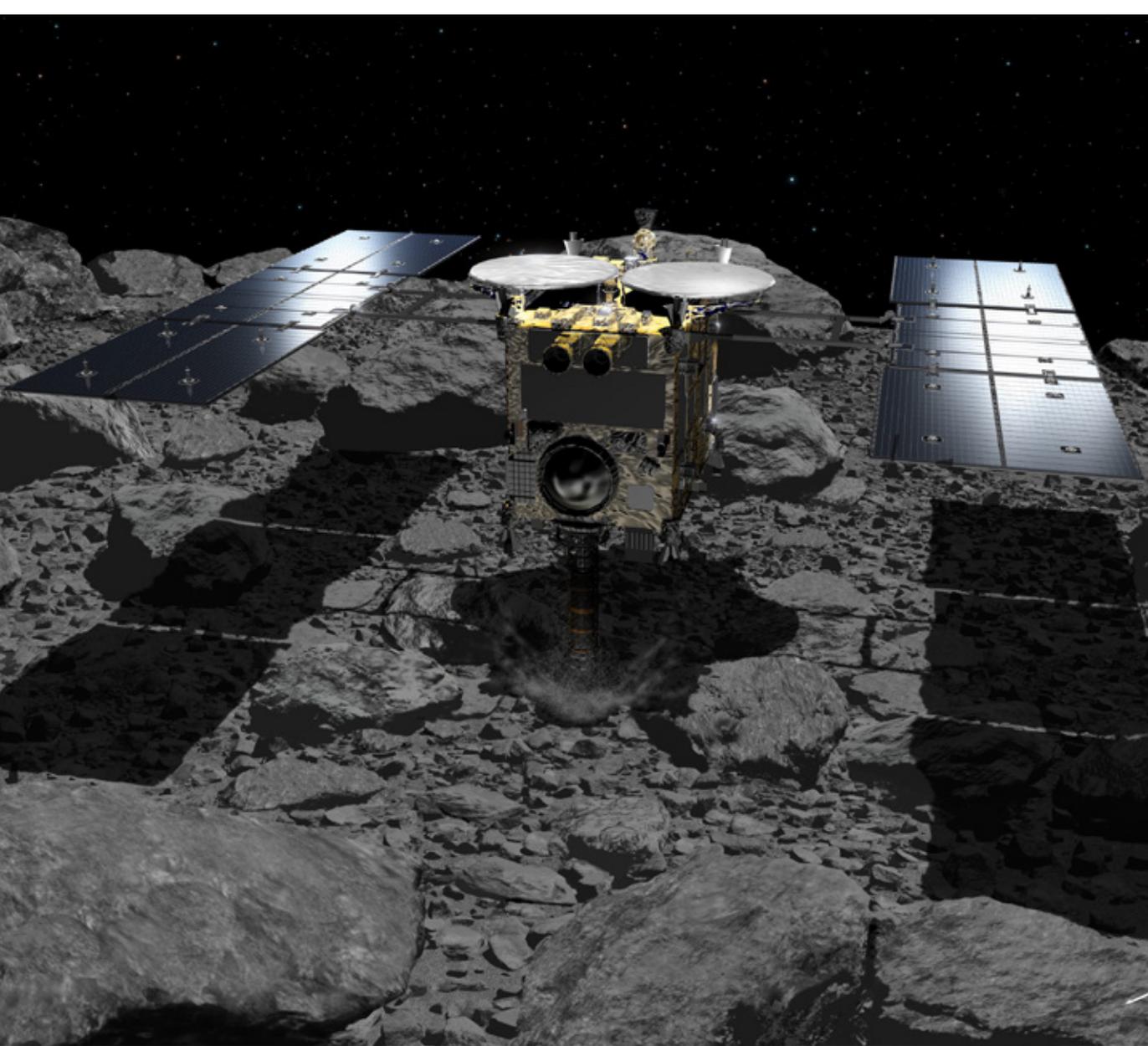


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EXPLORING SPACE

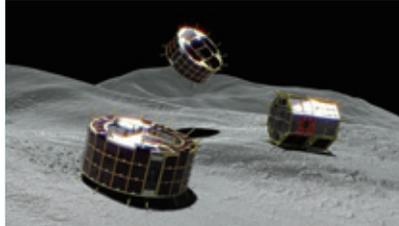
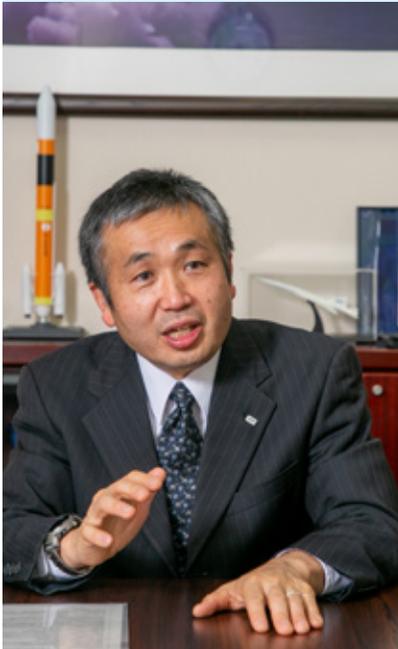
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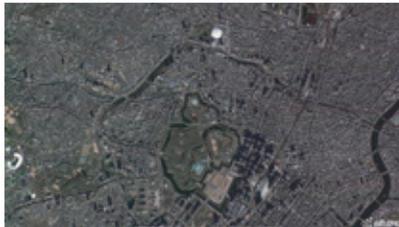
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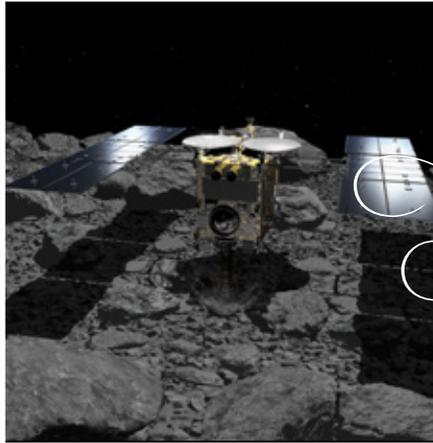
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THEME FOR **FEBRUARY:**  
**EXPLORING SPACE**

**J**apan's fascination with outer space is recorded in its earliest literature and is evident today in fields as varied as fashion, amateur stargazing and traditional rocket making. Japan's expertise in satellite manufacturing and space exploration meanwhile is attracting the attention of the world. All of the above come under the "telescope" in this month's issue of *Highlighting Japan*, "Exploring Space."

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A Journey to Warm the Body and Soul

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**ON THE COVER**  
Exploring Space  
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**EDITORS' NOTE**  
Japanese names in this publication are written in Japanese order: family name first, personal name last.



Photograph of the leaders shaking hands

## JAPAN-POLAND SUMMIT MEETING

On January 21, 2020, Mr. Abe Shinzo, Prime Minister of Japan, held a summit meeting with H.E. Mr. Mateusz Morawiecki, Prime Minister of the Republic of Poland, who was paying an official working visit to Japan.

As opening remarks, Prime Minister Abe welcomed Prime Minister Morawiecki's first visit to Japan, stating, "On the occasion of last year's 100th anniversary of the establishment of diplomatic relations between Japan and Poland, many high level visits realized, including the visit to Poland by Their Imperial Highnesses Crown Prince and Crown Princess Akishino, and various cultural programs were held, and they have significantly deepened the friendship between the two countries; today, I look forward to holding meaningful discussions so that we, as strategic partners, can elevate our bilateral relationship to the next level."

In response, Prime Minister Morawiecki stated: "Thank you for your invitation. I vividly remember the visit by Their Imperial Highnesses Crown Prince and Crown Princess Akishino, and I was honored to have an audience with Their Imperial Highnesses today. I am very pleased that the 100th anniversary of the establishment of Japan-Poland diplomatic relations has led to the deepening of our bilateral relations. I will work to further vitalize our bilateral exchanges in political, economic, and cultural fields."

Prime Minister Abe welcomed that the bilateral cooperation has made progress in various areas, in line with the Action Plan for the Implementation of the Strategic Partnership for the years 2017-2020. Prime Minister Abe expressed the view that Japan would like to deepen its cooperation with Poland, a country enjoying solid economic growth and gaining increasing importance in the European Union (EU), and that he intends to promote Japan-U.S.-European coordination and "V4+Japan" cooperation. Furthermore, Prime Minister Abe expressed an intention to begin working on drafting Action Plan based on the outcomes of Prime Minister Morawiecki's visit. Prime Minister Abe also stated, "Japan hopes to expand security dialogues with Poland,

which is fulfilling an important role in European security."

In response, Prime Minister Morawiecki stated: "The strategic partnership between Japan and Poland is critical, and our relations have deepened in a variety of areas. The two countries share the view on many issues, such as the importance of free trade. Poland is in close relation with Europe, the United States, and Japan, and intends to work with Japan to resolve various issues. Poland also attaches importance to strengthening political relations with Japan. The V4 is increasing its importance, and I intend to work to strengthen the V4-Japan cooperation."

The two leaders exchanged views regarding the situations in East Asia and Europe, and shared the view that Japan and Poland, as strategic partners, will coordinate with each other toward maintaining and strengthening an international order based on the rule of law. Regarding North Korean issue, the two leaders shared the view on continuing to work closely toward the complete denuclearization of North Korea, including full implementation of United Nations Security Council resolutions. In addition, Prime Minister Abe asked for Prime Minister Morawiecki's understanding and cooperation for the early resolution of the abductions issue, a top priority for Japan, and obtained the Prime Minister's support.

The two leaders also exchanged views regarding the Brexit, and shared the view that it is important for both the EU and Japan to build close relations with the United Kingdom after its withdrawal from the EU.

### **Note: V4 (Visegrad Group)**

A sub regional cooperation framework consisting of the Czech Republic, Hungary, Poland, and Slovakia. The group was founded in Visegrad in Hungary in 1991.

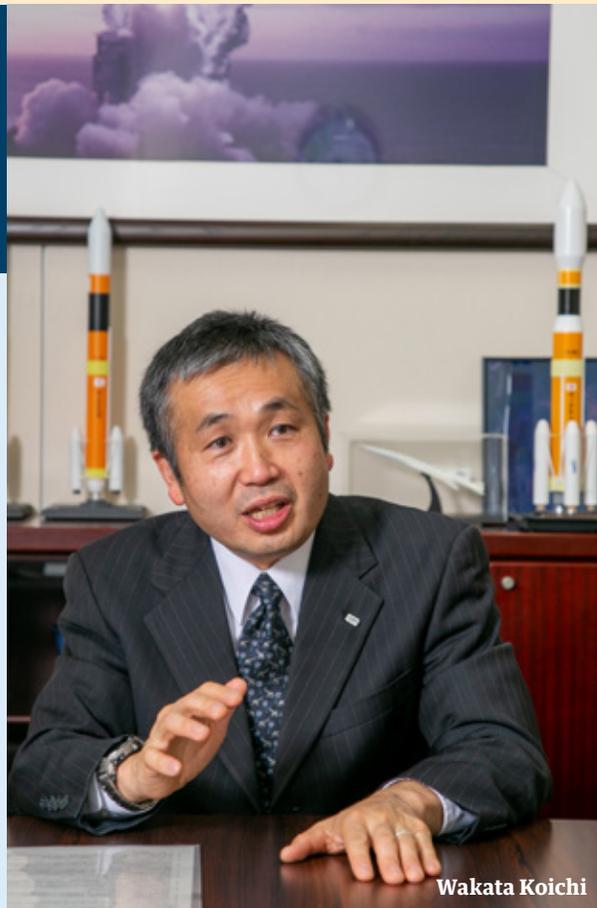


Photograph of the Japan-Poland Summit Meeting



# EXPLORING SPACE

“Japan is contributing to the resolution of global issues through its space technology,” says Wakata Koichi, astronaut and Vice President of the Japan Aerospace Exploration Agency (JAXA), in our Interview on the following pages. Japan’s strength, according to Wakata, “lies in its technology: explorers such as Hayabusa2 and rockets with high launch success rates.” Japan’s technological strength in the field is also underpinned by a long and broad fascination with outer space among ordinary people, which is another focus of this month’s issue of *Highlighting Japan*, “Exploring Space.”



Wakata Koichi

**W**AKATA Koichi, Vice President of the Japan Aerospace Exploration Agency (JAXA), is an astronaut who has had four space flights to date, logging a total of 347 days in space. We asked Wakata about his impressions of space, his work as an astronaut, and Japanese space development.

**What triggered your interest in space?**

In 1969, when I was 5 years old, Apollo 11 brought humans onto the surface of the Moon for the first time. I watched the lunar landing on TV and longed to go to space. But at the time, astronauts were exclusively from the United States or the former Soviet Union, and I felt it would be difficult for me as a Japanese to get into space.

# Space Exploration to Protect Earth

Because I've loved airplanes since I was a kid, after I studied aeronautical engineering at university, I joined an airline company as an engineer and I was fulfilled at work every day. During my third year with the airlines, I saw an advertisement for astronaut candidates in the newspaper. I recalled my dream of going to space at the age of five and applied. I never dreamed I would get through, but fortunately I was selected as a candidate in 1992.

**What impressions have you taken away with you from your space flights to date?**

I will never forget the sight of the blue Earth when I flew in space for the first time on the Space Shuttle in 1996. It made me realize how lucky I was to have been born on such a beautiful planet.

My stay on the International Space Station (ISS) from November 2013 to May 2014, which was my fourth space flight, also made a lasting impression on me. The ISS orbits the Earth sixteen times a day, which means that if you stay on the ISS for six months, you will orbit the Earth more than 3,000 times. This gave me a sense of how small and vulnerable the Earth is. In the same way that a breakdown of the equipment that removes CO2 on the ISS would endanger the lives of its crew, the destruction of the Earth's natural environment poses a danger to humanity. I became acutely aware that the technologies developed and new knowledge gained in long duration space flight on the ISS and human exploration to the Moon and Mars not only expand the scope of human activities beyond the Low Earth Orbit but are also significant for protecting the Earth's natural

environment and the survival of humanity.

**During your fourth space stay, you became the First Japanese Commander of the ISS. What was your approach as commander?**

When I served as ISS commander, my crew consisted of two Americans and three Russians. The role of a commander is to bring out the abilities of individual crew members and maximize the outcome as a team. Also, as a crew commander, I tried to create a team which places importance on the spirit of harmony. From training before the flight onwards, I communicated frequently with my crew mates and worked to create a team in which crew members could speak their minds without hesitation.

ISS space food menu items consist of standard food and “bonus food,” and I also used the bonus food as a means of communication. Crew members can select their preferred bonus food items, and I selected the food items that my colleague crew members might like. Treating my crew mates with the bonus food helped me have smooth and relaxed communication with them. The curry rice, fish dishes and other Japanese food that I selected as bonus food went down extremely well. In the closed environment in the ISS with little entertainment to hand, such small shows of consideration for others are important.

**What are Japan’s strengths when it comes to space exploration?**

Japan is contributing to the resolution of global issues with its space technology. Japan’s strength lies in its technology, for instance, explorers such as Hayabusa2 landing on asteroid Ryugu, rockets with high launch success rates, and the cargo transporter Kounotori that delivers supplies to the ISS.

Moreover, Japan’s greenhouse gases observing satellites are internationally recognized for providing highly reliable data. The outcome of

the wide range of experiments being conducted on the Japanese Experiment Module called “Kibo” of the ISS will no doubt continue to make significant contributions in various fields such as development of new drugs and medical research to cope with aging. What is more, a total of 244 small satellites have been deployed from “Kibo” to date. These include many satellites developed as part of Japan’s international cooperation efforts, with some countries including Kenya, the Philippines and Costa Rica launching their first satellites from “Kibo.” Such human resource development in developing countries in the field of space technology is also an important role played by Japan.

**What projects is JAXA currently involved in?**

In October 2019, Japan decided to cooperate with the United States in the moon exploration which aims to land US astronauts on the moon by 2024. JAXA plans to launch Smart Lander for Investigating Moon (SLIM) in FY2021, which aims to demonstrate the high-precision landing technology necessary for lunar exploration. In FY2023, we plan to launch a robotic explorer that will land on the south pole region of the moon to explore the water resource in collaboration with India. The findings from these missions will also make a significant contribution to the crewed missions to the moon.

JAXA is also working with Toyota Motor on the joint research of a fuel cell-powered crewed pressurized rover which will roam the lunar surface. In the future, we plan to form more partnerships with the private sector that has had no previous involvement in space activities in order to research and develop technologies that are useful both in space and terrestrial applications. 

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Interview by SAWAJI OSAMU

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Members of the Hayabusa2 project in the control room at JAXA's Sagamihara Campus in Kanagawa Prefecture  
Photo: Courtesy of ISAS/JAXA

# Unraveling the Origins of Earth and Life

**H**AYABUSA2 was launched in December 2014. In June 2018, it finally arrived at the asteroid Ryugu, roughly 300 million kilometers from Earth. It spent one year and five months around the 1,000-meter-diameter asteroid, completing a number of missions before bidding farewell and setting off on its return trip to Earth in November 2019.

“In short, the project’s aim is to collect surface samples from the asteroid and bring them back to Earth. Hayabusa2 inherited this mission from its predecessor Hayabusa, which was launched in 2003,” explains Yoshikawa Makoto, Hayabusa2 Mission Manager at the Japan Aerospace Exploration

Agency (JAXA). Hayabusa2, an asteroid explorer, reached the surface of the asteroid Ryugu in 2019, successfully collecting samples which hold the key to unraveling the origins of both our solar system and life on Earth. As of January 2020, Hayabusa2 has completed its grand mission and is en route back to Earth.

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**SASAKI TAKASHI**

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Agency (JAXA).

Hayabusa was a spacecraft that landed on the asteroid Itokawa, roughly 320 million kilometers from Earth. It became the world’s first spacecraft to land on a celestial body other than the moon, collect a sample and return to Earth with it. The journey was incredibly risky, with its seven-year return to Earth now heralded as a miracle,



The surface of Ryugu  
Photo: Courtesy of JAXA, University of Tokyo & collaborators

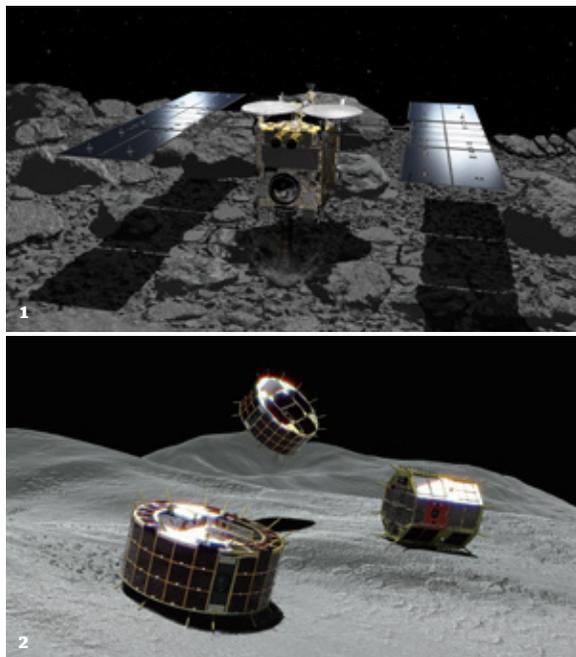
having overcome communications blackouts, engine failure and other troubles.

“Hayabusa met with a number of unforeseen issues, because returning an asteroid sample to Earth had never before been attempted. With Hayabusa2, however, we dramatically improved the space probe’s performance and our operational capacity by subjecting the craft to rigorous testing based on those situations encountered by Hayabusa. So far, we haven’t had any major issues, and from what we can tell from photos and video footage, sample collection went off without a hitch,” says Yoshikawa.

But why is Hayabusa2 bringing asteroid samples back to Earth? The main goal is to analyze the samples, shedding light on the basic building blocks of our planet and the life on it, and the birth and evolution of our solar system. When the solar system was born 4.6 billion years ago, so was our Earth. The building blocks of Earth were melted when Earth was formed, so we cannot know what the building blocks of Earth were just by studying the material of the current Earth. Asteroids in our solar system like Ryugu, however, remain largely unchanged from the time of the solar system’s birth. It is highly likely that the basic building blocks which formed our Earth and the rest of the solar system remain on these asteroids.

On this mission, the Hayabusa2 touched down on Ryugu twice to obtain samples. This was done by firing a 5 g metallic projectile into Ryugu’s surface at high speed at the moment of arrival, with samples obtained from among floating material displaced by the collision. Before the second touchdown, Hayabusa2 succeed in creating the world’s first man-made crater on an asteroid, roughly 10 meters across and 2-3 meters deep, by firing a 2 kg copper lump at Ryugu from high altitude—about 300 meters away. The second touchdown was made close to this crater. Experts predict that with this touchdown, Hayabusa2 successfully collected subsurface samples of the asteroid, from a place not affected by sunlight or radiation.

Aside from the sample collection, Hayabusa2 also succeeded in deploying two rovers developed by JAXA. The rovers were automated, taking

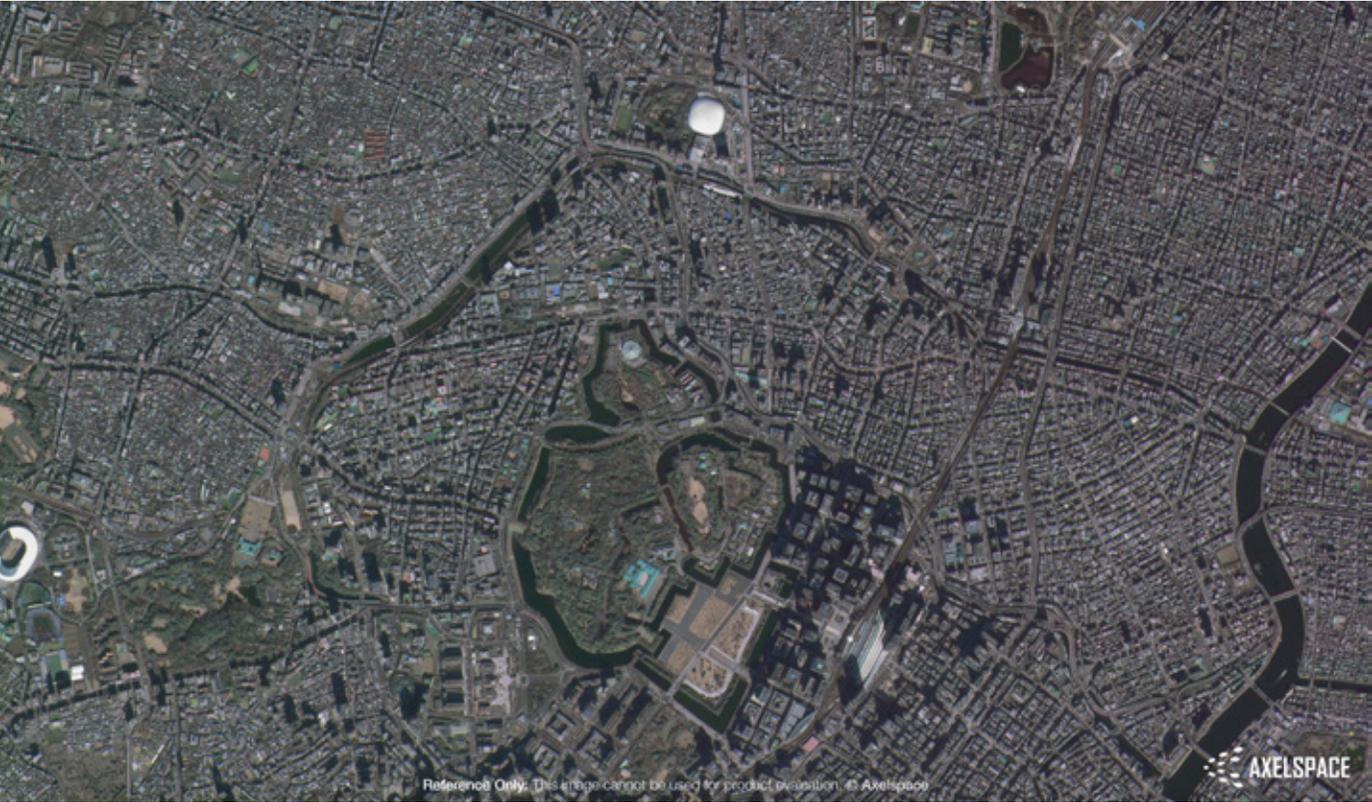


1 Illustration of the Hayabusa2 touch down on Ryugu  
2 Illustration of rovers exploring the surface of the asteroid  
Illustrations: Courtesy of Ikeshita Akihiro (1); Courtesy of JAXA (2)

photographs as they hopped along the asteroid’s surface. In addition, Hayabusa2 dropped off a small lander called MASCOT, jointly developed between Germany and France, which took detailed photographs of the surface and measured surface temperature and magnetic fields.

“Our organization’s budget size pales in comparison to NASA (The National Aeronautics and Space Administration) or ESA (The European Space Agency). Yet even so, we have gone where no man has gone before in terms of asteroid exploration. This has led Western researchers to take great interest in Hayabusa2. In particular, our singular technology and operational capacity which enables pinpoint landing on asteroids may find wide application in future aeronautical development undertaken by international cooperatives,” says Yoshikawa.

Hayabusa2 will return to Earth around the end of 2020, after a long, six-year journey. If the collected samples can be analyzed, they may provide a clue towards solving the great mystery of where our solar system and life on this planet originated. **7**



Reference Only. This image cannot be used for product evaluation. © Axelspace

Central Tokyo as captured by a GRUS microsatellite in the AxelGlobe Earth observation network

# Microsatellites as Social Infrastructure

**A Japanese startup company is developing businesses that utilize microsatellites with the aim of making a contribution in areas such as the global environment, agriculture and infrastructure.**

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**UMEZAWA AKIRA**

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**A**XELSPACE Corporation, a startup company working on the development of commercial microsatellites, was founded in 2008 by Nakamura Yuya and two of his colleagues. The idea for the start-up originated when Nakamura was a university student involved in a

All photos: Courtesy of Axelspace Corporation

project to develop “CubeSat,” a microsatellite, being a cube with 10 centimeter sides and weighing around 1 kilogram. The CubeSat was launched in 2003, successfully capturing images of Earth from orbit. Nakamura went on to work on three microsatellite projects during his time at university, which heightened his passion for satellite development.

“I was a student, but as a beginner engineer, I was really impressed by the thrill of seeing something I had created travel into space and work as it was designed to do. At the same time, I felt a strong desire to create something useful for the world using microsatellite technology,” says Nakamura.

In 2013, the company developed and successfully launched WNISAT-1, weighing 10 kilograms and equipped with optical cameras for the purpose of monitoring sea ice in the Arctic Sea. WNISAT-1 became the world's first commercial microsatellite owned by a private company. 2014 saw the launch of Hodoyoshi-1, weighing 60 kilograms and equipped with optical cameras capable of identifying objects with a ground resolution of approximately 6.7 meters. So far, it has captured more than 4,000 images. In 2017, WNISAT-1R, weighing 43 kilograms, was launched as the successor to WNISAT-1.

The company is currently working on the construction of the next-generation Earth observation network named "AxelGlobe," consisting of more than ten microsatellites called "GRUS," weighing 100 kilograms each. GRUS is capable of identifying objects with 2.5 meters ground resolution.

"Until now, satellite imagery was costly and its capture intervals were too long to be satisfactory for most users. Therefore, we aimed to build a system that was capable of high-frequency, timely monitoring by placing dozens of low-cost microsatellites in orbit," says Nakamura.

The first GRUS satellite was launched in 2018, followed by the start in May 2019 of a service that



Nakamura Yuya holds a 1:2 scale model of a GRUS microsatellite

provides the captured images. By mid-2020, four more satellites will be launched, and in 2022 the company aims to have a satellite network comprising more than ten satellites.

"The launch in 2020 will give us a total of five observation systems, enabling images of most of the planet's surface to be captured on an almost daily basis. This will enable us to empirically demonstrate applications that require frequent observations using actual data," says Nakamura.

Examples of applications include the monitoring of conditions for growing crops, early detection of illegal logging, and the monitoring of infrastructure. According to Nakamura, in addition to these conventional applications, he is receiving many requests for applications he hadn't even imagined from all over the world.

"The major advantage to starting AxelGlobe's services is that clients themselves have found ways to use them. This allows us to ascertain the needs of such clients in real time, and feed that back into the satellite development process. Going forward, comparing real-time data to data accumulated in the past will enable us to identify the kinds of changes currently taking place as well as predict what will happen in the future. I would like to establish microsatellites as the new social infrastructure," says Nakamura, his eyes lighting up. ▮

Haneda airport as captured by a GRUS microsatellite in the AxelGlobe Earth observation network



# A LITERARY HISTORY OF THE HEAVENS

**The sun, moon and stars have been popular topics in Japanese literature for centuries and still attract many readers today.**

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**SATO KUMIKO**

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**H**EAVENLY bodies are beloved themes of myths, folktales and poems around the world, and Japan is no exception. Professor Suzuki Ken'ichi of the Faculty of Letters at Gakushuin University, compiler of *Tenku no bungakushi: Taiyo tsuki hoshi* (Literary History of the Heavens: The Sun, Moon and Stars), says the *Kojiki* (Records of Ancient Matters), Japan's oldest historical chronicle (712), is also the first example of Japanese literature to feature heavenly bodies.

In the creation myth in the *Kojiki*, Amaterasu Omikami, the sun goddess, leaves the earth in darkness when she flees to a dark cave and only returns light to the world when she reemerges.

According to the myth, Amaterasu was born from the left eye of Izanagi-no-Mikoto, a god of creation, while Tsukuyomi-no-Mikoto, the moon god, was born from his right eye. Professor Suzuki notes that it is interesting that the sun goddess and the moon god are seen as eyes watching over the world.

“The sun and the moon must have been very

mysterious to ancient people. I believe they expected the sun and the moon to answer fundamental questions about their past and future.”

*Taketori monogatari* (The Tale of the Bamboo Cutter) is a popular Japanese folktale from the late ninth century in which an old bamboo cutter called Taketori-no-Okina finds an infant girl inside a mysterious stalk of bamboo. He and his wife raise her as their own and name her Kaguya-hime (shining princess of the supple bamboo) as she grows into a woman of extraordinary beauty. Eventually, she reveals that she is not of this world and returns to her people on the moon.

“As the day of her return approached, the Mikado [Emperor] positioned many guards around her house in vain to protect her from the moon people. This suggests that the moon was seen as something transcendent.

“The story is deeply touching as Kaguya-hime says that she adores spending time with the old man and his wife, and would rather not return to the moon, where nobody grows old or dies.”

“A certain melancholic impression of the moon dates back to the influence of Bai Juyi (771-846), a Chinese poet who was very popular in Japan in those days. Therefore, there are many lyrical poems from Japan associated with the autumn sadness of the moon.”

Professor Suzuki considers the following poem to be representative of those that express autumn melancholy.

*Tsuki mireba / chi-di ni mono koso / kanashikere wa ga mi hitotsu no / aki ni ha aranedo*

When I look at the moon / I am overcome by the sadness / of a thousand, thousand things— / even though it is not Fall / for me alone.



Matsuo Basho depicted by Yosa Buson  
Photo: Courtesy of Basho Museum



From an Edo-period picture scroll of *Taketori monogatari*: Kaguya-hime returns to her people on the moon  
 Photo: Courtesy of National Diet Library

– From the *Kokin Wakashu*, by Oe no Chisato, nobleman and poet, late ninth to early tenth century  
 (Trans. Dr. Joshua S. Mostow)

There are relatively few poems about the stars compared with those about the moon. Kenreimon-in Ukyo no Daibu (c. 1157-year of death unknown) is one poet who depicted the beauty of the stars.

*Tsuki-wo-koso nagamenareshika hoshinoyono fukaki awarewo koyoishirinuru*

It is upon the moon / That so often I have gazed enraptured, / But tonight / I have come to understand at last / The profound beauty of a starlit sky

– From an anthology of poems by Kenreimon-in Ukyo no Daibu (Trans. James G. Wagner)

Matsuo Basho (1644-1694), the most famous poet of the Edo period (1603-1867), embraced and expressed *wabi* (satisfaction with simplicity and austerity) and *sabi* (contented solitude). The following is one of his best known poems.

*Meigetsu ya / ike wo megurite / yomosugara*

The autumn full moon: / all night long / I paced round the pond  
 (Trans. Dr Thomas McAuley)

Meanwhile, Yosa Buson (1716-1784), painter and poet, composed the following panoramic poem depicting the sun and moon in the sky as well as the land full of rape blossoms.

*Nanohana ya / tsukiwa higashi-ni / hiwa nishi-ni*  
 Rape blossoms / and the moon in the east / the sun in the west

(Trans. Allan Persinger)

“Haiku is the shortest type of poem, consisting of just seventeen ‘syllables.’ Through its succinct form poets communicate the essence of the Japanese view of nature or aesthetics shared in society,” says Professor Suzuki. “*Saijiki*, a list of seasonal terms used in Japanese poetry, aids in understanding certain aspects of Japanese culture. Some sections refer to the heavens, including the sun, moon, stars and the weather. It has been translated into multiple languages. I hope you have a chance to read the book.” 

A Ryusei rocket flies high into the sky



# The Dragon Ascends!

**In Chichibu City, Saitama Prefecture, the tradition of making and launching Ryusei rockets has continued for more than 400 years.**

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**SASAKI TAKASHI**

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**I**GNITED at the top of a 25-meter-tall launch tower, a Ryusei rocket flies off high into the sky letting out a great sound and leaving a trail of thick white smoke. Once it reaches a height of 300 meters, the parachute opens with a bang, and the rocket slowly begins to fall. At that moment, cheers and applause ring out from a gallery of nearly 100,000 spectators.

Ryusei are handmade rockets, the manufacturing techniques for which have been passed down from generation to generation among the people of the Yoshida area of Chichibu City, Saitama Prefecture, for about 400 years. The name “Ryusei” means “ascending dragon,” the *ryu* being the dragon of Japanese legend.

On the second Sunday of October every year, Ryusei are launched as a Shinto ritual in an annual festival at Chichibu’s Muku Shrine. In 2018, the ritual was designated as a national important intangible folk-cultural property.

According to Hasegawa Kiyomi, vice president of the Society for the Preservation of Ryusei-Festival in Yoshida, “there are several areas in Japan where traditional handmade rockets have continued to be made. Ryusei from the Yoshida area of Chichibu are the only ones where everything has continued to be made by hand, all the way down to the mixing of the gunpowder which acts as fuel, without relying on professionals. This and the fact that the ancient method for making Ryusei by hand, passed down by oral tradition, has been preserved are some of the main reasons that it was designated as a national

All photos: Courtesy of Nozawa Fumio/MICKEY Co., Ltd.



- 1 Ryusei from the Yoshida area of Chichibu are made entirely by hand
- 2 A *kayakutou* gunpowder tube
- 3 Transporting a *yagara* rocket shaft to the launch tower
- 4 The rocket launch tower



cultural asset.”

Ryusei are made up of three large components. First, is the *yagara* (shaft), made from dried green bamboo that was cut in winter. It is about 18 meters long, and has the role of stabilizing Ryusei’s flight. The *shoimono* (carried items) are the paper umbrella, fireworks, parachute and other mechanisms set up at the end of the *yagara*, and fastened below that is the *kayakutou* (gunpowder tube). According to Kato Goro, a staff member of the Preservation Society and follower of the Jyoumine zuiunryuu school of the Ryusei tradition, “the construction is just as it was in the past, and in principle, it is the same as solid fuel rockets. This is why a person from NASA (National Aeronautics and Space Administration) who looked at materials on Ryusei said, ‘if scientists had known about Ryusei, our progress with rockets would’ve been ten years faster.’”

Currently, twenty-five schools are active, each with ten to thirty members. On the day of the annual festival at Muku Shrine, thirty Ryusei rockets are launched at 15-minute intervals, with the *shoimono* differing according to the school.

Not all Ryusei launches are successful. Some do not rise into the air, and sometimes the top of the launch tower explodes. This makes the success of a perfect launch all the more joyous, and there are more than a few members who involuntarily burst

into tears.

Even though the Ryusei of the Yoshida area bring excitement each year, the issue of lack of successors has become a problem. Gathering all the members of each school and working together has become difficult as the declining birthrate and aging population progress, the number of full-time farmers decreases, and most people leave the area to work in the city. At the same time, the Preservation Society is putting effort into outreach programs at schools. For two hours per week over about five months, lessons on creating parachutes for Ryusei, carving pipes for gunpowder, and more have been held at Yoshida Elementary School since 2003 and at Yoshida Junior High School since 2010.

“Because we handle gunpowder, you have to be 18 to become a member,” says Hasegawa, “but in the past, people who would later become members began to appear from among the kids that I taught at my elementary school. I’m really happy when someone calls out to me at meetings and other times, saying, ‘Long time no see, Ms. Hasegawa!’”

At Michi no Eki Ryusei Kaikan in the Yoshida area, films of Ryusei launches are shown on a large screen alongside exhibits of Ryusei and the towers used for launches. Local people are coming together to work on outreach programs so that there is a future for the tradition of handmade rockets. 

# Beautiful Starry Skies Inside

**A Japanese planetarium manufacturer with almost 100 years of history continues to attract visitors in Japan and overseas with its beautiful starry “skies.”**

**SASAKI TAKASHI**

**I**N 1910, Halley’s Comet passed close to earth on its roughly 75-year orbit of the sun. At that time, Goto Seizo, 19, who lived in Kochi Prefecture, was excited to see it in the sky, and the experience deepened his interest in astronomy. In 1926, Goto founded Goto Optical Mfg.



A 45-cm telescope at the University of Chile

All photos: Courtesy of Goto Inc.



Co. (now Goto Inc.) in Tokyo, beginning the development and sales of telescopes for the public.

“At that time, astronomy telescopes were very expensive, and only large research institutions such as astronomical observatories were able to possess them,” says the current president of the company, Goto Nobutaka, Seizo’s great-grandchild. “However, the telescope that Seizo created was compact, but with sufficient performance, and was also low-priced. He received a rush of orders.”

The company’s astronomy telescope was adopted for use in school science classes and held an 80 percent market share in Japan at one time, but Seizo began to explore the development of a totally new product around 1950.

Goto says, “I think my great-grandfather might have felt a sense of crisis because a small and medium-sized company like ours cannot compete with large companies in terms of volume production. At such time, he encountered a planetarium on an overseas visit to the United States.”



The Hybrid Planetarium in Anjo City, Aichi Prefecture

In those days, a well-known Germany-based optical instrument company was the only one manufacturing planetariums. However, a lens-type planetarium, completed by Goto in 1959, had performance equivalent to the existing German planetarium, and was sold at about one tenth the price. The planetarium attracted a great deal of attention around the world.

The company continued the development and volume production of a variety of planetariums from small to very

large, delivering a large number of planetariums to astronomical observatories, museums and commercial facilities in Japan and around the world. One of its representative products is the Hybrid Planetarium, the world's first planetarium system, developed in 2004, which integrates an optical mechanical projector and a full-dome digital video system. In addition, Chiron, which can project more than 140 million stars, was developed in 2010 and Chiron II using LED light sources was developed in 2012.



Goto Nobutaka with a Chiron III projector

Its upgraded version, Chiron III, renders all of the approximately 9,500 visible stars in their specific colors, reproducing not only their brightness, but also the color of the stars faithfully for the first time in the world.

Goto says, “Our company sticks to thorough manufacturing of our products because we want to make the starry sky that our planetarium projects closer to the real thing. Now, we are not able to see the Milky Way from central Tokyo, but if you climb mountains with clean skies, you can see a beautiful starry sky any time. We want as many people as possible to take an interest in the stars and outer space after their visit to a planetarium and be moved by the real beauty of the starry sky.”

The enthusiasm for the starry sky of the founder, who was charmed by Halley's Comet and then began to manufacture an astronomy telescope of his own, is still alive today. **7**

# A Town *With* Bountiful Twinkling Stars

UMEZAWA AKIRA

**I**N Ibara City, located in the southwestern part of Okayama Prefecture, is Bisei Town, a place known as the Beautiful Star. Just as the name suggests, the sparkling stars in the night sky are beautiful in Bisei, and the town is dotted with facilities for astronomical observation. Many amateur stargazers and fans of astronomy gather here. Among the facilities, the Bisei Astronomical Observatory has gained popularity as a place where anyone can casually enjoy stargazing.

Itoh Ryosuke, an engineer at the Observatory, says, “the Bisei Astronomical Observatory was opened in 1993 as a place for lifelong learning for city residents.

Crowds at a Stargazing Party



All photos: Courtesy of Bisei Astronomical Observatory

Albireo viewed through the Observatory telescope



Having the highest number of days with clear skies in Japan, the Bisei Town area of Ibara City, Okayama, boasts beautiful starry nights and is visited by many people for astronomical observation.

In addition to residents of Ibara City, many people from neighboring Kurashiki City and Fukuyama City come to observe, as well. We also host events where ordinary people can casually enjoy the starry skies in addition to training and supporting the activities of amateur stargazers by loaning out large-scale telescopes at night, for example.”

From 6 pm on Friday through Monday each week, a Stargazing Party is held at the Bisei Astronomical Observatory. At this popular event, participants can observe the seasonal celestial bodies using a large 101 cm-diameter telescope, and every year, roughly 14,000 people attend. The event attracts many families and couples.

Inside the dome where the telescope is stored, the Observatory employee enters the desired celestial body into the computer and the telescope turns and changes directions while making a deep sound. Then the visitors each take turns taking a look through the lens. The employee explains, “What you are looking at is Albireo in the Cygnus constellation. This is the star that makes up the beak of the swan.” Out on the veranda that wraps around the outside of the dome, other employees are explaining the night sky using large binoculars and volunteers are explaining the constellations. There were a few clouds out on this night, but we were still able to see many stars, more than you could ever see while in town.

One man, who came with his wife and two elementary school children, gave his impressions of the Observatory, saying, “I myself like space, so I

came today thinking I wanted to show the universe to my kids. I want to come again during another season as my kids have become interested.”

Itoh explains why astronomical observation has become popular in Bisei Town.

“There are three conditions for astronomical observation. They are: high amount of days with good weather, minimal air fluctuations, and a dark sky. It is well known that Okayama Prefecture has a high amount of days with good weather, but the Prefecture also has some of the most minuscule air fluctuations due to temperature change and wind in Japan. Because of this, private-public observatories were built in Kurashiki City in the 1920s, but the sky became brighter due to the effects of urbanization and the environment for making observations worsened, so Bisei Town in the mountains became the ideal spot for observations.”

Because of this history, an Optical Environmental Disruption (Light Pollution) Prevention Ordinance to preserve the beautiful starlit skies in Bisei Town was established and put into effect in 1989.

“The regulations have established rules, such as turning off all outdoor lights except for security lighting and other essential lights at 10 pm and keeping light from seeping out into the night by blocking it with curtains, for example, in places like offices where large amounts of light are used. At the

Bisei Astronomical Observatory as well, we teach children who come to visit about the importance of maintaining a dark night sky.”

From 2019, the Bisei Tourism Association has taken center stage in working on activities for the Bisei Hoshimori Project. Specifically, they are working to change LED street lights to a color that has low light diffusion and are calling for vending machine lights to be turned off after 10 pm, among other initiatives. They are also aiming to receive Dark Sky Place recognition, a kind of World Heritage Site for starry skies, from the International Dark-Sky Association.

Itoh says he wants to leave behind a suitable environment for stargazing in the future through these kinds of initiatives.

“The beauty of the stars seen in the pitch black night sky is simply extraordinary. I want to share this splendor with as many people as possible.”





Participants in the fashion show

# Sora Fes: Sharing a Sense of Wonder

An unusual festival is pulling in the crowds for its outer-space-themed fashion show, shops and night-sky attractions.

SATO KUMIKO



Speakers and visitors come from all walks of life



Stargazing is a popular attraction at the festival

All photos: Courtesy of SORA FES



**S**ORA Fes, an event that aims to familiarize people with outer space, has been held in Arashiyama, Kyoto on an autumn day when the moon is near full every year since 2014. Over 6,000 people attend the event. Since November 2019, the event has also started to be held in Nihonbashi, Tokyo.

Many people attend Sora Fes sporting their own fashion creations—accessories or clothes on the theme of outer space. During the event, visitors are invited to participate in a fashion contest, a feature of the festival which has been growing in popularity, according to Ikegawa Keiko of the Sora Fes steering committee. Participants demonstrate their ingenuity either by creating costumes from scratch or altering clothes having space or star motifs in their pursuit of the coveted grand prize.

Sora Fes started when a manufacturer of astronomy telescopes and other optical instruments consulted the event production company for which Ikegawa works in order to expand its customer base. Ikegawa planned Sora Fes to be held in an easy-to-access location so that a wide variety of people could take part.

Sora Fes comprises a variety of events, including a panel discussion with speakers from different fields, recently featuring an engineer from the Japan Aerospace Exploration Agency (JAXA) and a rock musician, for example. Another popular event is the astronomy telescopes party, while the market for the retail of handmade products has been a huge success since the first Sora Fes.

“We asked creators selling space-themed products on websites to bring their products to Sora Fes,” says Ikegawa. “We initially expected about 1,000 visitors,

but more than 3,000 attended and bought up all the products so quickly.”

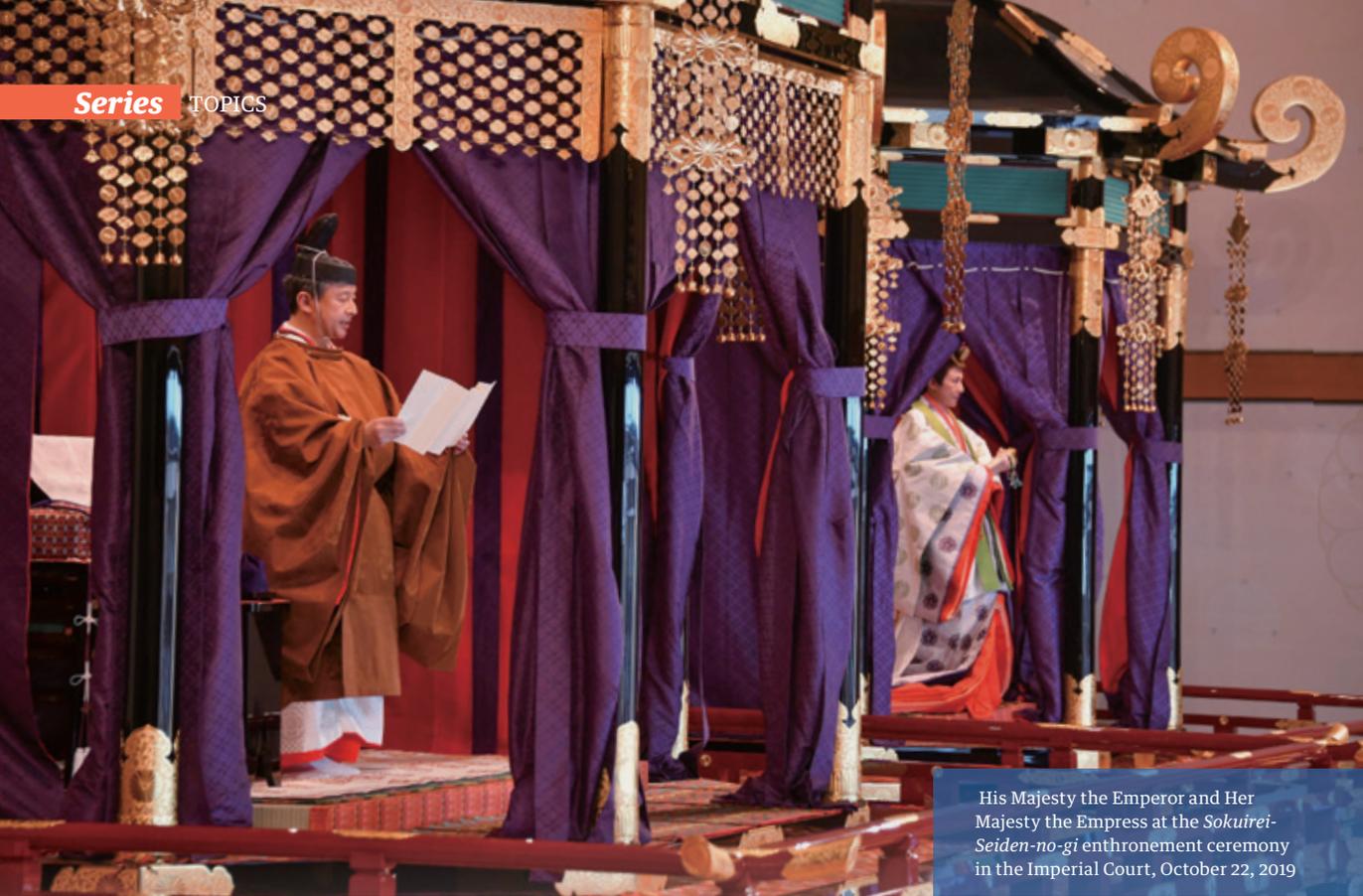
At the market’s booths, visitors can find accessories such as gemstones connected like planetary constellations and smartphone cases decorated with a starlit sky. At the first Sora Fes, many of the young women who visited the market not only bought products from their favorite creators, but also wore items they had made themselves, which attracted the attention of the event staff. This is what led to the launch of the aforementioned fashion contest – initially called Sora Girl – at the second Sora Fes. Participants in the fashion contests, led by young people with an interest in space or the starry skies, were young women at first, but over time the number of participating parents, children and men has increased.

Encouraged by the contest, middle-aged and elderly male space enthusiasts now come to Sora Fes wearing themed clothes, including JAXA or NASA work uniforms. At the most recent Sora Fes, the entire venue was buzzing with happy, enthusiastic visitors of all ages, both male and female.

The Sora Fes steering committee intends to increase the number of experience-based activities in the future, and they have begun reaching out to start-ups in the field of outer space to get them involved in the event.

“Sora Fes should be a place for visitors to feel a sense of wonder,” says Ikegawa. “The reasons why each person visits the event will differ. It may be for their interest in fashion, culture or science, but everybody looks up at the same sky, imagining the limitless reaches of outer space.”

Ikegawa wants to share that sense of wonder. 



His Majesty the Emperor and Her Majesty the Empress at the *Sokuirei-Seiden-no-gi* enthronement ceremony in the Imperial Court, October 22, 2019

# *The Ceremonies of the Accession to the Throne of His Majesty the Emperor*

ON October 22, 2019, His Majesty the Emperor publicly proclaimed his enthronement, and the *Sokuirei-Seiden-no-gi*, the Ceremony of the Enthronement of His Majesty the Emperor at the Seiden (State Hall) was held, celebrated by the representatives of domestic organizations and foreign states. It was attended by 1,999 people, including the heads of the three powers and their spouses, representatives of various fields in Japan, the heads, dignitaries, and their spouses of 191 foreign states, organizations and others, and the ambassadors of foreign states to Japan.

His Majesty the Emperor proclaimed, “Having previously succeeded to the Imperial Throne in



The *Sokuirei-Seiden-no-gi*

His Majesty the Emperor at the *Kyoen-no-gi*  
(Court Banquets after the Enthronement)



Her Majesty the Empress at the *Kyoen-no-gi*  
(Court Banquets after the Enthronement)



accordance with the Constitution of Japan and the Special Measures Law on the Imperial House Law, I now perform the Ceremony of Enthronement at the Seiden State Hall and proclaim my enthronement to those at home and abroad.” His Majesty continued, “I deeply reflect anew that for more than 30 years on the Throne, His Majesty the Emperor Emeritus constantly prayed for the happiness of the people and world peace, always sharing in the joys and sorrows of the people, and showing compassion through his own bearing. I pledge hereby that I shall act according to the Constitution and fulfill my responsibility as the symbol of the State and of the unity of the people of Japan, while always wishing for the happiness of the people and the peace of the world, turning my thoughts to the people and standing by them.”

Following His Majesty’s words, Prime Minister Abe Shinzo stated, “We, the people of Japan, revere Your Majesty as the symbol of the State and of the unity of the people, and pledge, with new resolve, to devote our utmost efforts to create a bright future for Japan, which is peaceful and brimming with hope, in which we take pride, and create an era of culture coming into being and flourishing when people bring their hearts and minds together in a beautiful manner.”

The *Kyoen-no-gi* (Court Banquets after the Enthronement), which are the occasions for announcing and celebrating the enthronement, and to receive the felicitations of the guests, were held four times between October 22 and 31, 2019. They were attended by 2,021 people, including the heads, dignitaries, and their spouses of foreign states, the ambassadors of foreign states to Japan and their spouses, the heads of the three powers and their spouses, and representatives of various fields in Japan. On November 10,

the *Syukuga-Onretsu-no-gi* (Imperial Procession by motorcar after the Ceremony of the Enthronement), was held to broadly celebrate the enthronement and receive the felicitations of the public. The parade traveled from the Imperial Palace to the Akasaka Imperial Residence, and approximately 119,000 people gathered along the roadside. ㊦



His Majesty the Emperor and Her Majesty the Empress at the *Syukuga-Onretsu-no-gi* (Imperial Procession by motorcar after the Ceremony of the Enthronement) on November 10



The *Syukuga-Onretsu-no-gi* (Imperial Procession by motorcar after the Ceremony of the Enthronement)



# A Satellite Guide for Snow Blowers

**Japan's highways have introduced snow blowers that safely clear roads using positional information from satellites, accurate nearly down to the centimeter.**

**UMEZAWA AKIRA**

**S**NOW removal vehicles in high-snowfall areas of Japan need to work around the clock in winter to keep the roads safe. East Nippon Expressway Company Limited (“NEXCO East”) is a highway operator whose service area includes high-snowfall locations like Hokkaido and the Tohoku region. Of the 3,943 km of roads operated by the company, about 2,500 km—over 60%—runs through Japan’s snow belt, receiving more than a meter of snow cover in winter. The company’s total distance plowed for the 2018 fiscal year came to 460,000 km, equivalent to ten times the earth’s circumference. According to Nakatani Ryo, Senior Snow & Ice Specialist in NEXCO East’s Technology & Environmental Department, snow removal vehicle operators require a sophisticated set of veteran skills.

“When the road surface and shoulders are covered in snow, you can’t use the road lines or shoulder guard rail to guide you. Falling snow obscures your vision as well, so you need to know the road condition well and drive very delicately. And you need to operate the plow at the same time. That’s why it takes such skill and experience.”

However, Nakatani says there are concerns of snow removal labor shortages as the most skilled veterans

grow older. This is why NEXCO East began working on the development of an operation support system for snow blowers in 2013. Following verification tests, the system entered practical operation in January 2018.

The operation support system for snow blowers uses precise positional information sent by Michibiki, Japan’s quasi-zenith satellite system. Since Michibiki’s orbit keeps it positioned directly above Japan at all times, it can broadcast radio signal to mountain corridors or other areas which are difficult to reach with GPS signal, enabling consistent, uninterrupted positioning.

There are two main kinds of snow removal vehicles: snow plow trucks, which push road snow off to the shoulders, and rotary snow blowers, which remove snow collected on the road shoulders. The operation support system for snow blowers combines precision positioning data with high-resolution 3D mapping data to display the position of rotary snow blowers currently operating on the highway—accurate nearly down to the centimeter—on a driver’s seat guidance monitor. This allows snow blower drivers to accurately remove snow from the road shoulders, even when snow obscures their view of the white line separating the shoulder from the driving lane.



“The driver’s seat monitor displays driving lane overlap and where to point the truck or how to correct its trajectory in order to avoid contact with the guard rail. This enables even less experienced operators to plow safely and surely,” says Nakatani.

In February 2018, NEXCO East conducted a demonstration of snow removal on straight and curved lines using the rotary snow blower equipped with the driving support system. They confirmed the vehicles were able to remove the snow without straying from the planned course.

One veteran snow blower operator expressed his surprise at the results, saying, “Even if you can’t see the lines in the road at all, you can see the point where the driving lane approaches the curve and determine the right way to turn the wheel. This should be plenty effective, even during a whiteout.”

Nakatani says, “I heard an operator who was interviewed on the day said, ‘This system is equivalent to about ten years’ driving experience.’”

The issue is the implementation cost. The receiver and antenna to pick up the signal from Michibiki are both expensive, since they have only just been

developed and the market still has to catch up. There are also heavy costs associated with creating the high-resolution map.

“It’s predicted that more and more car navigation systems will come to use Michibiki in the future. We expect this market expansion will help reduce cost. Although the precision maps are currently provided by a mapping company, we are considering creating our own proprietary mapping technology,” says Nakatani.

Since January 2018, the operation support system for snow blowers has been operating on a trial basis on a 21-km stretch of the Hokkaido Expressway between Iwamizawa and Bibai. Having now reached its third winter, NEXCO East is working to improve the guidance monitor’s position, information display, and screen design based on the opinions of operators actually using it to plow the roads.

“In the future, we plan to expand the area of operation and install the system on faster snow plow trucks capable of clearing driving lanes at 50 kph. After that, we will aim to safely automate the snow removal process, incorporating automated driving technology,” says Nakatani. ▣

# From the Sky to Space and Beyond



Members of Chiba University's Center for Environmental Remote Sensing with the CP-SAR onboard UAV JX-1



The Circularly Polarized Synthetic Aperture Radar (CP-SAR)



Josaphat Tetuko Sri Sumantyo



JX-1, an unmanned aerial vehicle (UAV) developed by Josaphat's laboratory to conduct in-air flight tests

A native of Indonesia, Josaphat Tetuko Sri Sumantyo is working on research and development of “remote sensing” technologies, which could aid in disaster prevention.

## SATO KUMIKO

**J**OSAPHAT Tetuko Sri Sumantyo, a professor at Chiba University’s Center for Environmental Remote Sensing, is a specialist in remote sensing microwave radar systems for the observation of long-distance targets, conducting research and development in the field in addition to teaching. Remote sensing works by illuminating the earth’s surface with radio waves from satellites and aircraft, then analyzing and visualizing the scattering waves, allowing for observation of a wide range of surface conditions. Visualizing land deformation, for example, can be used to develop natural disaster countermeasures, and the ability to observe plant growth, waves on the ocean’s surface, and other phenomena has an extremely wide range of applications. Josaphat, from Indonesia, has developed his own remote sensing system, the Circularly Polarized Synthetic Aperture Radar (CP-SAR), which utilizes microwaves’ ability to penetrate clouds, fog and smoke to obtain more accurate and detailed surface data.

“Like Japan, Indonesia has many earthquakes and much volcanic activity. I developed CP-SAR to closely observe land deformation brought about by this volcanic activity. It can sense changes in land surface movement as slight as 1 cm per year,” explains Josaphat. “As human impact on the environment continues to increase, sensing technology will also be indispensable in achieving balance between food and energy resources. It can even be used to survey new planets, should humanity ever take to the stars one day. That’s my dream.”

When Josaphat was a child, back in the 1970s, Indonesia’s domestic aircraft development was taking off. Building aircraft was a dream shared by many Indonesian children. Josaphat says that he too would

often fly model airplanes that he designed himself. In 1989, after he had entered university, he was selected from among 15,000 applicants to travel to Japan and study at Kanazawa University’s Department of Electrical and Information Engineering, as the recipient of a study abroad scholarship offered by the Ministry of Research and Technology of the Republic of Indonesia. He later obtained his PhD in Engineering at Chiba University in 2002.

“The environment at Chiba University greatly furthered my research. I think I was fortunate to study abroad in Japan. I’ve been able to develop sensor-equipped unmanned aerial vehicles (UAV) here as well, so you could say that it helped me realize my dream of building airplanes too,” Josaphat says, smiling.

The Center for Environment Remote Sensing serves as Asia’s hub for remote sensing research. Together with his research students, Josaphat has joined a technological cooperative with the Japan International Cooperation Agency (JICA) to create a landslide map for the Malay peninsula, as well as an international joint research project to estimate food supply issues that could occur alongside Indonesia’s changing urban landscape. Many non-Japanese students, including those from Indonesia, have joined Josaphat’s laboratory, and Josaphat says it is heartening to see ties between Japan and these countries grow stronger as graduates continue their research even after returning home.

Josaphat set up a foundation in 2001 to provide scholarships to Indonesian children who dream of becoming researchers in the future. Josaphat says that he cried tears of joy around the end of last year when he learned that the scholarship’s first recipient had been granted a research position.

Josaphat is currently researching the relationship between earthquakes and changes in electron density within the ionosphere (an atmospheric layer containing many ions and electrons, more than 60 km above the earth’s surface) in an effort to predict earthquake occurrences. Additionally, he is working to develop a sensor in order to predict volcanic eruptions.

“Even if I’m busy, I’m doing what I love. I want to continue researching sensing technology, to make a difference worldwide.” 📷



*Nihonbuyo* master Nishikawa Minosuke in rehearsal with daughter Kei

# The Slow-Burn Appeal of *Nihonbuyo*

The ancient performing art that is *Nihonbuyo* “is Japanese dance itself,” and in more than just name.

ROB GILHOOLY

**N**ISHIKAWA Kei stands beside her father, Minosuke, and replicates his shuffling steps, supple tilts of the neck and graceful hand movements, which are punctuated by deft flourishes of a folding fan.

Minosuke makes frequent glances over his shoulder, scrutinizing his daughter’s every move, made to the sounds of traditional *shamisen* guitar, *tsuzumi* drums and meandering song, and offers words of encouragement as she rehearses a dance of the ancient *Nihonbuyo* (literally “Japanese dance”) tradition.

Kei started dancing at the age of two years and nine months, and just nine months later, she says, “Before I knew it, I had made my stage debut.” That was a turning point. “Performing was fun.”

Starting at such a tender age is a common custom, explains Minosuke, who was also just a toddler when

his father, Nishikawa Senzo, first put him through his paces at the Nishikawa School in Tokyo. Established over 300 years ago, the Nishikawa School is the oldest of the five major schools of the *Nihonbuyo* tradition. The school has nurtured a long line of revered performers, among them Senzo. Current Head Master Senzo has received numerous awards, including the prestigious title of Living National Treasure, which was bestowed upon him in 1999.

“We all start as children, so learning is from feeling, not theory,” says Minosuke, a *Nihonbuyo* master whose career spans some fifty-seven years. “This is probably true of all Japanese classical performing arts. Performers acquire the skills naturally and in the case of *Nihonbuyo* with the instructor teaching at the student’s side.”

This has long been the way in a dance genre that began around 400 years ago, but whose roots go back even further to some of Japan’s oldest performing arts.

According to the website of the *Nihonbuyo* Kyokai (Japanese Classical Dance Association, or JCDA), *Nihonbuyo* “is Japanese dance itself,” and in more than just name. Over the centuries it has incorporated



The Nishikawa School is the oldest of the five major schools of Nihonbuyo

elements and “the essence” of many Japanese traditional folk dances and performing arts, such as *bugaku* court dance and *noh* plays, the JCDA says.

And with time this amalgam of dances has been refined to form what is arguably the quintessential Japanese performing art.

According to Minosuke, a major influence in this mixtape genre is the dance found in kabuki, which helps explain the exquisite kimono, headdresses and accessories worn in Nihonbuyo performances.

“Kabuki was a performance entertainment that regular people themselves couldn’t do,” Minosuke explains of the UNESCO-protected theater. “However, people who saw the dance in kabuki wanted to try it themselves and it gradually became an independent identity.”

That entity was Nihonbuyo, whose popularity spread during the Meiji period (1868-1912), when schools and troupes began to flourish, he adds.

And while the post-World War II penchant for anything western has led to a decline in its popularity, largely due to the growth of imported competitors such as ballet and ballroom dancing, today there are still some 120 schools affiliated to the JCDA, which has twenty-six branches nationwide and 5,000 members.

Minosuke believes actually dancer numbers are in the tens of thousands - 90 percent of them female.

Minosuke himself was less interested in the art as a teenager and it was only later while studying modern dance at the prestigious Laban Center in London (today known as the Trinity Laban Conservatoire of Music and Dance) that he began to fully appreciate what he had left behind in Japan.

He has since devoted his time to spreading the word of Nihonbuyo, wowing audiences both domestically and overseas.

During the upcoming 2020 Tokyo Olympics, too, Minosuke is playing an instrumental part in a JCDA initiative to give performances at the National Theater specifically targeting foreign visitors, he says.

An overriding element of Nihonbuyo that he would



like foreigners to appreciate is the subtle, slow-burner nature of the genre, which differs from many more elaborate dances in the West, he says.

Its understated charm reflects the more reserved nature of the Japanese people, says Minosuke.

“This is not a hell-for-leather culture, but one that simmers gently from within and is more reserved,” he says. “That’s the kind of thing I want foreign visitors to feel when they watch a performance.”

Minosuke’s second daughter, Nao, 14, is also a Nihonbuyo performer, and like Kei wants to spread Nihonbuyo to a wider audience. “There are many people who don’t know about Nihonbuyo and I want to raise awareness even if only to a few people,” says Kei. “That goes for people from overseas. I want them to become interested, too.”



The *Stove* train with  
Mount Iwaki in the  
distance

# A Journey to Warm the Body and Soul

The *Stove* train, which operates in the culturally rich Tsugaru region of Aomori Prefecture, preserves an old-fashioned way to keep passengers warm in the cold winter months.

SAWAJI OSAMU

THE Tsugaru Railroad runs through the central part of the Tsugaru Peninsula in Aomori Prefecture on the northern tip of Honshu. The route, which extends 20.7 kilometers from Tsugaru Goshogawara Station in Goshogawara City in the South to Tsugaru Nakasato Station in Nakadomari Town in the North, takes approximately 40 minutes. The Tsugaru Railroad operates seasonal themed trains such as the *Furin* (Japanese wind chime) train in summer, when carriages are hung with wind chimes made of iconic local Tsugaru Kanayama Yaki pottery, and the *Suzumushi* (bell cricket) train in the fall, when carriages contain baskets of crickets

chirping melodiously. Most famous of all is the *Stove* train in winter. Featuring coal-fired stoves, the *Stove* train has been in operation almost every year since the opening of the Tsugaru Railroad in 1930.

“The *Stove* train was familiar to locals, but since the 1980s it became a popular winter attraction for tourists visiting Aomori Prefecture,” says Tateyama Hiroichi of Tsugaru Railroad Co.

The *Stove* train makes three round trips a day from December 1 to March 31 every year. Installed in one of the train’s two cars are two pot-bellied stoves, which were widely used in Japan before the popularization of gas and oil-fired heating appliances.



On the Stove train, *surume* (dried squid and cuttlefish) can be cooked on a grilling net placed on top of a stove. Passengers can bring their own *surume*, or buy *surume* produced in Aomori Prefecture on the train. They can also have their *surume* grilled by the Tsugaru Peninsula Sightseeing Attendant on board. The Stove train operates in the coldest months when the area is covered with snow and outside daytime temperatures on some days drop to around minus 10 degrees Celsius. Chewing on the piping hot, freshly grilled *surume* while partaking of local sake purchased on the train warms the body and soul.

The train travels at an average speed of around 30 kilometers per hour, allowing passengers to enjoy the views of the vast snowscape. On a fine day, you can see the stunningly magnificent Mount Iwaki with an altitude of 1,625 meters above sea level. Referred to as Tsugaru-Fuji, Mount Iwaki is the symbol of the Tsugaru region.

“Tourists are impressed by the extensive snowfield and the beauty of Mount Iwaki, but when the weather is bad, they are surprised at the ferocity of the blizzards,” says Tateyama.

There are also other tourist spots along the Tsugaru Railroad showcasing the traditional culture of the Tsugaru region. One is *Tachineputa no yakata*, situated about a 5-minute walk from Tsugaru Goshogawara Station. *Tachineputa* are giant floats that are carried around the center of Goshogawara City at the *Tachineputa Festival*, held annually in early August. *Neputa Festivals* featuring floats with colorful paper dolls depicting warriors and other figures on a dais are held in summer all over Aomori Prefecture. The distinguishing feature of the *neputa* at Goshogawara City are their great height – 23 meters – compared to floats in other areas. The *Tachineputa Museum* houses three floats as permanent installations, and visitors can watch *tachineputa* being made at the production studio. From May to June, visitors can try their hand at pasting paper on *tachineputa* that will actually be used at the festival.

Another spot where visitors can enjoy traditional culture is the Tsugaru Shamisen Hall in Kanagi Town, about a 10-minute walk from Kanagi Station. Tsugaru



1



2

- 1 Stoking the stove fire before departure
- 2 Preparing *surume* on the stove top.

shamisen were first produced in the early Meiji period (1868-1912) by a native player of Kanagi Town called Nitabo, who created a style of music played on the shamisen, a stringed instrument that rose to popularity in the Edo period (1603-1867). Tsugaru shamisen is characterized by performances that are rich in improvisation, played at a quick tempo, and have a very loud sound produced by hammering on the strings with the *bachi* (pick). Visitors to the Tsugaru Shamisen Hall can enjoy shamisen exhibitions and live music.

“Some people come from Tokyo several times a year because they love the people and countryside around here. I would urge you to travel on the Tsugaru Railroad and experience the atmosphere of the good old days in Japan,” says Tateyama. 🗨️

Courtesy of Tsunan Town



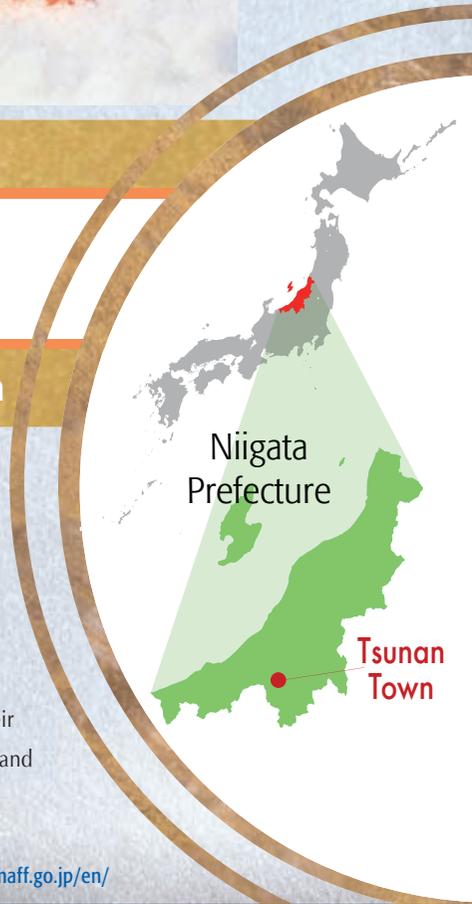
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