

DRIVE YOUR BUSINESS  
INTO SPACE



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CORPORATE OVERVIEW



Space BD Inc.  
Nihonbashi Mitsui Tower 7th Floor, 2-11 Nihonbashi Muromachi, Chuo-ku, Tokyo, 103-0022, Japan  
Published in March 2023



# CORPORATE PROFILE

## About Space BD

We at Space BD are a one-stop service provider of solutions for those in the space utilization field. Not only can we deliver payloads to space by a variety of launch methods and facilitate use of International Space Station assets, but we can also assist with everything from business plans to hands-on technical demonstrations.

Since the company's inception in 2017, we have quickly become a trusted partner of the Japan Aerospace Exploration Agency (JAXA), including selection as a service provider for its first ever project open to private-sector participation (deployment of a small satellite from Kibo, Japan's experiment module on the International Space Station), and other projects worldwide such as life-science experiment services in microgravity in the ISS's external modules, and rideshare on JAXA's H-IIA and H3 rocket launches.

Meanwhile, in addition to expanding our core satellite launch services, we are pioneering new applications for space and catering to growing and increasingly diverse demand for space-related solutions such as local industry promotion, education and workforce development, and leveraging our technological capabilities for project management. Harnessing our strengths in sales and business development based on technological expertise, we offer a full range of business planning, execution, and technical support services tailored to suit each projects' unique challenges and objectives.

## CORPORATE PROFILE



Masatoshi Nagasaki,  
Co-founder & CEO

### Name

Space BD Inc.

### The Space BD Network

Headquarters: Nihonbashi Mitsui Tower 7th Floor,  
211 Nihonbashi Muromachi, Chuo ku, Tokyo,  
103-0022, Japan  
Europe Office: Belgium

### Incorporated

September 2017

### Our Shareholders





# BUSINESS PORTFOLIO

## Our Partnership with JAXA

Space BD was selected as a service provider by JAXA in 2018 for its first ever project open to private-sector participation, the deployment of a small satellite from Kibo module. Since when, we have worked with JAXA on a variety of ISS projects, such as using on-board and external facilities and transporting satellites, and multiple other projects including the development, manufacture, and launch of satellites, as well as in-orbit operations (e.g. exploration and experiments) and other space applications.



## More than Just a JAXA Partner : Our Diverse Business Activities





# SPACE INFRASTRUCTURE



## Launch Services



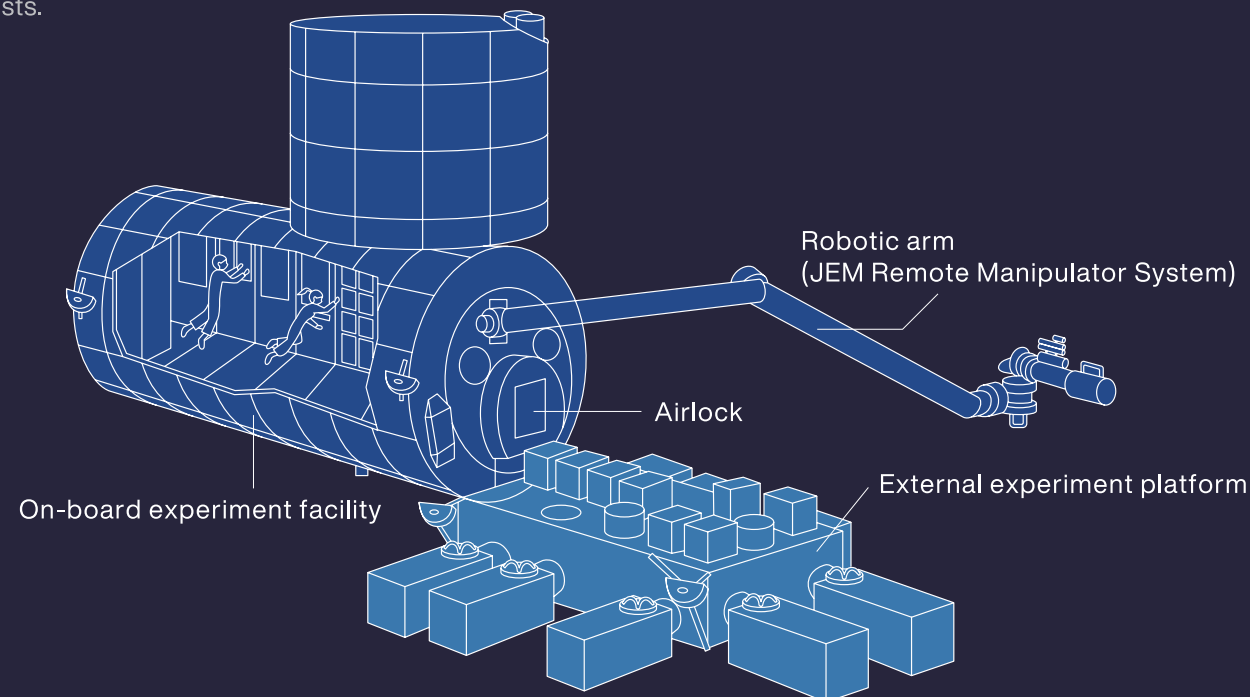
### Full service line-up from prep to deployment



# Use of ISS Facilities

## ●Use of External Facility

Our services offering use of the IVA-replaceable Small Exposed Experiment Platform (i-SEEP), a hardware adapter attached to Kibo module on the ISS, are cherished as a means of space-based testing with some of the lowest barriers to access. In fact, we facilitated the first instance of use of i-SEEP by a non-Japanese (Spanish) company. Since 2019, we have provided the client the integrated support they need to get to the ISS, including securing a place in a launch, technical coordination, examination of test results, official permits and procedures, and a full range of engineering services to ensure they pass the safety and compatibility tests.



### i-SEEP Projects Facilitated by Space BD

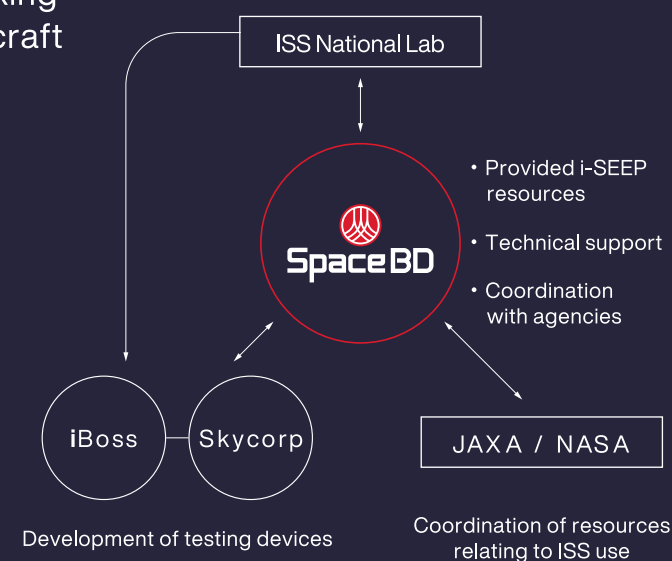
#### [Skycorp]

#### Qualification experiments on auto-docking mechanism for next-generation spacecraft

We provided support services for the Intelligent Space Systems Interface Flight Qualification Experiment (iSSIFQE), a series of in-orbit tests.

iSSIFQE is a testing system designed and manufactured by Skycorp (USA) for the specific purpose of in-space functional evaluation of the iSSI developed by iBOSS (Germany).

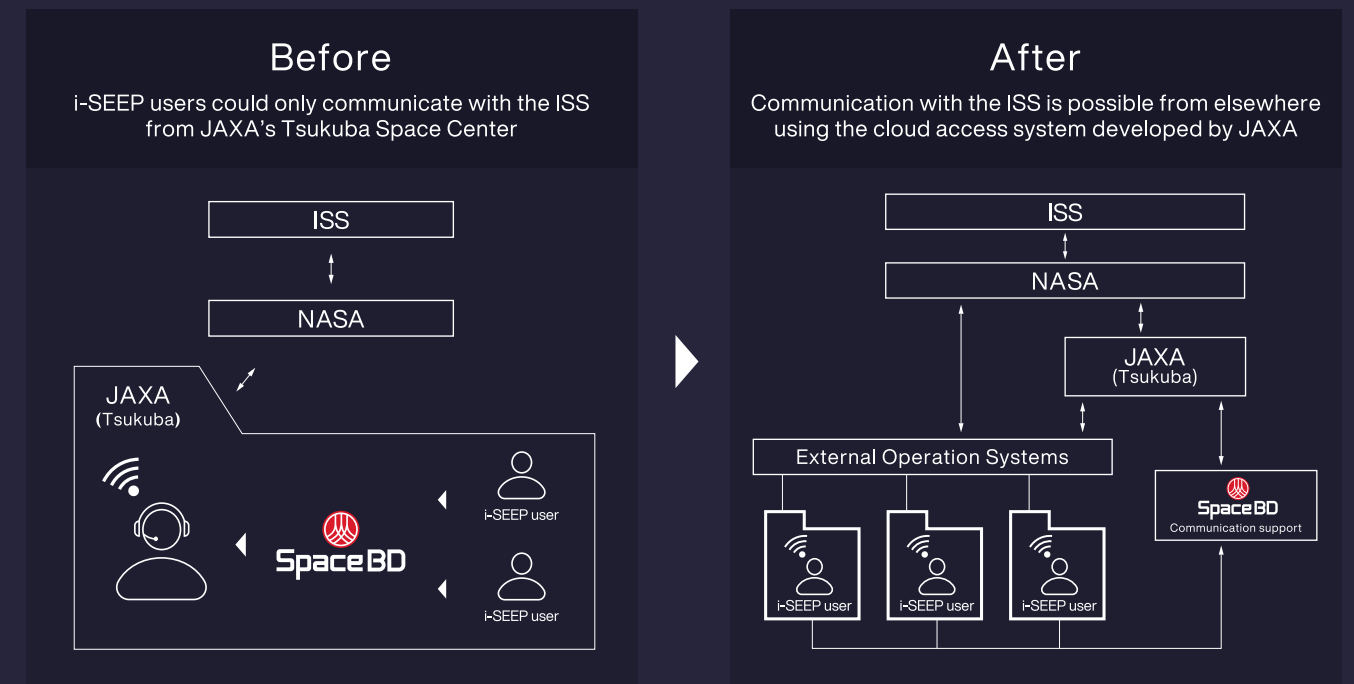
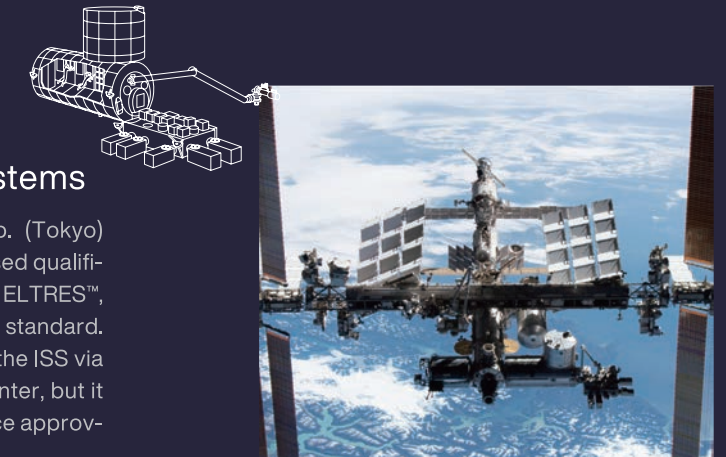
This was a truly global project, which also involved the ISS National Laboratory (USA), a resource provider for the ISS. Our role at Space BD was to partner with Skycorp and provide comprehensive support relating to the use of i-SEEP.



#### [LPS]

#### Support Services for Sony : Japan's First External Operation Systems

We provided support services to Sony Group Corp. (Tokyo) offering use of the ISS's external facilities for space-based qualification testing of wireless testing devices compatible with ELTRES™, Sony's low-power wide-area wireless communication standard. Previously, i-SEEP users could only communicate with the ISS via the control tower on-site at JAXA's Tsukuba Space Center, but it is now possible to do so from off-site (subject to advance approval) using the cloud access system developed by JAXA.



## ●Use of Internal Facilities

We provide a range of integrated solutions—both Earth-based and space-based—for studying, testing, and structural analysis needed for gathering structural data vital to new drug discovery.

### Protein Crystal Growth Experiment Service Using Internal Facilities on Kibo Module

We provide support services for JAXA's high-quality protein crystal growth experiment using internal multipurpose facilities on Kibo module. High-quality protein crystals are hard to make on Earth; by helping create them in space, we are unlocking of the mysteries of life.



Amylose protein crystals created on the ISS (left) and on Earth (right). ©JAXA, Maruwa Foods and Biosciences



#### Maruwa Foods and Biosciences, Inc.

In partnership with Maruwa Foods and Biosciences, a provider of support for new drug discovery and protein structure research with more than two decades' experience working with JAXA (and its predecessor NASDA), we have established a one-stop shop for space-based and Earth-based R&D services for drug discovery and other areas of the life science field.

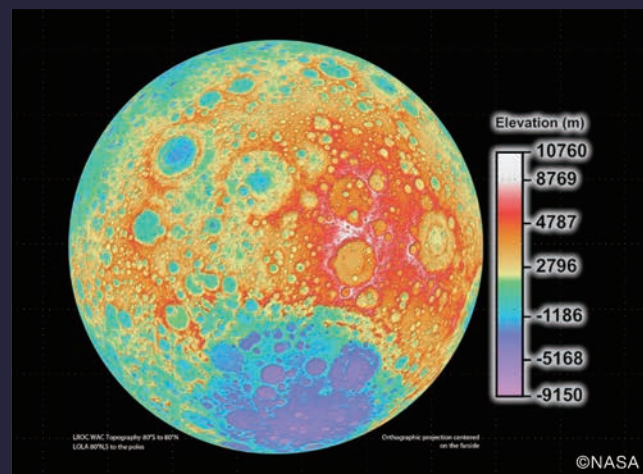


# Technical Project Management

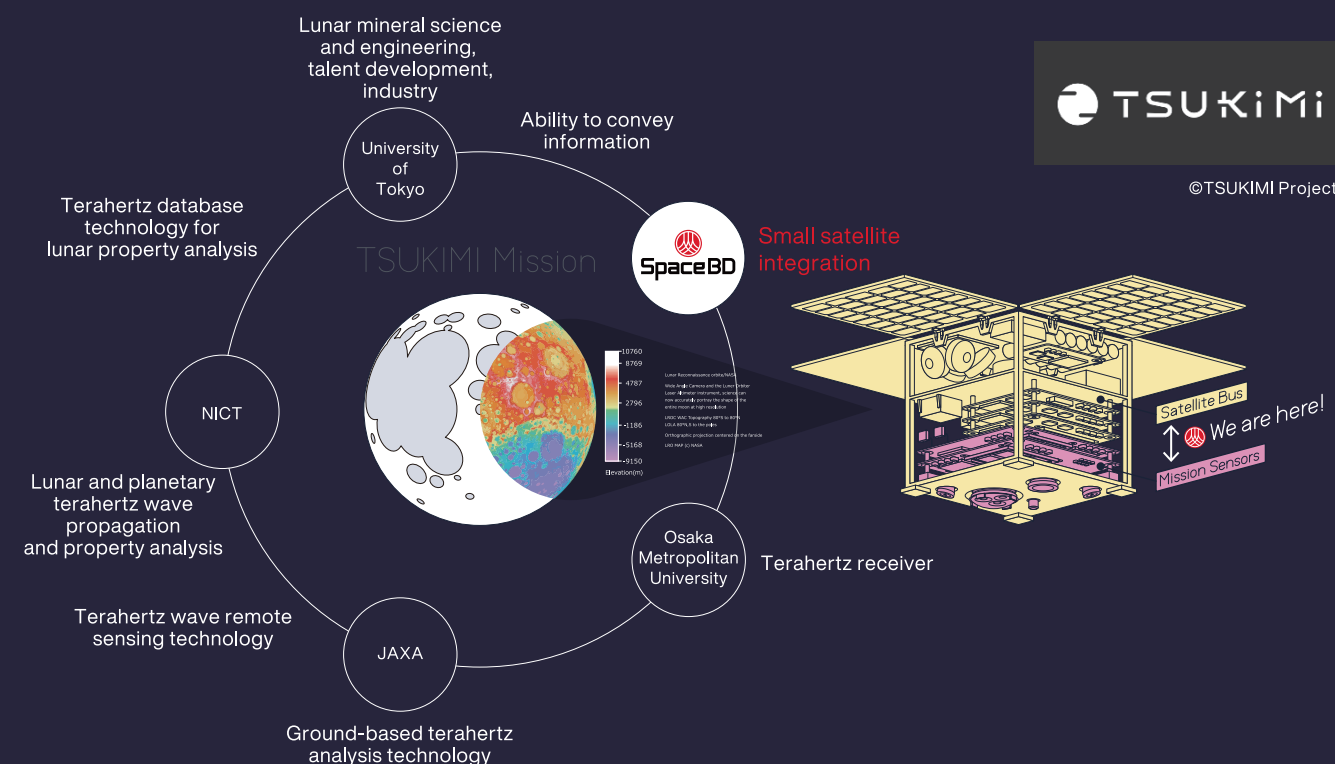
Our engineers, experienced in satellite development, and skilled in technical coordination and project management, manage satellite launches and other projects based on each client's needs. We are fully capable of assisting with non-routine projects in the space industry, such as large facility installations, market research, and overseas business expansion, and help lead projects to success with a cohesive support covering every aspect from project startup to execution.

## TSUKIMI Project

We were selected by the Japanese Ministry of Internal Affairs and Communications to participate in a project to map water energy resources on the moon's surface layers using terahertz waves. The TSUKIMI Project is a joint project with the National Institute of Information and Communications Technology (NICT), the University of Tokyo, Osaka Metropolitan University, and JAXA. At Space BD, our role is project management of the wide-area exploration for water energy resources on the moon.



## TSUKIMI = Lunar Terahertz Surveyor for Kilometer-scale Mapping



# Other Launch-related Services

## Sourcing material service

Our broad-ranging, integrated material sourcing services offer a wealth of solutions and information to help clients make the most of their space venture, covering satellite launches, use of the ISS, and other space utilization.

- 1 We can assist deployment process of satellites and other equipment by sourcing components from global suppliers on your behalf. Leave the ordering, coordination with manufacturers, and import/export procedures to us so you can concentrate on deployment process.
- 2 We can also act as sales representatives for manufactures.



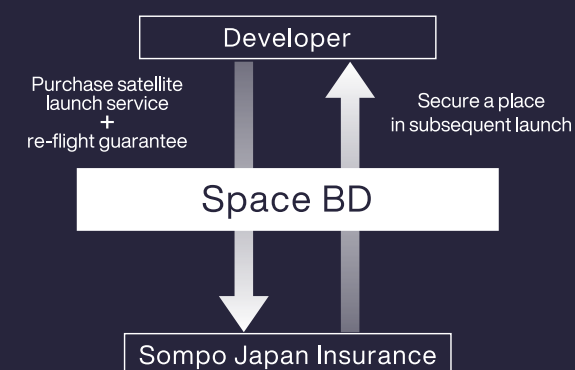
<https://space-for-space.com>

SPACE FOR SPACE



## Re-flight Guarantees Sompo Japan Insurance Inc.

Working in space involves risks unlike those on Earth. Of these, the additional costs that come with launch failure loom large in the development and commercialization of space business. To mitigate those risks and encourage further development of the space industry, we have teamed up with Sompo Japan, the experts in space-related insurance underwriting, to offer re-flight guarantees. Satellite developers can choose our re-flight guarantee as an optional extra satellite launch service (fees apply), and the cost of re-launch will be insured by Sompo Japan.

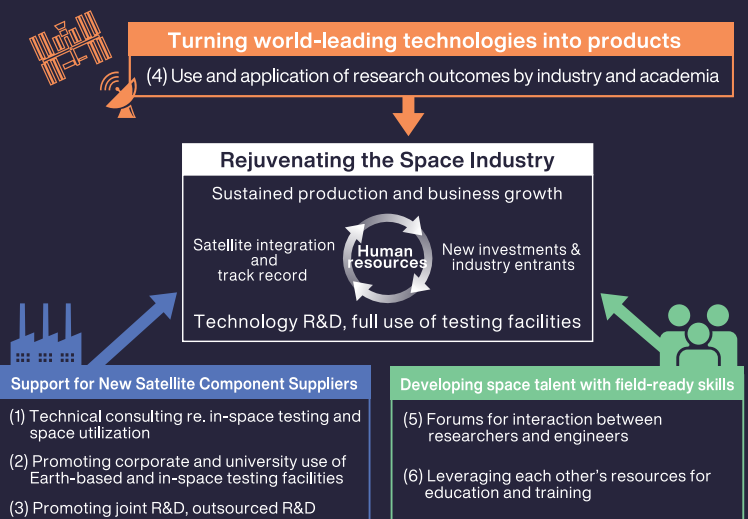


## Collaborating on accelerating development of New Space Technologies

### Kyushu Institute of Technology

Japan has many companies with advanced technologies suitable for space purposes, but some leave the sector because of the difficulty in getting their products adopted for use in space, or struggling to sustain production and supply systems.

We have teamed up with the Kyushu Institute of Technology to help resolve these issues and give rise to high-demand space products by tailoring product planning to needs identified through dialogue with the market, by amassing in-orbit experiment experience through our space infrastructure utilization services, and by making the most of Kyushu Institute of Technology's testing facilities to improve product development efficiency.





# Life Science Services

## Life Sciences

We are an integrated service provider of Earth-based and space-based solutions for studying, testing, and structural analysis needed for gathering structural data vital to new drug discovery.

Our team



Space BD



### Earth

1

Sample purification, researching Earth-based crystallization conditions

2

Crystallization testing and improvement in space-spec lab containers

### Space



3

Testing on ISS and recovery of test samples

### Earth

4

X-ray analysis and 3D structure data

As little as six months from start to finish

## Drug Discovery in Space Integrated protein structural analysis service

Based on precise structural data obtained from in-space tests, we can identify the binding mode of target proteins and new drug candidate compounds at the atomic level to streamline the search for new drugs.

### Earth-based Testing Vs. In-space Testing

#### EARTH

Low quality



Convection currents cause uniformity of concentration (i.e., no gradient)

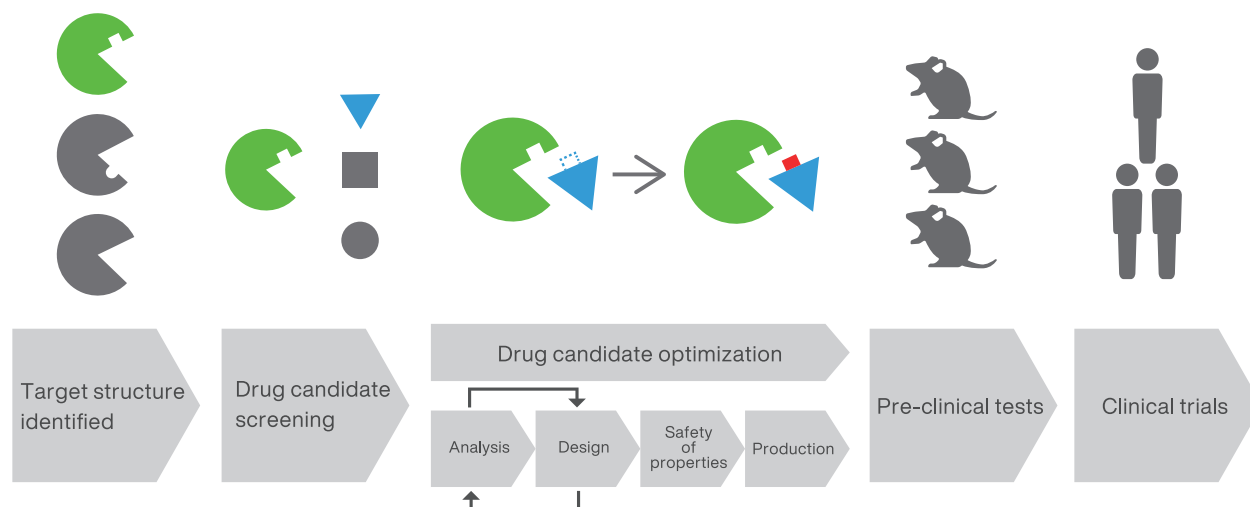
#### SPACE

High quality



Minimized convection currents maintain concentration gradient

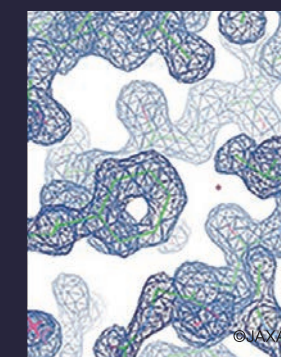
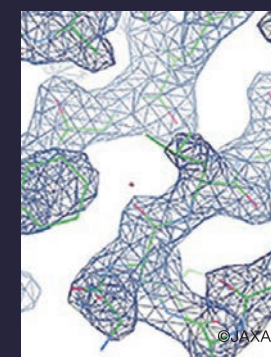
### Drug Discovery Research Solutions



## A Growing Track Record in AI-driven Drug Discovery

### Joint Study Aimed at Building the World's First AI Drug Discovery Support Service

In February 2022, we launched a joint research project that combines our high-quality protein crystal structural analysis services, which take advantage of the microgravity of space, with the AI drug discovery platform Deep Quartet provided by Tokyo-based Intage Healthcare. Moving forward, we are also endeavoring to develop the world's first drug discovery support service that harnesses precise structural data obtained through in-space testing and AI-based compound design assets.



## A Growing Track Record in In-space Testing

### High-quality Protein Crystal Generation Service: The 1st JAXA Private-sector Partner to Launch & Recover Crystals; Testing Performed on Kibo module Aboard ISS

We have provided services to research institutes and corporate clients from Brazil, Taiwan, and Japan for in-space testing sample launch and recovery missions aimed at discovering new agrochemicals and drugs to combat novel coronaviruses.



#### AgroDesign Studios

AgroDesign Studios (Kashiwa, Chiba, Japan) seeks to improve pesticide safety through R&D into molecularly targeted pesticides that directly inhibit the function of important proteins in pests and weeds. In-space testing helps them obtain reliable protein crystal structure data conducive to efficient pesticide design.

#### National Synchrotron Radiation Research Center \*1

The National Synchrotron Radiation Research Center (Taiwan)<sup>1</sup> uses X-ray analysis of virus-like particles generated from E. coli crystallized in space to better understand the viral structure and infection mechanism.

#### Brazilian Biosciences National Laboratory, Brazilian Center for Research in Energy and Materials \*2

The Brazilian Biosciences National Laboratory at the Brazilian Center for Research in Energy and Materials<sup>2</sup> (São Paulo) uses X-ray crystallography of the N-protein of the virus responsible for Covid-19 crystallized in the microgravity of space to discover the three-dimensional structure.

\*1. In cooperation with HelloX Cosmos of Taiwan, a Space BD channel partner. \*2. Under a cooperation agreement with Airvantis of Brazil, a Space BD channel partner.

## Hanamaki Kita High School

The Hanamaki Kita High School Science Club and volunteers, around 20 in all, are participating in a real-live space-based experiment. Following lectures on the use of protein crystals, they generated real protein samples, which will be crystallized by astronauts on the ISS and returned to Earth, thus giving those students the chance to observe those crystals made in space.

# Local Industry Promotion Services

From planning to execution, we offer support for space-related business creation. Our services are ideal for companies and government agencies looking to harness the potential of space utilization.

Industry Promotion (Devices, necessities of life, service industries)	Talent Development	Use of Satellite Data	Local Area Promotion (e.g., tourism, entertainment)
Helping clients develop a mid-to-long-range vision for entering the space industry	Education for students	Support for identifying problems solvable using satellite data	Space-related branding support
Building momentum through seminars			
Researching and highlighting local businesses' strengths	Education for businesspeople	PoC support	Satellite launch events
Business matching			

## Kagoshima Prefecture

Space industry experts see Kagoshima Prefecture, with two rocket launch sites and plenty of coastal land near the equator, as an ideal launch environment. Through the Space Business Creation Promotion Project we pursue in cooperation with Kagoshima Prefecture, we hold study groups involving people from the local area and beyond, as well as seminars and other events that use local launch sites. We also plan to promote regional development using the launch sites as a starting point, and harness satellite data for the benefit of the food industry, a major driver of local commerce.



## Oita Prefecture

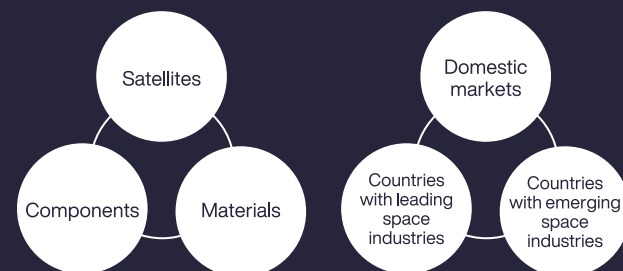
The announcement that Oita Airport will serve as a spaceport means hopes are currently high that the space business will bring local benefits. Oita Prefecture recognizes that developing and acquiring talent who can lead business creation in such an unpredictable field is key to capitalizing on this momentum. At Space BD, we offer Oita companies and universities courses on space business, focusing chiefly on business creation centered on use of the ISS's experiment facilities.

## Saga Prefecture

We provided Saga Prefecture DX support using satellite data as part of its overhaul of disaster prevention operations. Our role was to manage the testing of a system to detect areas and locations in Saga prone to landslides and other disasters. We conducted interviews and identified problems related to disaster prevention and conservation in Saga, selected and verified satellite data required, and formulated a draft plan for full-scale introduction in FY2023.

## Gifu Space Project Study Group: Nurturing and Supporting a Local Space Industry Together

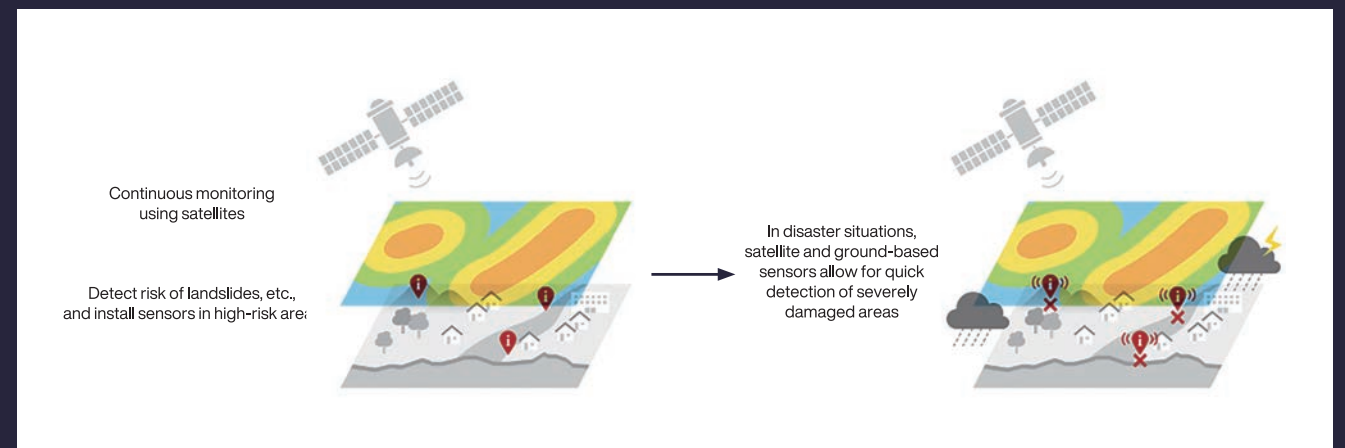
The Gifu Prefectural government, which is seeking to foster a local space industry as a core driver of local business, has appointed Space BD to help with the launch of the Gifu Space Project Study Group. In our capacity as the group's coordinator, we are working with local government, Gifu University, manufacturers and other businesses, and others to set agendas, provide information, facilitate discussions and business matching, and create opportunities for entry into the space industry, as well as planning talent development programs.



Industry promotion	Making use of aircraft manufacturing tech	<ul style="list-style-type: none"> <li>Local aircraft industry businesses rediscover strengths and seek new challenges to pursue</li> </ul>
	Local industry x space	<ul style="list-style-type: none"> <li>Looking for ways that local qualities and strengths can be applied in the space sector</li> </ul>
Talent development		<ul style="list-style-type: none"> <li>Fostering people who can manufacture quality products and people who can use them effectively</li> <li>Partnerships with Gifu University, NIT Gifu College, local technical schools, and businesses</li> </ul>

## Gunma Prefecture

We were selected for the FY2022 Gunma Prefecture Space Innovation Partnership as part of the prefectural government's Gunma Space & Aero Project. Aiming to create space-related businesses, we will hold workshops and verification projects, and debate ideas such as using satellite data and helping the local manufacturing industry expand into the space sector. Ideas generated in the workshops will be developed and tested as prototypes as part of the verification projects.





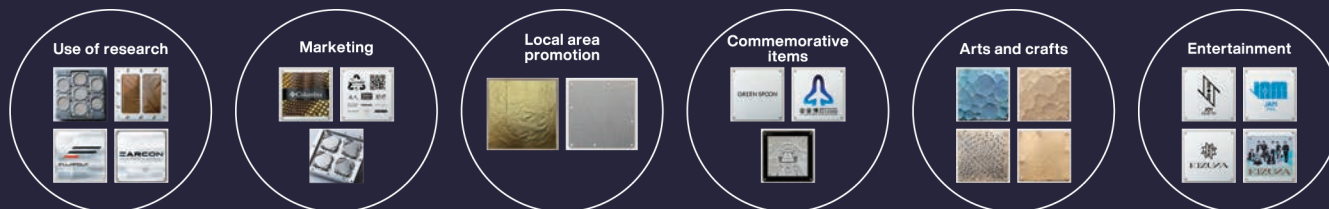
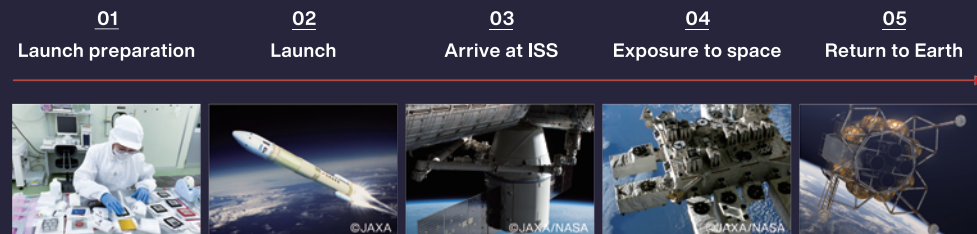
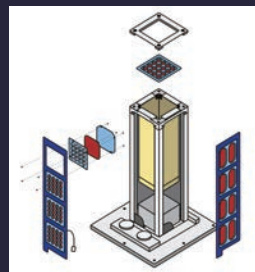
# Marketing, Branding Exploitation

The exposed experiment platform on the Kibo Exposed Facility attached to the ISS can be used for product PR and other marketing and branding. We are contributing to the expansion of space utilization by carrying a variety of products to space.

## Space Delivery Project -RETURN TO EARTH-

Products are transported to the ISS and installed in ExBAS, the exposed experiment bracket we developed with JAXA, then exposed to space for around six months before returning to Earth.

Image of ExBAS



## Official ambassadors for Space Delivery Project round 2

### JO1

JO1, a global boys group, has been appointed the official ambassador of the Space Delivery Project—RETURN TO EARTH—in an exciting collaboration of space and entertainment. Aluminum plates bearing the logos of the band and its fan club, JAM, as well as the cover art of the band's latest album, will travel to space and return to earth for the band and its fans to enjoy.



## Toagosei

We teamed up with Toagosei for a Space Delivery Project to test the effects of exposure to space on the company's famous household instant glue Aron Alpha. The project provides Toagosei with an ideal PR angle for Aron Alpha.



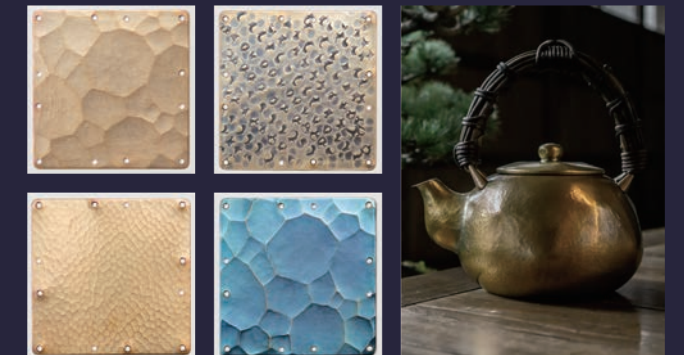
## Sompo Japan Insurance

We created a commemorative gift to serve as a prize awarded as part of Sompo Japan Insurance's "Sompo Park x Space Travel" campaign. The winner chooses the photo they would most like to have travel in space; the photo is engraved on an aluminum plate and taken to the ISS to orbit in space before returning home.



## Gyokusendo

Together with Gyokusendo (Tsubame, Niigata), a manufacturer of traditional hand-hammered copperware more than 200 years old, we have launched a project under the theme Space x Traditional Craft. Copper and steel materials will be launched and exposed to space, then used upon their return by expert artisans to create traditional crafts infused with new values.



## Junior Chamber International (JCI) Kanazawa

As part of its Space Talent Development Program, JCI Kanazawa is sending gold leaf, a specialty product of Kanazawa, into space. The program is also educational in nature, with participating students studying ways to utilize the gold leaf upon its return.





# SPACE x EDUCATION

## Nurturing Talent : For Space and the Future

Exploring space is one of the best ways to broaden knowledge and education, and to foster the ability to solve problems and make decisions amid uncertainty. We have developed programs to nurture the leaders of the space age—programs that span career design, intra-organization communication skills, and other life skills useful for developing values and building relationships.

### The excitement, diverse possibilities, and uncertainty of space

Exploring the unknown  
Learning through inquiry

Different perspectives  
Understanding change

Cross-disciplinary learning  
Incorporating arts  
and sciences

#### Essence

Space exploration:  
Exploring the unknown



Skills needed to  
become an astronaut



Entrepreneurship  
education



#### Assets

Satellite development  
and  
launch support services



Use of ISS assets



Navigating the realities  
of start-up business



#### Programs

Cross-disciplinary,  
practical curriculum.  
Students experience and  
follow the satellite  
development process

Lectures and training on  
the basics of space  
technology use  
and business development,  
and space business planning  
and execution

Communication games  
in settings that  
imitate space  
and the astronaut's  
work environment

Experience-based training  
in space business  
and venture management

Entrepreneurship training  
with real business people  
from space-related  
enterprises



# Education Program Following the Satellite Development Process

## Clark Memorial International High School Space Project

A Practical Learning Program Following the Process of Satellite Development, Launch, and Operation

We provide workshops and lectures that allow participants to follow the process of satellite development. This hands-on program not only teaches methods of space utilization, but also deepens learning in each phase of satellite making and use, from basic knowledge about satellites to studying missions, development, safety reviews and testing, launch, and in-orbit operations.

### < Program Content >



### Participant Testimonials



#### Student A

I like space stuff but I knew nothing about it, so I was glad to learn about the equipment and things that help us learn about space. I'd like to do more study and engineering in this field, and hopefully do something space-related in the future.



#### Student B

There were some heated exchanges of views (in team discussions in the workshops), but the instructors pointed out that this too was an important part of the process. I learned that finding and addressing points for improvement through repeated trial and error is important in whatever we do.

## The Hanamaki Space Project : UP Hanamaki

We provide high school students in Hanamaki with a cross-disciplinary learning experience through exploring uncharted territory by "launching" a satellite. The program enables students to develop task-setting and problem-solving skills by grappling with uncertainty, implementing solutions, and learning from failure.

### Taking on challenges

### Interest in space

### Problem solving

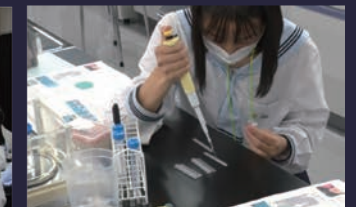
Program Benefits:

Follows the satellite development process

Hands-on learning

Forges community ties

Satellite development	Satellite development	<ul style="list-style-type: none"> <li>Students observe the development and launch process of "their" satellite.</li> <li>Students carry out their mission themselves.</li> </ul>
Skill development	Space BD Program	<ul style="list-style-type: none"> <li>In parallel with satellite development, students learn the various elements necessary for one process.</li> <li>Working on tasks helps develop non-cognitive skills.</li> <li>Hands-on learning using simple satellites.</li> </ul>
Expert instructors	<ul style="list-style-type: none"> <li>University of Tokyo program</li> <li>Guest speakers</li> </ul>	<ul style="list-style-type: none"> <li>Hearing from leading experts in satellite development enhances interest in space development.</li> <li>Rare access to insider insights enhances interest in space.</li> </ul>
Space Experiments	Iwate Medical University program	<ul style="list-style-type: none"> <li>Students experience life-science experiments in university labs through protein crystallization experiments, and learn the importance of in-space experiments by comparing protein crystals made in space and on Earth.</li> </ul>



## Nurturing a New Generation who Can Harness Diversity to Contribute to Hanamaki and the Local Community

» Students learn by experiencing the mission planning→design→build→launch→operate process of satellite development and hearing from astronauts and leading experts in satellite development, etc.

- ☐ Eagerness to explore the unknown ————— Develop the guts to persevere through failure until success
- ☐ Discoveries gleaned through team effort toward a common goal ————— Learn from cross-cultural adaptation and communication
- ☐ Creating new value ————— Gain experience conducive to honing idea-creation skills and output
- ☐ Study and implement a range of problem-solving methods from a space-oriented perspective ————— Learn to approach issues from a broad, comprehensive perspective and take the initiative to resolve them

### Participant Testimonials



#### Student C

The message (of the career program) that I can keep doing what I want to and it will lead to something in the future left an impression on me. I am still undecided about what I want to do, but I hope to tackle whatever takes my interest and do something now that will stand me in good stead in the future.



#### Student D

This (the PCG program) was my first time to do a full-on experiment—pipettes and everything—very impressive. Seeing those crystals with my own eyes in the end made all that work worthwhile.



# Space Business Education Programs

## Space BD & Gakushuin University : Industry-academia collaboration on joint curriculum development

We are collaborating with Gakushuin University to develop a curriculum that aims to nurture the drivers of tomorrow's society by providing a platform for practical learning to deepen knowledge combining Gakushuin's education and research in arts and sciences with Space BD's business. Gakushuin is the first university in Japan to enter into a collaboration agreement with a venture company to jointly develop a space utilization theory curriculum for all students and departments.



### Participant Testimonials



#### Student E

The seminars focused on the specifics of doing business using space technology, followed by workshops that encouraged us to think and come up with our own ideas. I am really glad to have attended.



#### Student F

I learned skills that will be useful in the workforce, like how to facilitate discussions in the process leading up to a presentation, hints for ideas, how to present, and word choice.

## Training for Corporate Clients and Businesspeople : Program on Space Business and Venture Management

We offer a program based on "business games" that simulate the experience of a series of business processes in space exploration and venture management based on the theme of the space industry, which is widely seen as a growth sector. In one section of the program, participants discuss and make presentations based on actual case studies relating to the realities of management experienced by Space BD over the six years (as of 2022) since the company's establishment. In this way, the program provides the kind of insights into real-life, experience-based management and leadership skills and new perspectives conducive to innovation that can't be learned through lectures alone.



### Participant Testimonials



#### Employee of participating company (major corporation)

This was a fresh kind of training, practical and full of role-playing and discussions that not only deepen understanding of the space industry and its unlimited potential, but also enables participants to experience the realities of success and failure in corporate management. This was a good opportunity to hone skills to judge situations and make decisions in a rapidly changing society, and to foster a mindset of explore the unknown amid unpredictability.

# Entrepreneur Incubation

## Aoki Global Entrepreneurship Program

### Special Program for Junior High School Students Who Dream of Starting a Business

Learn among peers! Not just business knowledge, but entrepreneurial skills, too: inventiveness, communication, thinking, and leadership.

### Special Program for Junior High School Students Living or Attending School in Yokohama Internships at Japanese startups and overseas study tours also available!

We disprove the misconception that Japan is not conducive to entrepreneurship with a program to foster future generations of entrepreneurs who can thrive in Japan and around the world. The program, operated by the Aoki Global Entrepreneurship Program executive committee, aims to sow the seeds of entrepreneurship in the still-fertile minds of junior high school students.

### Fostering entrepreneurial spirit that's not just about business skills

In addition to instilling business knowledge, the program also has a generous range of modules to develop the communication, leadership, and cooperative skills required of entrepreneurs.

### Small class sizes

Groups of four students are assigned one mentor, a businessperson currently active in a venture company. The small group sizes enables better tailoring of support to each student's characteristics and progress.

### Not just lectures: Students get real experience through internships, overseas study tours, etc.

The program offers students exposure to the business coalface through internships at startups in Japan and overseas study tours to new business hotspots.

#### Entrepreneur Fundamentals Classes

A discussion-based course on thinking skills and how to perceive things by Tatsuo Kitagawa, an education practitioner. Participants learn how to enhance teamwork and motivation, and learn from advanced case studies on the typical mistakes of entrepreneurs in order to build an entrepreneurial mentality.



#### Business Plan Development

Students formulate business plans to make a difference in the world, and improve them over the course of the program under advice from mentors, who have a wealth of business experience.



#### Internships

Interning students visit Japanese startups, observe business meetings, attending morning meetings and conferences, and engage in dialogue with entrepreneurs.



#### Overseas Study Tours

These tours are designed to enable students to develop a clear image of their own entrepreneurial future by listening to entrepreneurs in the destination countries, and to develop presentation skills through training.



#### Special Activities

In addition to classroom learning, the program provides opportunities for hands-on learning and teamwork assignments.



#### Final Presentations and Graduation Ceremony

The program culminates with a final ceremony, where students make individual and group presentations, share future aspirations, and share their visions for becoming entrepreneurs in the future, and receive final messages from program's various instructors and mentors.



### Participant Testimonials



#### Student G

I had imagined we would just learn entrepreneurial know-how, but the program was focused on building human character as an entrepreneur. This isn't the only program that teaches business, but I don't think there are many that enhance human and non-cognitive skills as well. The environment was one of serious engagement in the program, and the improvement in my skills was noticeable.