and new entry into the space business by sharing its experience and challenges at outreach events, contributing to the expansion of regional space industry players.

4. Contribution to technology

e-SET member companies are advancing their respective technologies. For example, Murai Kohki Co., Ltd. improved productivity by standardizing machining center systems across multiple factories to achieve significantly shorter lead times and respond rapidly to frequent design revisions in support of QPS-SAR mass production, achieving a 22% reduction in lead time. In addition, Ogawa Kiko Co., Ltd. conducted R&D to replace aluminum alloys commonly used in satellite structures with CFRP, achieving a lighter, high-rigidity, and cost-effective solution while maintaining structural rigidity. Furthermore, from 2024, e-SET members and external engineers have initiated a project to design and launch their own small satellite, evolving from a component supplier into an organization capable of providing technical guidance to emerging space startups.

5. Contribution to promoting public understanding and human resource development

QPS-SAR is sometimes referred to as a "Shitamachi Satellite," inspired by the TV drama "Shitamachi Rocket." e-SET aims to demonstrate that even a small local factory can contribute to world-class satellite development, inspiring younger generations. In collaboration with iQPS Inc. and others, it actively supports the development of next-generation space talent in Kyushu. Key initiatives to date are as follows:

- Hosting workshops for primary school students, explaining satellites in an easy-to-understand way and building smartphone stands using satellite components to convey the appeal of manufacturing.
- Holding special lectures for high school students, sharing firsthand experience in satellite design and fabrication to emphasize the importance of perseverance and taking on challenges.



Development of a disaster-response FM radio broadcasting system utilizing disaster and crisis management alerts

ERA Katsuji, Yamaguchi Broadcasting Co., Ltd.

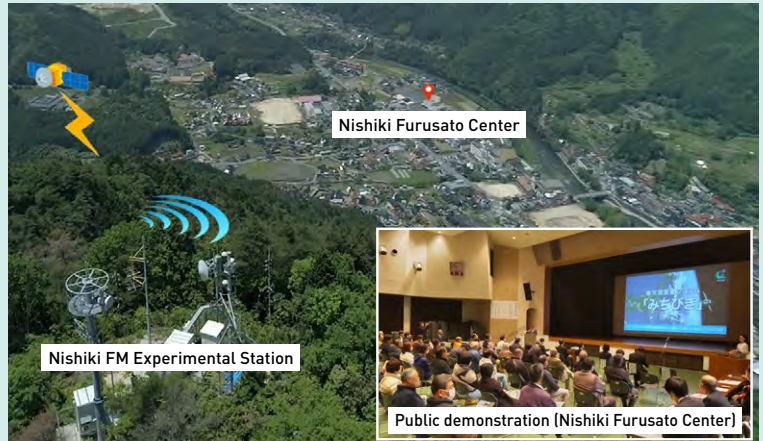
Case Overview

A broadcasting system was developed that utilizes the disaster and crisis management alert service of the QZSS "Michibiki" to enable uninterrupted automated transmission of disaster information, even when parts of the radio broadcasting network are disrupted during disasters or emergencies.

Key points regarding receiving the award (Comments from the selection committee)

The system is highly commendable for being the first in Japan to apply continuous crisis management information transmitted via the L1S signal of the QZSS "Michibiki" launched in 2018, to terrestrial radio broadcasting. By establishing a disaster-response FM radio broadcasting system, it enables the delivery of critical information even when network disruptions occur during disasters.

It represents an excellent example of space utilization by local radio and is expected to be applicable in other regions and countries.



Scenes from the public demonstration

Concrete Results

1. Contribution to creating new areas for space development and utilization

This initiative represents the first application in Japan of the QZSS "Michibiki" disaster and crisis management alert service to terrestrial broadcasting, achieving commercialization in 2025. FM radio enables wide dissemination of voice-based information and is highly accessible to the public, with receivers commonly available in everyday settings such as vehicles, making it an effective medium for obtaining information during disasters. By utilizing this technology, even in large-scale disasters such as a potential Nankai Trough Earthquake, where terrestrial infrastructure may be severely damaged, critical information can continue to be delivered via FM radio, contributing to public safety.

During disasters, broadcasters play a vital role in delivering real-time information. This demonstration established a system that delivers disaster information from the QZSS "Michibiki" through radio using the voices of local announcers, enabling continuous information dissemination without interruption, even in emergencies.

2. Contribution to expanding the space development and utilization market

As broadcasters have a mission to deliver reliable local information in real time, both in everyday life and during disasters or emergencies, this approach is expected to be adopted as a new broadcasting model by broadcasting stations nationwide.

3. Contribution to the advancement of the economy and society

During the Noto Peninsula Earthquake on 1 January 2024, some broadcasters experienced interruptions when relay lines from parent stations were severed. The disaster-response FM radio broadcasting system has established a method for maintaining broadcasts under similar disaster conditions.

This system can also be applied to temporary emergency broadcasting stations established during disasters and to community FM stations used by local governments to deliver regional information. Community broadcasting was institutionalized in January 1992 to provide locally focused information. The number of operators has steadily increased, with rapid growth from 1996 to 1998 following major disasters, and as of November 2025, 342 stations operate across all 47 prefectures, with disaster information as a primary mission. By utilizing this

system for community broadcasting, emergency alerts from Michibiki can continue even during unmanned hours, particularly at night and early in the morning, directly contributing to the safety and security of local residents.

4. Contribution to technology

Since 2018, Michibiki has continuously transmitted disaster and crisis management information, including tsunami alerts, via the L1S signal. Utilizing this L1S signal enables rapid delivery of disaster information even in areas with weak communications infrastructure, such as mountainous regions, or in situations where communication has been cut off due to damage to ground infrastructure. Yamaguchi Broadcasting therefore researched a system that allows FM transmission sites to directly receive and broadcast L1S signals.

Through continued research, the company successfully commercialized the disaster-response FM radio broadcasting system using QZSS "Michibiki," marking the first application of this approach in terrestrial broadcasting and enabling reliable delivery of disaster information to local residents.

5. Contribution to promoting public understanding and human resource development

The public demonstration simulated multiple warnings and cancellations, including a heavy rain emergency warning in the Nishiki FM experimental area and a flood warning for the nearby Nishiki River. Local residents participated in an evacuation drill in Nishiki-cho, Iwakuni City, and a test transmission from "Michibiki" was conducted with the cooperation of the Cabinet Office.

At the Nishiki FM Experimental Station, under a simulated outage of the main FM transmitter in Hofu City, Yamaguchi Prefecture, disaster and crisis management alerts from "Michibiki" were received and automatically broadcast via an FM relay system using the company's announcers' voices. Approximately 90 participants, including local residents and Iwakuni City disaster prevention officials, attended and monitored the broadcast. The public demonstration was broadcast live on a Yamaguchi Broadcasting radio program and featured on television in evening news broadcasts and the following day's information programs.

Post-demonstration surveys indicated a highly positive response to voice-based disaster information delivery, with approximately half of respondents reporting that they regularly listen to radio.



Published: March 17, 2026

Issued by: **National Space Policy Secretariat, Cabinet Office**

For inquiries regarding this publication and its contents, please contact:

National Space Policy Secretariat, Cabinet Office