NEDO

focus NEDO

2023 No.89

Reporting on Today and Tomorrow's Energy, Environmental and Industrial Technologies

Special Report

NEDO Supply Chain Data Challenge

Attracting a Lot of Ideas in NEDO's First Prize Contest!

New Energy and Industrial Technology Development Organization

The Fastest in the World! "Tsurugi," a Database Management System for the Next Generation that Maximizes Hardware Performance, is Born.

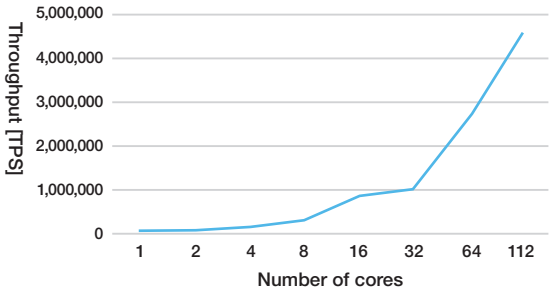
Currently, in database operations that support the global information industry, hardware such as CPUs and memory continue to evolve, while software that manages databases is designed based on an old hardware environment. This brings about a major issue because the software is unable to support the highly efficient and high-speed data processing that high-performance hardware can achieve. In addition, current database management systems are mainly provided by foreign companies, and it is essential to develop and disseminate domestically produced systems to strengthen the competitiveness of Japan's information industry.

In light of such background, NEDO, NEC Corporation (NEC), and NAUTILUS Technologies, Inc. are working on "the development of technologies for AI chips and the next-generation computing that enable high-efficiency and high-speed processing." The company group has succeeded in developing "Tsurugi," a relational database management system compatible with hardware environments for the next generation, such as many-core and large-capacity memory systems.

Tsurugi is designed to increase system performance as hardware performance improves. In benchmark tests, it achieved both the world's fastest processing performance of 4.56 million TPS*1 and response latency of 219 nanoseconds among hardware with more than 32 cores. Besides, since Tsurugi is designed on the basis of distributed databases, it is possible to edit or add new data during batch processing. For example, it is possible to perform complex batch processing and online processing simultaneously at high speed, such as real-time analysis of image data while being captured from a camera or high-speed processing of large data with petabytes of data.

A community website has already been opened to disseminate information on Tsurugi and NEDO has just released an open-source version since October in 2023. It will continue to disseminate information henceforth. In addition to developing a

Verification Results of Throughput Performance (Response Performance and Data Transfer Volume) of Tsurugi



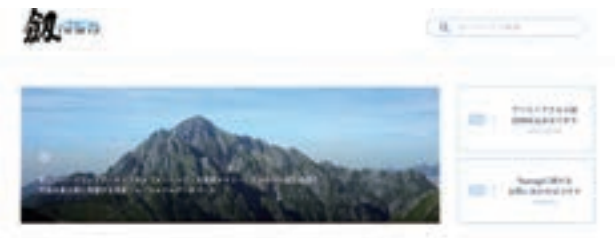
Verification Results of Benchmark Test on Tsurugi

YCSB-A※2		
threads	latency[ns]	throughput[TPS]
1	18,780	53,249
2	11,047	90,525
4	6,924	144,428
8	3,238	308,787
16	1,231	812,434
32	995	1,004,982
64	387	2,585,706
112	219	4,560,475

※2 YCSB：Yahoo! Cloud Serving Benchmark.
A typical benchmark tool to measure database performance.

platform for this technology to be widely used in society, NEDO aims to strengthen its international competitiveness as a database management system originating from Japan.

*1 Transaction Per Second



Tsurugi's Community Website
https://www.tsurugidb.com/

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A Few Words from the Editor

No.89

This edition features the "NEDO Supply Chain Data Challenge," which was implemented last year. The challenges of those who are motivated to utilize satellite data and make technology useful to the world...
This prize project was also a new challenge for us at NEDO.
Please take a look at the passionate drama of the challengers.

Special Report

NEDO Supply Chain Data Challenge

NEDO conducted a prize contest named the "NEDO Supply Chain Data Challenge" in the hope that new players in the satellite data business would emerge.

Gathering!

★The challenge this time is open to three themes in two divisions.

Idea Category

Theme: technologies and solutions that solve supply chain management issues through the use of satellite data and other applications.

System Development Category

Theme 1: estimating the impact on the supply chain caused by congestion in container logistics at ports and providing visualization services
Theme 2: providing an estimation of the impact on supply chains caused by disasters such as large-scale wind and flood damage along with its visualization services

Innovations in Space

NEDO
Director General, Innovation Promotion Department
YOSHIDA Takeshi

A New Generation Will Leap Forward. It Is Our Job to Prepare the Stage.

There is growing momentum for the commercialization of satellite data. However, there are challenges before satellite data can be more commonly used for business purposes. NEDO held its first prize contest to publicize the usefulness of the satellite data and seek fresh ideas for solving various issues in industries, security, disaster prevention, and the like.

The theme of this prize contest aims at ideas and systems that can stop supply chain disruptions caused by disasters, conflicts, infectious diseases, and so forth. The modern supply chain is a huge network that transcends national borders, and if a failure occurs in one location, the damage will spread to other locations in the chain. Faced with this situation, companies have been waiting for a breakthrough solution because it is extremely difficult for them alone to monitor every corner of an expanding supply chain and take appropriate action when issues arise.

The reason why we chose the contest format was because we expected to encounter completely new ideas and totally new players. The economist Joseph A. Schumpeter said that "new combinations," in other words, new pairings, create innovation. True to his word, there were many entries in this prize contest, including teams of venture companies, individuals, universities, teams with no experience in the space business, and even teams from overseas, and at the final screening, there were a number of innovative and highly feasible presentations.

The space business is still in its early stages, but the challenge of addressing social issues, such as maintaining supply chains, and the passion to utilize technologies for the benefit of the world is a gateway to major business opportunities. We hope you will feel the enthusiasm of these young people who have produced a number of reliable plans.

NEDO Supply Chain Data Challenge

Meet the Three Award-winning Teams!

Awarded the first Prize in the Idea Category

Supply Chain Solution Business with Low Risk of Disaster by Combining Satellite Data and Disaster Simulation

Space BD Inc.

Mr. YOSHIZAWA Ryo
Space BD Inc.
Manager, Head of Business Unit - ISS Platform Business

This Challenge Became a Catalyst for New Business Development

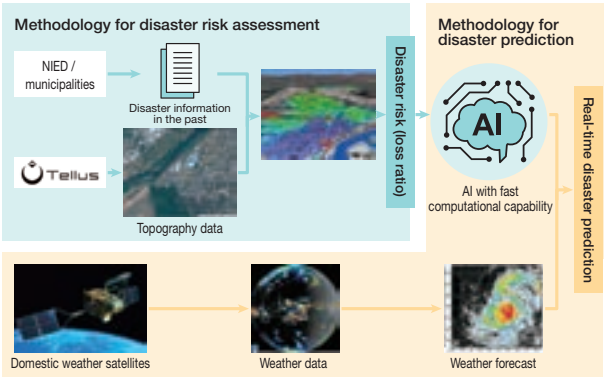
"First Steps to Be an Insider in the Satellite Data Field!"

Mr. Yoshizawa of Space BD Inc. recalls that he learned of the prize contest just days before the deadline. "At the time, we were in the phase of promoting the satellite data business within the company, and the timing was perfect. We thought that this was a great opportunity, and we tried to do our best, even staying up all night to prepare for it! As the company name BD equals Business Development, we were frankly happy to have achieved results that will lead to new business development."

In the limited time available, they interviewed insurance companies, manufacturers, and municipalities with which they have relationships and came up with a sense of the issues. "By listening to potential customers, we were able to offer an original value proposition to insurance companies, such as incorporating disaster risk into their insurance products," he said. In addition, they focused on the issues with current meteorological satellites, such as real-time performance and the lack of data on vapor observations necessary for forecasting line-shaped precipitation systems. He continued, "I think the fact that we proposed a small weather satellite business led by the private sector as part of our long-term vision was also a key point of evaluation."

However, disaster simulation is highly uncertain, and it is difficult to present benefits quantitatively. Therefore, there are said to be many challenges to commercialization. Mr. YOSHIZAWA said, "That's why it's interesting that there is still so much room for development in the use of satellite data...It is essential to collaborate with a variety of businesses, not to complete the project with just one company. We would like to leverage our strength of listening to our customers and digging deeper into their issues to build relationships with a variety of vendors as we connect them to our business," he said. Space BD's challenges continue as it looks to expand into new areas of its business.

Approach: disaster risk assessment and forecasting



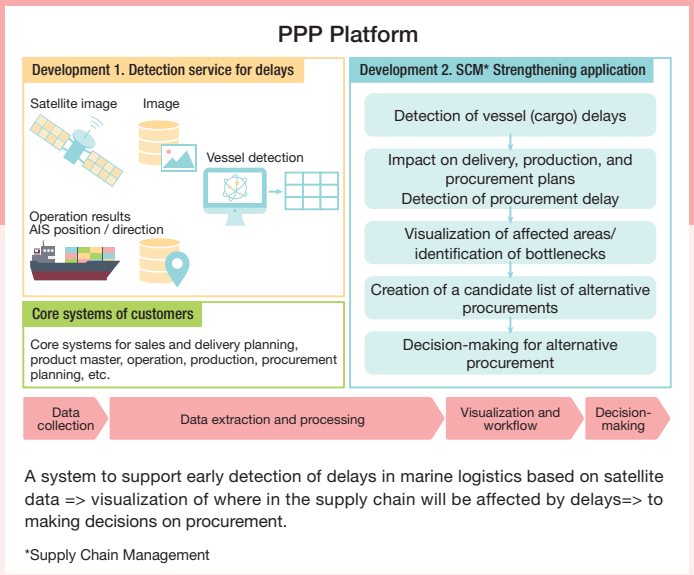
Simulation of disasters based on past disaster records and weather-and-topographical data observed by satellites. Furthermore, the model aims to minimize damage by combining AI that learns the results of disaster simulations with weather forecasts to predict disasters in real-time.

★Evaluation point

The proposal was promising, not only for providing disaster risk information but also for developing and launching its own weather satellite.

Large Thematic Setting Stimulated our Challenge.

"Too many orders to handle."



A system to support early detection of delays in marine logistics based on satellite data => visualization of where in the supply chain will be affected by delays=> to making decisions on procurement.

*Supply Chain Management

Mr. Doi, the leader of Team PPP, says, “The essence of the award-winning project was the furious interviews with the users, the companies that are the shippers.” In interviews, they painstakingly gathered feedback from the frontlines of the sales, production, and procurement divisions of major manufacturing companies such as automobiles, electronics, and steel, and they also visited shipping operators to speak with present captains of vessels. Team PPP determined where disruptions in maritime logistics were having the greatest impact on its operations.

He said, “The most severely affected division was the procurement division. At the moment a delay occurs in shipping, decisions on how long of a delay is acceptable, whether to switch to air transportation, and how to procure alternative suppliers and alternative parts are currently handled in a hectic and analog manner. Moreover, we found that the rate of on-time compliance for container vessels covering the world’ s major shipping routes is only 40%, and procurement departments are forced to accept such late shipments quite often." Even during the actual interview, the division was eager, saying, "We would like to have a system like this!" Ms. Tanaka, a member of the team, said, "I was in a division at the time to create a business using satellite data, but our main market was land transportation. The contest was a valuable opportunity to look toward port logistics."

Mr. Doi said, "We believe that our major achievement was that we were able to provide an environment where the procurement division was freed from the task of looking up the relevant parts from the BOM (Bill of Materials), which used to take several hours, and they were able to focus on their original tasks." There are high expectations for the future of Team PPP, which says that it has come up with ideas for using satellite data to solve new issues through meetings with its clients.

★Evaluation point

As orders had already been placed by the time of the final selection meeting, the content accurately captured the needs and the system was nearly complete.

System Development Category of Theme 1: Ports and Harbors
Awarded the first place

Platform for Procurement and Production (Platform for Procurement and Production)

Team PPP

Mr. DOI Yuki
Fujitsu Limited
Global Business Solution Business Group
Head of Technology Adoption Division

TANAKA Haruka
Fujitsu Limited
Business Management Unit
Data Analytics Center

System Development Category of Theme 2: Disasters

★★★Awarded the first place

Visualizing Disaster Situations Using SAR Satellite Data and AI to Support Supply Chain Maintenance

Space Shift Inc.

Ms. TADA Tamao
Space Shift Inc.
Manager, Business Development

Mr. KAWAKAMI Yuji
Space Shift Inc.
Head, Business Development

Wishing to Reduce the Impact of Natural Disasters

"We excel in adapting our services to a wide range of industries!"

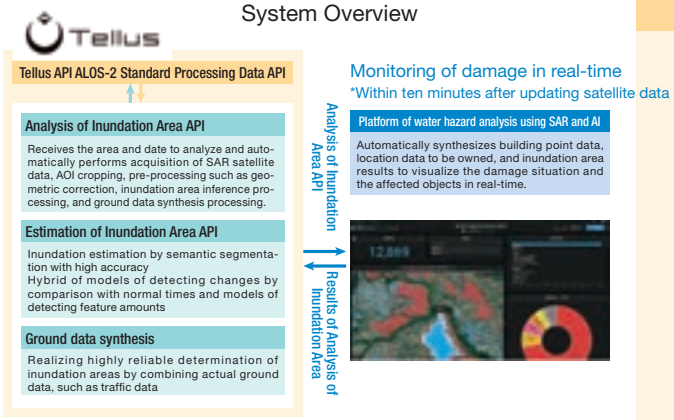
Space Shift Inc. applied for all three categories of this year's prize contests, was selected as a finalist in all the categories, and won second place in the Idea Category. Mr. KAWAKAMI, who gave a presentation in the final selection stage, said, "We had originally developed our own technology to analyze inundation areas based on SAR* satellite data automatically, so we are honestly more relieved than happy to have won first place in the 'Theme 2 Disasters' competition." Nevertheless, there were difficulties in developing the system in a short period of time, especially in improving the accuracy of the AI by using disaster data, which is still scarce. He also noted that in the case of processing the SAR satellite data into image information, it took time to process the data because coherence values were added as a means of improving the accuracy of detecting water areas.

On the other hand, Ms. TADA, who is currently conducting a proof-of-concept (PoC) with the non-life insurance industry to commercialize the system, says, "I feel that the external recognition we received in the contest has changed the way user companies view us and has provided a tailwind for our commercialization." Mr. KAWAKAMI also evaluated, "I think that this prize project has helped many people realize that satellite data can be used for business purposes, depending on how it is used."

In the future, when the number of SAR satellites increases, the frequency of imaging will improve to enable us to observe the world in almost real-time, and the way we see it should change drastically. Mr. KAWAKAMI seemed to have a clear vision of a large and expanding market as he said, "Just as the internet has created new industries, I would like to provide a completely new service that makes full use of satellite data."

*Synthetic Aperture Radar

System Overview



Promptly analyze data from SAR satellites, which can be observed at night and in stormy weather by using AI. Visualize damage in real-time by integrating with ground data. Can be applied to various industries by changing the data to be integrated.

★Evaluation point

As the proposal was highly accurate with the use of multiple data sources and the company has already started a PoC with insurance companies, it was highly realistic.

Award Winners Q&A

Questioned to Each

Expert Researcher,
Innovation Promotion Department,
NEDO

SAKAI Kenji

Space BD Inc.

Mr. YOSHIZAWA Ryo

Team PPP

Mr. DOI Yuki

Space Shift Inc.

Mr. KAWAKAMI Yuji

Q What Has Changed as a Result of Receiving the Award?

Space BD Inc.

Since we are now seen as an insider in the satellite data field, we are getting more attention, and the information and inquiries coming in are increasing, which creates a virtuous cycle.

Team PPP

Although we had a sense of a positive response from the market during the interviews, winning the award gave us recognition that we had received a certain level of evaluation, and I think this has increased the momentum for commercialization.

Space Shift Inc.

We think the award has had a great effect, such as receiving inquiries from customers who saw the news of the award and increasing our company's presence.

Q How Would You Evaluate This Prize Project?

Space BD Inc.

In a sense, it became like a festival, a good place to draw people's attention. Besides, unlike commissioned or subsidized projects, the threshold for participation was low, which made it easy for anyone to participate.

Team PPP

There is definitely a need, and we could create a system that would be valuable to society. We are particularly grateful for one reason: the thematic setting was good.

Space Shift Inc.

Compared to subsidized projects, we think that the prize project is easier for venture companies to participate in. This is a good opportunity to gain broad knowledge, and we hope NEDO will continue it.

Q Was NEDO's Assistance Helpful?

Space BD Inc.

The study sessions and mentoring gave us not only new knowledge but also milestones for our presentation, which helped us to proceed in a well-planned manner. It was also a great opportunity to communicate with many participants.

Team PPP

They were very kind and very helpful. We are especially grateful for the lecture by Mr. SUZUKI of Nippon Yusen Kabushiki Kaisha, hosted by the secretariat, which led to a theme change at the last minute.

Space Shift Inc.

We appreciated the opportunity to input basic knowledge about ports and harbors, particularly by attending the seminar and receiving advice from various experts.

Q How Would You Like to Make the Most of This Experience in the Future?

Space BD Inc.

We believe that winning the award is not the end of the process, and we must establish our proposal as a business in the future.
We would like to continue to explore collaboration with various business enterprises.

Team PPP

Since we were able to experience the process of how to utilize and shape data to solve issues our own way, we will be able to reflect this in new projects as well.

Space Shift Inc.

Currently, the PoC with the non-life insurance industry is going well, and we are fully committed to putting it into practical use.
We will actively try to get into the prize project if the opportunity arises.

Comment from SAKAI Expert Researcher

The prize project had never been done before, so we were stumbling in the dark until the very end. But, once it was over, we realized many things. For example, the applicants were motivated by more than just the prize money; they had high expectations for this kind of business, and there are people who believe that the space business will break through.

The Universe Is

There Is No One Correct Answer. Enjoy the Challenge without Fear of Failure.

Last year, the world's population exceeded eight billion. When viewed at night from the orbit, Earth is already full of the orange light of humans on land. As the capacity of Earth approaches its limits, to overcome further obstacles such as conflicts, and infectious diseases, we must consider mutualism, not only with humans but also with all life on Earth. At such times, it will be very important to have both a zoomed-out viewpoint that perceives Earth as a whole, and a zoomed-in viewpoint that captures it in high-definition data.

Through spaceflight, I understood the significance of perceiving both the whole and the individual, or the total and the part at the same time. From this perspective, I think the "NEDO Supply Chain Data Challenge" was a very good project. There were many ideas for integrating satellite data to observe large areas with a variety of data on the ground, and it increased the expectations for innovation. Furthermore, the accumulation of satellite data, including from the private sector, progressed, and I could sense the possibility that the provision of data from "Tellus," the satellite data platform, and other services could lead to the launch of a number of businesses which would be useful to various industries. At a time when there has been an invasion of Ukraine and during a period of time when supply chains in many countries has been hit by the COVID-19 pandemic, there will be an opportunity for Japan to be ahead of the curve and contribute to the world if it can establish a business that uses satellite data. In today's diverse society, where there is no one correct answer, the next business opportunity is born from the experience of failure. To this end, it is important to build a system that provides data that can be used by anyone and to create a business environment in which failures can be evaluated and tested again as long as they are the result of positive challenges.

The teams who participated were rich in a variety of backgrounds and ideas, and I was particularly impressed by the teamwork skills of the young people. I expect that we will be able to attract more attention from challengers by continuing these contests two or three times and that Japan will be the first in the world to usher in an era in which they compete to utilize satellite data.

Special Jury:
Astronaut,
MOHRI Mamoru
Director Emeritus of
the National Museum of
Emerging Science and Innovation

NEDO Supply Chain Data Challenge Review

AGE

Full of Possibilities

As an Opportunity to Cross the Barriers of the Space Business.

President and CEO, SPACETIDE Foundation and Specialist Director, A.T.Kearney

ISHIDA Masayasu

The reality is that there is still a high barrier between demonstrating the effectiveness of satellite data and its commercialization. I believe this contest is a springboard to overcome this barrier. In particular, by setting issues focused on the area of supply chain, more pointed and near launch proposals were gathered.

I hope that the participants will use the evaluation at this time as credibility and face the next steps of commercialization.

Making the Event as a "Place" to Connect Motivated People.

Chief Executive Thought Leader, Deloitte Tohmatsu Group

MATSUE Hideo

All of the participants' plans were highly complete, and I could sense their seriousness in pursuing commercialization. The prize project could be the perfect stage to make it known that satellite data can be used for business purposes. If the project is to continue in the future as well, I think its value as an event will be further enhanced by providing incentives for the top winners to join a type of salon and by delivering an opportunity to exchange knowledge and collaborate on business projects.

I valued NEDO's first attempt. I look forward to the further development.

Director, Strategic Planning and Business Development Department, Japan Space Forum

KOBAYASHI Yoshinori

This is probably the first time for a government prize contest to be held in Japan, and I think its significance is enormous. Compared to a contract agreement, it is easier for ventures and universities with technologies to participate, and by working on ambitious themes, non-winners can also hone their skills. I expect that many participants will seize the opportunity to step up by repeating this contest henceforward with media attention and making the contest grow into a more appealing program.

Turning This into an Opportunity to Discover and Boost New Players.

Specially Appointed Professor, the University of Tokyo Interfaculty Initiative in Information Studies

SHIBASAKI Ryosuke

This prize contest was a meaningful initiative because it covered a realistic topic, the supply chain, and it allowed us to discover new players from a wide range of fields outside of the universe. The use of satellite data is very important not only for logistics and the supply chain but also for national security. I wish that this opportunity will be a kick-off to new space projects for the participants.

This was a challenge to a new form of support, the prize project.

NEDO implemented its first prize project on its own with the expectation of creating excellent outputs for solving issues by widely soliciting knowledge and technologies and having participants compete with each other instead of R&D by a limited number of companies, as in conventional commissioned or subsidized projects. Since the key point is to have the participants propose multiple approaches to solving the problem, unlike in existing R&D support, NEDO discussed theme granularity and effective publicity channels while designing the system through unprecedented discussions with committee members, secretariat members, and others.

As a result, NEDO received applications not only from Japan but also from all over the world and is confident that it could select the winners in a spectacular manner at the final judging session. This helped create new ideas utilizing satellite data and revitalizing the industry by expanding its base. NEDO will continuously work to make the prize project a new pillar of its support system.

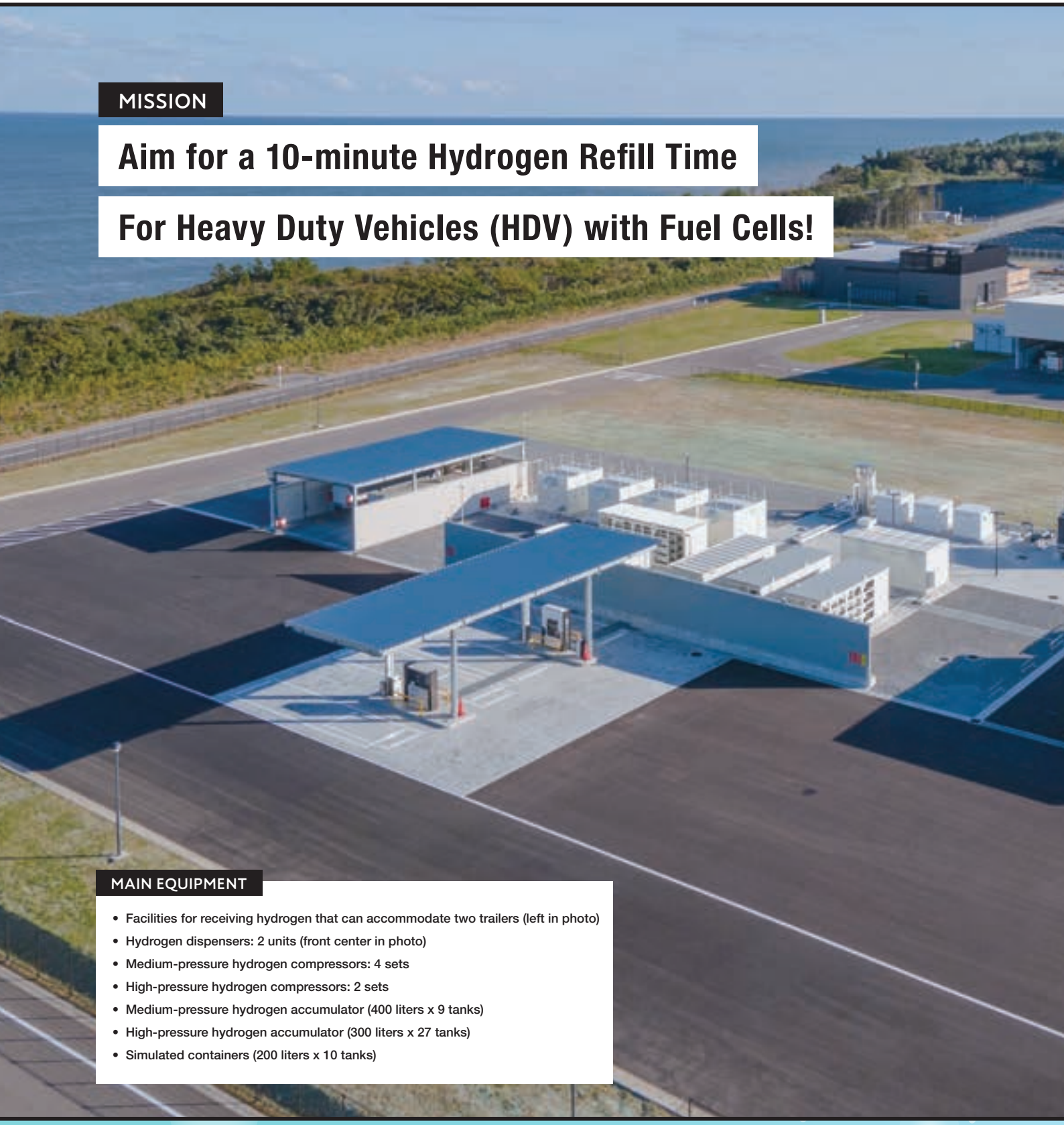
SATO Masaaki
Chief, Innovation Promotion Department, NEDO

Exploring the Future

Demonstration Facility

Toward the Decarbonization of Heavy Duty Vehicle

"Fukushima Hydrogen Refueling



MISSION

Aim for a 10-minute Hydrogen Refill Time

For Heavy Duty Vehicles (HDV) with Fuel Cells!

MAIN EQUIPMENT

- Facilities for receiving hydrogen that can accommodate two trailers (left in photo)
- Hydrogen dispensers: 2 units (front center in photo)
- Medium-pressure hydrogen compressors: 4 sets
- High-pressure hydrogen compressors: 2 sets
- Medium-pressure hydrogen accumulator (400 liters x 9 tanks)
- High-pressure hydrogen accumulator (300 liters x 27 tanks)
- Simulated containers (200 liters x 10 tanks)

(HDV)!

Technology Research Center"

Hydrogen energy is expected to be the ultimate clean energy. The "Strategic Road Map for Hydrogen and Fuel Cells (revised March 2019)" formulated by the Ministry of Economy, Trade and Industry (METI) calls for the development of hydrogen stations, including for Heavy Duty Vehicles (HDV). Still, there are issues to be addressed, such as developing methods for filling the large flow of hydrogen required for HDV and accurate measurement technology and standardization for safe filling.

To this end, NEDO promoted the development of the "Fukushima Hydrogen Refueling Technology Research Center," a research facility to develop and verify large-flow hydrogen filling technology and large-flow hydrogen measuring technology for HDV, as a part of the "Development of Technologies for Hydrogen Refueling Stations (project period: FY 2018-2023)," and started full-scale operation of the facility in December 2022. The Center is equipped with two hydrogen dispensers that can be filled with hydrogen at high flow rates.

In addition to this, the Center is the world's leading test facility for hydrogen refueling for HDV containing compressors that boost pressure to approximately 900 atm (87.5 MPa) and pressure accumulators capable of storing a large amount of hydrogen for testing, simulated containers, and other devices. In the Center, NEDO develops "large-flow hydrogen filling technology," which enables efficient hydrogen filling in a short time by controlling and adjusting the pre-cooling temperature and filling speed when hydrogen is filled. NEDO will establish a technology for hydrogen filling at a large capacity and high speed (filling 80 kg of hydrogen in approximately 10 minutes), which is required for HDV, and will proceed with efforts for international standardization by using obtained data. In order to measure hydrogen flow with higher accuracy, NEDO is developing the "Master Meter Method," a technology to inspect the metering accuracy of hydrogen dispensers at hydrogen stations by means of a portable flow meter (master meter) calibrated with standard flow meters. For HDV, this method enables more efficient and precise testing of hydrogen dispensers and reduces the cost of testing compared to a conventional inspection method (the gravimetric method), which require large and expensive equipment.

Through development at the Center, NEDO aims to realize hydrogen stations for HDV, which are expected to be introduced in many countries around the world as soon as possible.

Promising NEDO Startups

Startups growing into the future with NEDO's support

Innovator File.27

Providing Nano-satellite Solutions for a Wide Range of Applications from Low Earth Orbit to Lunar Infrastructure Construction

ArkEdge Space Inc.

Mr. FUKUYO Takayoshi
CEO

ArkEdge Space Inc. is a company that delivers a new business model by developing nano-satellites* and utilizing satellites to realize a "future where anyone can participate in the satellite business." The company achieves a significant reduction in the cost of manufacturing and launching satellites. It enables high-frequency satellite communications and earth observation through the operation of multiple satellites in orbit in a coordinated manner (constellation).

*Approx. 10cm x 20cm x 30cm.

Japanese Website
https://arkedgespace.com/
English Website
https://arkedgespace.com/en

Exhibition at CES2023 in Las Vegas.

Q What is the background of the NEDO's support project?

The project was adopted at the point when we were about to shift from the development and demonstration phases to the commercialization of nano-satellites in earnest, and that is when we received support for the project. In addition, as one of the recipients of this technology, we have been selected for a project to build a communications satellite constellation for ships, to monitor oceanographic conditions, and to digitalize the maritime industry.

Q What effect or impact did NEDO's support have?

The cost of developing and operating satellites that can withstand the harsh environment of space is a significant burden for startup companies. NEDO's support has not only reduced our financial burden but has also enhanced our credi-bility and helped us to win new business opportunities and projects.

Q What technologies and products are currently being commercialized?

We have developed and operated many nano-satellites, including the "RWASAT-1," a satellite for the first time in Rwanda, and the "OPTIMAL-1", a 3U nano-satellite. In addition to the orbit around the earth (near earth), we have developed and operated many spacecraft such as the "EQUULEUS," an ultra-compact lunar explorer, and the "Comet Interceptor," a comet explorer. We are involved in deep space exploration.

Q What is the ArkEdge Space's vision for the future?

In addition to expanding our business in areas such as satellite communications for ships (satellite VDES), IoT communications with low power to collect sensor information in mountainous and remote areas, and earth observation to collect image information over a wide frequency range, we will also develop and demonstrate the latest nano-satellites for lunar infrastructure construction, deep space exploration, and other applications.

It is essential to develop entrepreneurs with a "new technology" as a competitive power in order to revitalize the economy. Therefore, NEDO has been supporting startups from various angles, including R&D ventures. Among them, NEDO will introduce some notable startups that will continue to grow in the future.

Track Record of Adoption of NEDO's Projects

Adopted in July 2018

R&D Venture Support (NEP): Providing IoT and M2M Services Globally via Satellite Network of Nano-Low-Earth Orbit

Adopted in March 2023

Key and Advanced Technology R&D through the Cross-Community Collaboration Program/ Development and Demonstration Project of Maritime Situational Awareness Technology Based on a Constellation of VDES Satellites

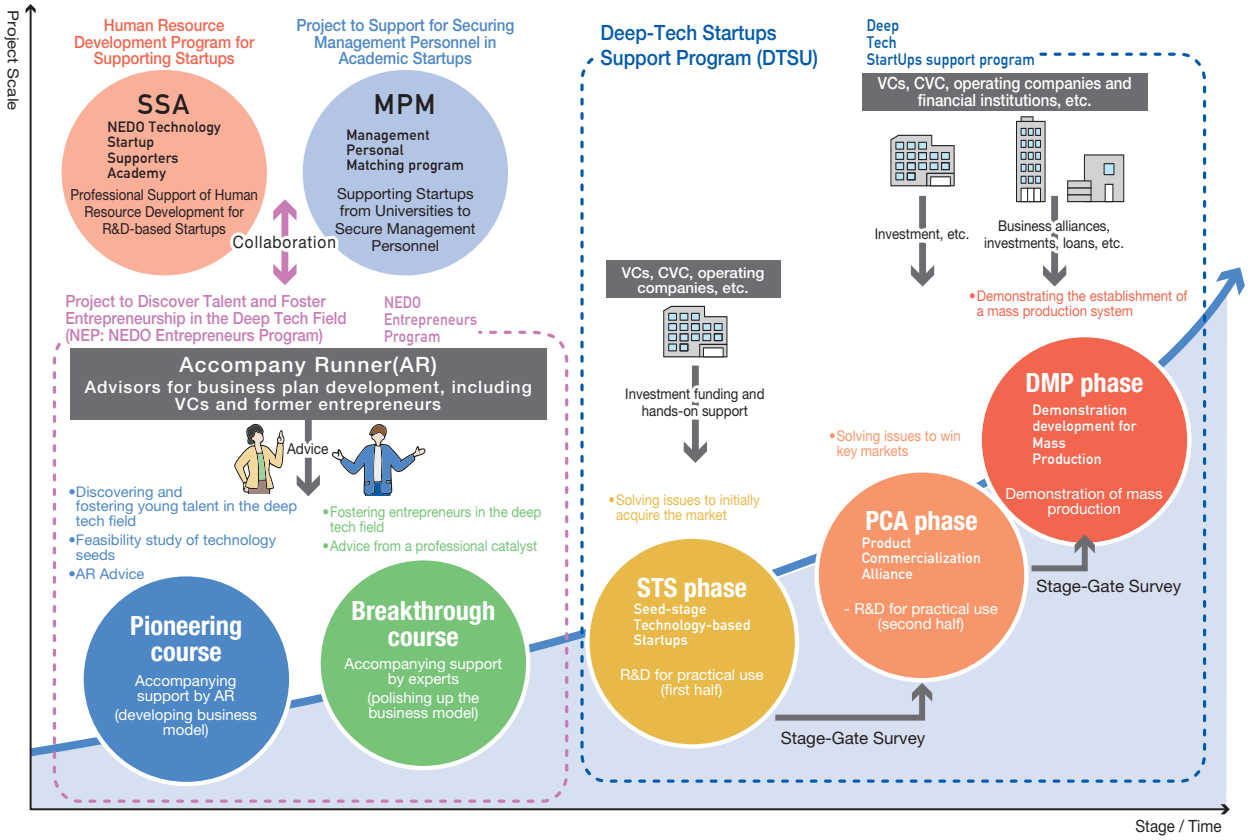
Adopted in July 2023

Research and Development Project for Technology Information Infrastructure of Space Industry (Development and Demonstration of General-Purpose Microsatellite Buses)

Turning Point

We were founded with the goal of implementing the nano-satellite technologies developed at the University of Tokyo into society. We applied for and got selected for the NEDO project at the timing of full-scale transition from the development and demonstration phases to commercialization and establishment of the system. NEDO's support is a big help during the mass production and market development phases.

NEDO's Startup Support Program



NEP Pioneering Course	NEP Breakthrough Course A and B	NEP Breakthrough Course C	STS Phase	PCA Phase	DMP Phase
Maximum 3 million yen for nine-ten months	Less than five million yen per case within 12 months	30 million yen or less/project within 12 months	300 million yen or 500 million yen/project 2/3 or less approximately 2-4 years	500 million yen or 1 billion yen or less /case 2/3 or less approximately 2-4 years	2.5 billion yen or less/case 2/3 or less or 1/2 or less approximately 2-4 years

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