



Japan Manned Space Systems Corporation
JAMSS
links humans and space



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Toward a New Era of Humans and Space. JAMSS will continue our challenges.

We, Japan Manned Space Systems Corporation (JAMSS), have been involved in the operation of “Kibo(Japanese Experiment Module)” and “KOUNOTORI(HTV or H-II Transfer Vehicle)”, the training of astronauts and flight controllers, and the implementation of space experiments, thereby supporting the International Space Station (ISS) Program since our establishment in 1990. We have also achieved positive reviews on our safety, reliability and maintainability of systems which are used in the space.

Now, Space is shifting from a place only for national projects to a place where private companies are taking an active role. As the next stage, JAMSS as a system integrator in the new era, we will contribute to a sustainable society by bridging between Earth and Space using the manned space technologies which have been established on the ISS, such as explorations on Lunar and Mars or expanding space utilization.

有賀 輝

President Teru Aruga



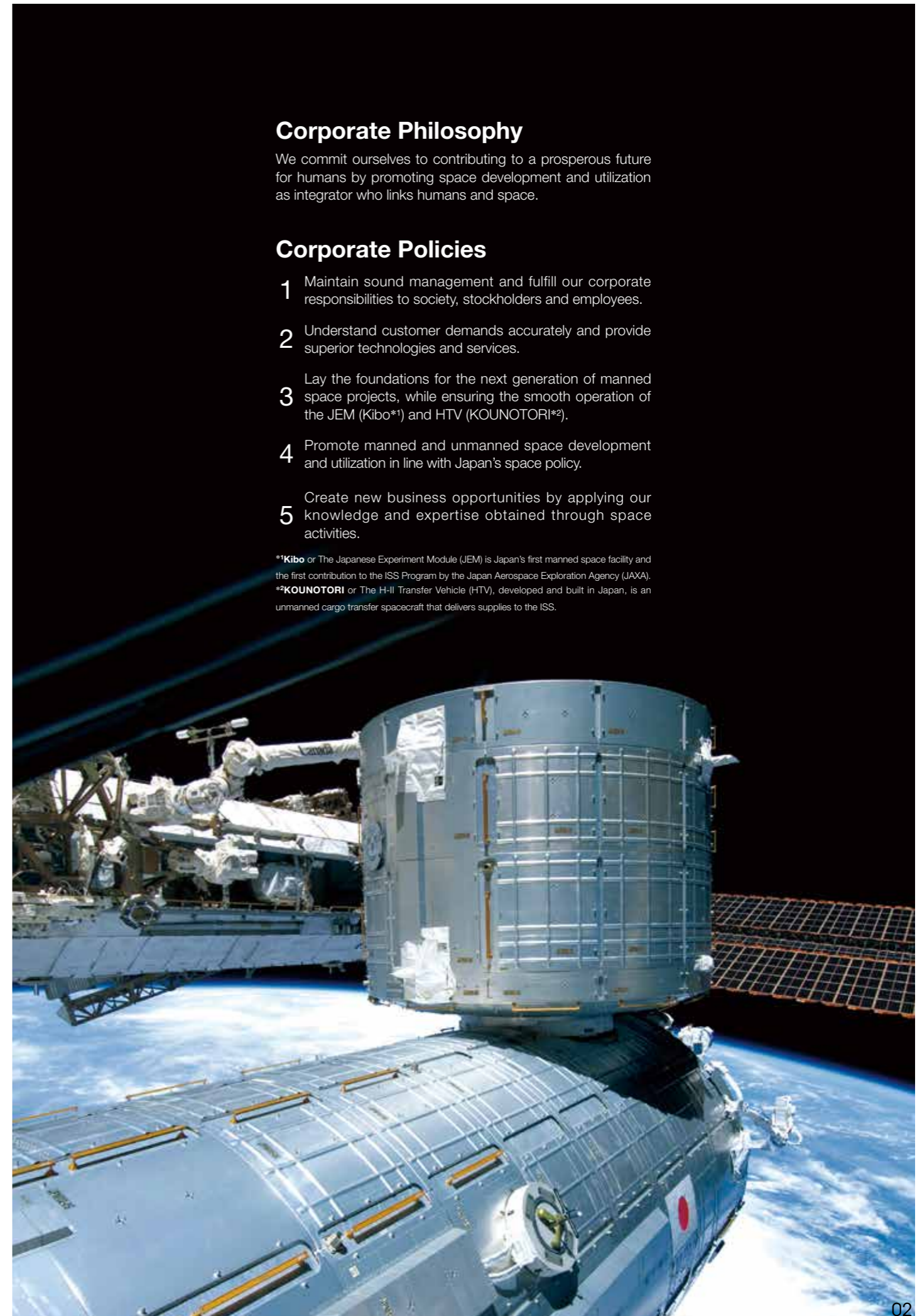
Corporate Philosophy

We commit ourselves to contributing to a prosperous future for humans by promoting space development and utilization as integrator who links humans and space.

Corporate Policies

- 1 Maintain sound management and fulfill our corporate responsibilities to society, stockholders and employees.
- 2 Understand customer demands accurately and provide superior technologies and services.
- 3 Lay the foundations for the next generation of manned space projects, while ensuring the smooth operation of the JEM (Kibo*1) and HTV (KOUNOTORI*2).
- 4 Promote manned and unmanned space development and utilization in line with Japan's space policy.
- 5 Create new business opportunities by applying our knowledge and expertise obtained through space activities.

*1Kibo or The Japanese Experiment Module (JEM) is Japan's first manned space facility and the first contribution to the ISS Program by the Japan Aerospace Exploration Agency (JAXA).
*2KOUNOTORI or The H-II Transfer Vehicle (HTV), developed and built in Japan, is an unmanned cargo transfer spacecraft that delivers supplies to the ISS.



Making Space Environments Accessible...

Research and Development Project

- Investigation and Research for the upcoming Manned Space Exploration
- Conceptual Study for the Future Space Systems
- Commercial Usage around the Low Earth Orbit

Satellite Development Support

- Satellite Engineering Consulting
- Design and Analysis
- Small Satellites Launch

Operations and Utilization of Kibo

- Operation of Kibo and KOUNOTORI
- Logistics and Maintenance, Cargo Integration
- Astronaut and Flight Controller Training
- Astronaut Support
- Space Experiment Operations
- User Integration
- Engineering Support
- Development of Soft Bag, etc.

Kibo Commercial Utilization

- Space Experiment Planning
- Development of Space Experiment Equipment
- Transportation of Space Experiment Equipment and Samples
- Safety Assessment of Space Experiment Equipment

Making Space Technologies Applicable...

Safety and Product Assurance

- Safety and Product Assurance for Spacecraft
- Safety and Product Assurance for Aircraft
- Training in Safety and Product Assurance

Satellite Utilization

- Utilization of Earth Observation Data
- Communication Satellite Utilization

System Safety Independent Verification and Validation (IV&V)

- IV&V on Automobile System Safety
- IV&V on Aircraft System Safety
- IV&V on Transportation System Safety

Training

- Rocket Launch Site Ground Controller Training
- Satellite Controller Training
- Training for Nuclear Power Plants Operator
- Training for Petrochemical Plants Operator
- Training Program for Private Companies



Location : JAXA Tsukuba Space Center

JAMSS has acquired manned space flight technology that prioritizes the safety of astronauts in the Japanese Experiment Module “Kibo” on the ISS.

We are keeping our confident eyes on astronauts and Kibo every day from the ground using the latest operation technologies necessary for extreme environments.

Operations and Utilization of Kibo

Endless challenges for maximizing the results from Kibo and future human space exploration

Providing support for manned space flights and the success of the mission in Kibo has been our main objective since JAMSS was established in 1990. Our flight controllers continuously monitor, control and analyze the status of Kibo from the Kibo Mission Control Room at the JAXA Tsukuba Space Center, and real-time coordination is made through hotlines linking them with the astronauts onboard and the National Aeronautics and Space Administration (NASA) in the USA. Our expertise for medical operation supports astronauts onboard to maintain their health. Training of the flight controllers and astronauts are also our vital role.

Our flight controllers are brought up to be experts. We run a two-year certification program for flight controllers involving training

and simulation exercises to prepare them for quick decision-making and ensure that they have high-level English proficiency and smooth communication skills.

Taking advantage of the microgravity environment of Kibo, astronauts implement a wide range of experiments that would be difficult to perform on Earth. We optimize these experiments for the space environment so that astronauts are able to carry them out safely and effectively in space. We provide end-to-end services for all aspects of each experiment making close communication with researchers. Our service includes international planning coordination, experiment equipment and sample check, launch arrangements, appropriate training for astronauts, and procedure and manual

development. While the experiments are conducted onboard, we remain in contact with the astronauts to provide operational support responding flexibly and promptly to off-nominal situations in coordination with our engineering support team who can provide their expertise to any problems.

We continue to work toward more sophisticated and efficient operation to maximize the outcome from Kibo and to accumulate the skills and technologies necessary for future space exploration activities. This challenge has enabled us to operate the robot arm on Kibo remotely from the ground on behalf of the astronauts who were formerly its prime operators.



Location : JAXA Tsukuba Space Center

Operation of “Kibo” and “KOUNOTORI”

The Kibo Mission Control Room at the JAXA Tsukuba Space Center monitors approximately 15,000 items of data 24 hours a day, 365 days a year, thereby ensuring astronaut safety and mission success.

Logistics and Maintenance, Cargo Integration

In addition to making supply plans for equipment, samples, tools and other onboard items, we formulate and optimize plans for loading items onto KOUNOTORI for every launch.

Astronaut Training

Our instructors provide training to astronauts in the JAXA Tsukuba Space Center on the operation of the equipment and robot arms on Kibo and KOUNOTORI as well as emergency response in Kibo.



Astronaut On-Board Support

We develop exercise programs and other health maintenance plans, monitor onboard environments inside the space station, and manage the health of astronauts at all times.

Space Experiment Operations

We formulate an excellent team suitable depending on particular experiments, thus provide flexible support to astronauts and operate experiment equipment for mission success.

User Integration

We have much experience in space experiment in Kibo. We can help researchers and Kibo users to plan their experiments in space and ensure compatibility with the space environment through testing and analysis before flight.



Location: JAXA Tsukuba Space Center

Kibo Commercial Utilization

Research and development of technology and products on the International Space Station

Kibo is a “piece of Japan in space” and is available for use by companies, research institutes and individuals in the Japanese private sector. Experiments can be performed not only inside but also outside of the space station with the use of robotic arms. Space enables a wide range of experiments that would be impossible to conduct on Earth.

JAMSS has actively promoted and supported the use of space by private Japanese companies since Kibo started

its operation. We have provided support from launch to recovery after re-entry for private companies’ projects, including the Kibo Robot Project in which KIROBO, the robot astronaut developed by Dentsu Inc. and Toyota Motor Corporation, conducted a conversational experiment with astronaut Koichi Wakata and the experiment carried out by the Suntory Global Innovation Center to “develop mellowness in an alcoholic beverage using a microgravity environment.”

JAMSS provides support for all aspects of space experiments including plan proposals, development, delivery and safety screening processes. Our thorough knowledge of Kibo enables us to provide comprehensive services that cannot be found elsewhere. The utilization of outer space environments is no longer a dream, but a reality. We look forward to helping companies that aspire to operate outside of the conventional frameworks.



©KIBO-ROBOT

Kibo Robot Project

An experiment to study the effects robots have on astronauts who spend a long period of time in an enclosed environment. JAMSS provide engineering support as well as real time operation in Kibo.



Experiment using a space environment

We use a space environment to conduct a wide variety of experiments, such as “to develop mellowness in an alcoholic beverage using a microgravity environment.”



Space Station Utilization Service

Taking advantage of U.S. commercial company NanoRacks LLC, a NASA partner, we carried out the educational Lagrange Kibo Mission which involved plant seeds flown into space.



Training

JAMSS provides space-qualified training services for various industries.

Our training services are based on the Instructional Design Process theory which is NASA-based organized approach to training and have five systematic processes such as “Analyze”, “Design”, “Develop”, “Implement” and “Evaluate”. We offer training services that combine only necessary processes according to customer’s needs.

“Analyze” investigates customer’s

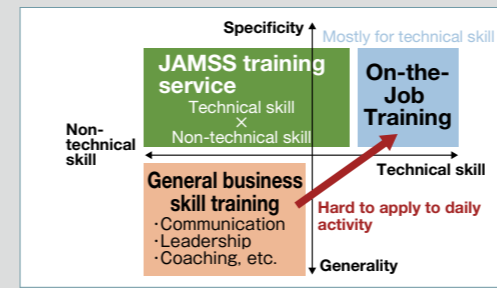
tasks and aims, visualizing the necessary Skills, Knowledge and Attitude to achieve the training objectives. It is called SKA analysis.

In “Design”, we propose efficient training methods, regarding to customer’s conditions and training objectives, etc.

In “Develop”, we prepare training materials and exercises to meet the training goals efficiently.

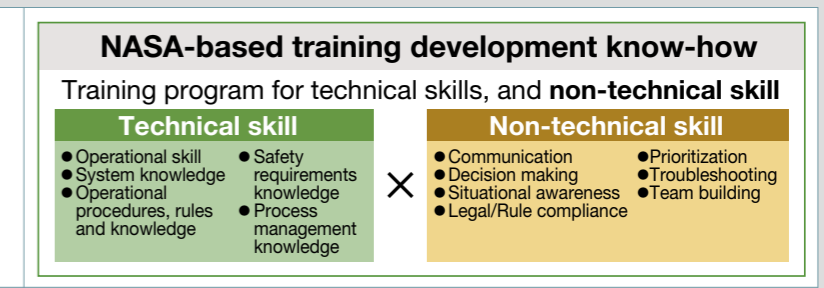
“Implement” and “Evaluate” carry out the training and then, its feedback session to evaluate the team and individuals to improve the performance and share the right knowledge of the ideal actions.

As a training method, it is possible to provide a wide variety of methods, not only lectures and exercises but desktop training and simulation training.



JAMSS training program service

JAMSS training combines both customer’s Technical skill training and Non-technical skill training, to reduce a risk of operation mistake and enhance the team performance.



Non-technical skill

In the human spaceflight, small miscommunication or operation mistake may result in a tragic accident. In order to reduce human errors and deal with emergency

situations calmly, non-technical skills are essential.

*SKA=Skill, Knowledge and Attitude



Safety and Product Assurance

The ultimate safety technology we have acquired through space activities is available for use in the private sector.

A seemingly minor accident on Earth can have catastrophic consequences in the enclosed environment in outer space. Our work ensures that the three main hazards in space, namely, fire, depressurization and air contamination, are under control. Additionally our work for safety and product assurance includes exhaustive checks on every item delivered to the ISS and doing everything within our ability to ensure the safety of the crew through implementation of stringent safety requirements.

We evaluate the reliability and safety of every item delivered into space at all levels beginning with materials and components through to the overall system, and provide suggestions to the developers. Our work provides independent assessments to prove that the item satisfies the stringent quality standards required by NASA and JAXA.

The knowledge and expertise required to ensure reliability and safety in space enable us to cater to the needs of the aircraft and railway industries, as they

demand extremely strict safety standards. We are now applying the technology developed for space to private enterprises on Earth.

We also regularly provide safety and product assurance training to engineers in the space industry. JAXA has been using our training classes as a mandatory course for JAXA's engineers. Our training program can certainly contribute to companies in other industries that require high-level training in safety, reliability and quality assurance.



Safety and Product Assurance for Spacecraft
We work with JAXA in the areas of safety, reliability and maintainability assessment for everything from manned spacecraft like "Kibo" to unmanned spacecraft including satellites.



Safety and Product Assurance for Aircraft
We provide engineering support for the design and safety of aircraft, establish verification plans for collecting data required to obtain type certification and carry out the verification evaluations



Training in Safety and Product Assurance
We provide safety and product assurance training suitable for safety assessors, developers and manufacturers based on our experience in space activities.



System Safety Independent Verification and Validation

We provide state-of-the-art software independent verification and validation (IV&V).

Software IV&V improves safety by identifying the flaws adversely affecting system safety and software reliability and verifying the proper operation of the software in an emergency situation.

JAMSS began IV&V work at the same time as NASA. Working cooperatively with the Massachusetts Institute of Technology (MIT), the University of Southern Denmark and other prestigious institutions around

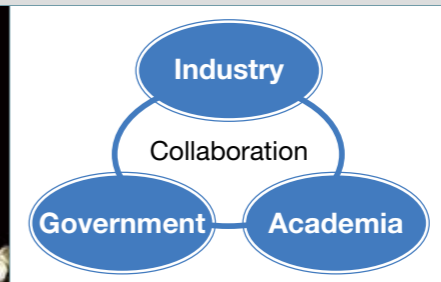
the world has enabled us to accumulate leading-edge software verification technology in the field of spacecraft software, which demands the highest level of safety. JAMSS can expertly apply the Integrated Formal Verification technology that extracts the most critical components of safety from the voluminous target software and verifies all possible combinations of conditions, in addition to

identifying potential accident causes that would only occur under extremely rare conditions. This allows us to develop software that is safer than ever.

IV&V is expected to be utilized in fields that have stringent safety standards for complex software, including the automotive, airline and railway industries.



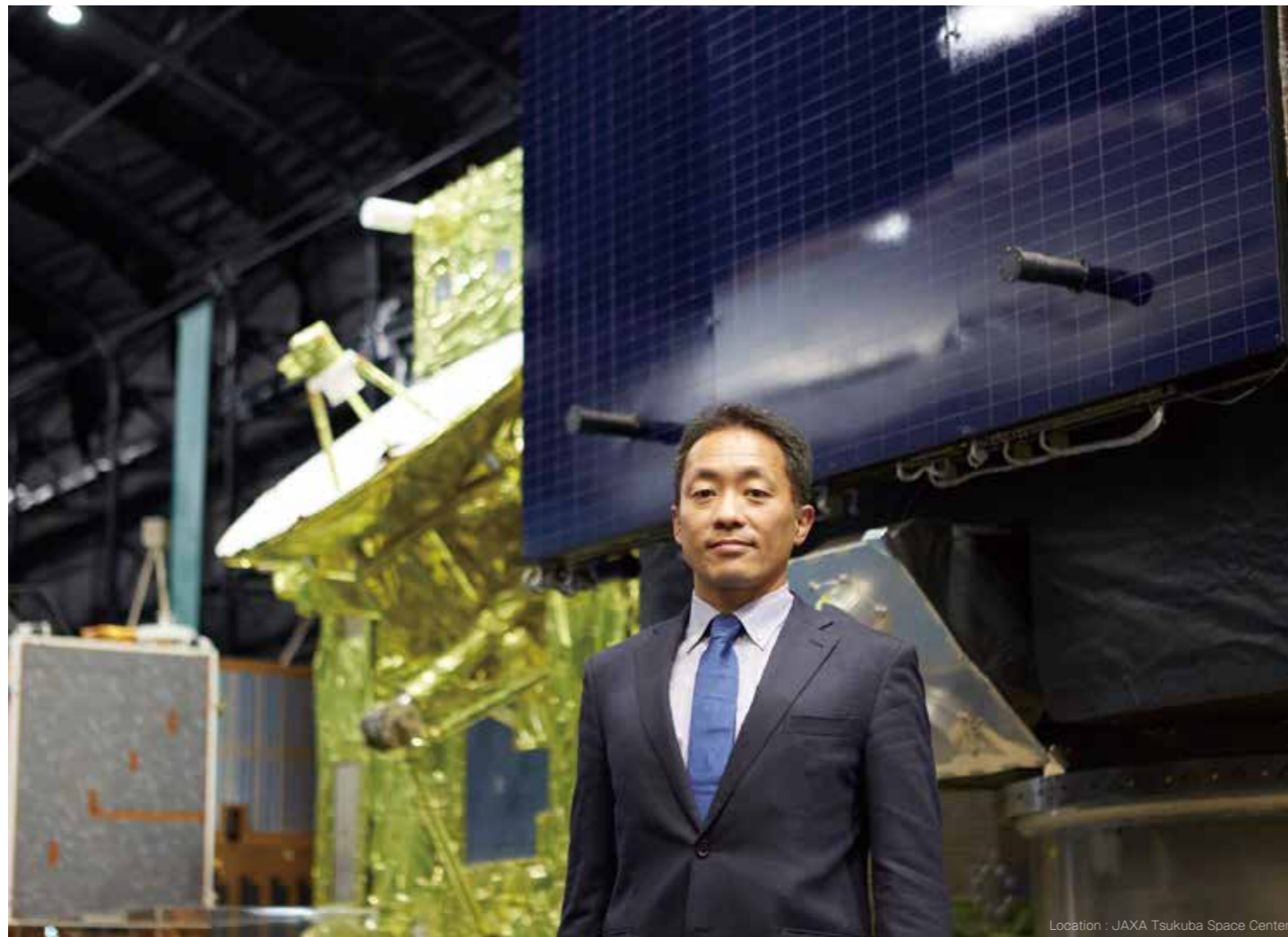
Technology developed for outer space
The highest level of verification is required to successfully dock the KOUNOTORI on the ISS. IV&V helps reduce unexpected software operations to zero to ensure high-level safety.



Global network connection
Joint research projects with various entities in private industry, academia and government enable us to develop assessment tools and techniques and maintain our state-of-the-art technology.



Building systems that require high-level safety
Advancements in IoT and AI in, for example, automobile, railway and aircraft, result in more sophisticated and complex systems that increase the need for software safety and reliability.



Location : JAXA Tsukuba Space Center

Satellite Development Support

Space engineering experts support the design, development and operation of satellites.

We have been supporting satellite-related projects encompassing the various fields of satellite development, such as system design, satellite communications technology support and orbital operation support, for many years.

Our satellite technical consulting services cover a wide range of areas, from requirement planning to design, manufacture, testing and operation, by exploiting the system engineering technologies and experience we have

accumulated from the viewpoint of satellite users. Based on this background, we also provide various survey services covering all aspects of space development both in Japan and overseas.

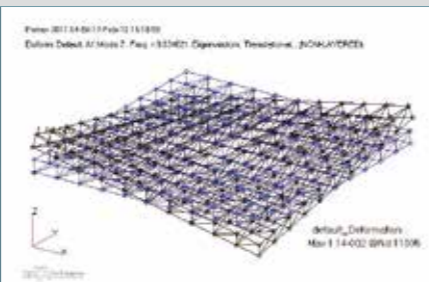
There has been a global trend in launching small satellites in recent years. Small satellite deployment from Kibo began in 2012. We provide small satellite deployment opportunities from Kibo with technical consulting services for design, manufacture and testing as well as documentation

support. It is necessary to meet all applicable safety requirements for deployment from Kibo. We have been supporting small satellite deployment from Kibo globally and successfully deployed three foreign satellites since 2015. We also provide small satellite launch opportunities using other launch vehicles around the world, based on our launch services network to meet our customers' demands. We will continue to provide technical support from satellite development to launch, both at home and overseas.



Satellite Engineering Consulting

We provide the necessary assessment services for satellite requirement planning, design, manufacturing and testing, from the viewpoint of satellite users and project management.



Design and Analysis

We provide the interface design for satellite and ground systems, design of satellite orbits, design of delivery control systems, optical sensors, communications and positioning systems.



Small Satellite Launch

We provide opportunities for deploying/launching small satellites from Kibo and launch vehicles suitable for its mission, and also technical consultation as needed for successful launch.



Solution Service

Solving the problem with space-based skill and know-how.

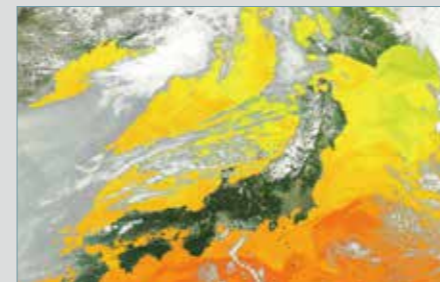
A large number of different satellites are currently orbiting space above Earth, and it is possible to receive and make use of vast amounts of satellite data for business purposes. JAMSS provides services in which the satellite data at advanced levels and the customized information passed on to users. In particular, people and companies involved in the field of agriculture are able to use cell phone or tablet to check on crop

cultivation status, thus bringing us inexorably closer to an age in which such information will be used to decide on harvest times and volumes.

As commercial use of space environment progress, JAMSS has developed a high-quality protein crystal growth service called "Kirara". Protein crystallization is performed in the International Space Station (ISS) for about one month, after which the crystal will be

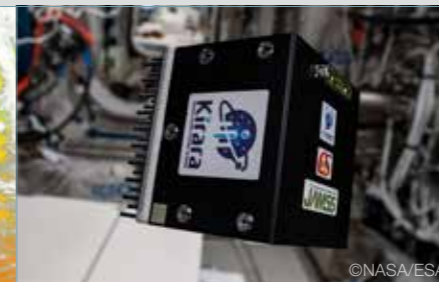
returned to your facility.

Besides, space-based know-how is also used in other field. Astronaut trainer in JAMSS has developed "Pullsora" which is a rehabilitation equipment with training program, focused on a similarity between weakness of muscle or a sense of balance during astronaut's stay in space and bedridden patient in hospital.



Digital Farming

"Digital Farming" is a satellite imagery based information service which help increasing your profitability by visualizing the crop conditions in your farm utilizing JAMSS-unique know-hows based on techniques including NDVI which can show the distribution and activity of various agricultural products.



Kirara

"Kirara" is a high-quality protein crystal growth service supporting drug discovery through the growth of high quality protein crystals in space. JAMSS's original cube-type incubator is installed in the ISS module to grow protein crystals using the counter diffusion method.



Pullsora

"Pullsora" developed by our astronaut trainer, is a rehabilitation equipment with simple function to fix on a handrail for pulling, and attached training program may motivate your daily rehabilitation program.

Company Profiles	<p>Name Japan Manned Space Systems Corporation (JAMSS) Location Tokyo Office Otemachi Bldg., 1-6-1, Otemachi, Chiyoda-ku, Tokyo 100-0004, Japan President Teru Aruga Established May 14, 1990 Capital 445 million yen Sales 4.8 billion yen (in fiscal 2021) Personnel 248 (as of April 1, 2023) Main account banks Mizuho Bank, Ltd., Sumitomo Mitsui Banking Corporation, MUFG Bank, Ltd., and Joyo Bank, Ltd.</p>		
History	<p>May 1990 Company established (Sanwa Building, 1-27-17, Hamamatsu-cho, Minato-ku, Tokyo) April 1991 Headquarters moved (Hamamatsu-cho Central Building, Tokyo) April 1994 Tsukuba Office opened (Urban Square Tsuchiura Building, Ibaraki) November 1997 JAMSS America, Inc. established (Houston, Texas, USA) November 2000 ISO-9002 certification December 2003 ISO-9001 certification November 2004 JAMSS joined KEIDANREN, The 21st Century Public Policy Institute and Space Activities Promotion Committee May 2005 Headquarters moved (Otemachi Building, Tokyo) March 2007 ISO-14001 certification November 2009 Kashiwa Office opened (Tokatsu Techno Plaza, Chiba), ISO/IEC27001 certification May 2010 20th anniversary of establishment (a commemorative public symposium held) September 2013 Offices located in Tsuchiura and Kashiwa were integrated with Headquarters, Tsukuba Office opened (Tsukuba Center Inc.) April 2015 Nagoya office opened (Mitsui Seimei Kanayama Building, Aichi) July 2019 Kobe office opened (Imon Kobe Building, Hyogo) November 2020 Nagoya office moved (NFC Kanayama ekimae Bldg., Aichi) December 2020 30th anniversary of establishment (released the special web site) April 2022 Nagoya office transferred (Safety and Mission Assurance Department)</p>		
Stockholders	<p>Mitsubishi Heavy Industries, Ltd. / IHI Corporation / NEC Corporation / Mitsubishi Electric Corporation / JGC CORPORATION / SKY Perfect JSAT Corporation / I-NET CORP. / Kawasaki Heavy Industries, Ltd. / TIS Solution Link Inc. / Chiyoda Corporation / NEC Space Technologies, Ltd. / IHI AEROSPACE Co., Ltd. / SUBARU CORPORATION / Fujitsu Limited / PASCO CORPORATION / High-Reliability Engineering & Components Corporation / SHIMADZU CORPORATION / Sumitomo Electric Industries, Ltd. / Nippon Avionics Co., Ltd. / Japan Aviation Electronics Industry, Limited / MATSUO ELECTRIC CO., LTD. / Mitsubishi Precision Company, Limited / Murata Manufacturing Co., Ltd. / FUJI ELECTRIC CO., LTD. / MITSUBISHI CABLE INDUSTRIES, LTD. / DAIKO DENSHI TSUSHIN, LTD. / Oki Engineering Co., Ltd. / Toray Research Center, Inc. / Mitsubishi Research Institute, Inc. / SPACE ENGINEERING DEVELOPMENT Co., Ltd. / Advanced Engineering Services Co., Ltd. / COSMOTEC Co., Ltd. / Mitsubishi Electric Software Corporation / SUMITOMO CORPORATION / Sojitz Corporation / MARUBUN CORPORATION / KANEMATSU CORPORATION / Marubeni Aerospace Corporation / Mitsui Bussan Aerospace Co., Ltd. / Amil Corporation / Sumitomo Heavy Industries, Ltd. / Hitachi Zosen Corporation / Mizuho Bank, Ltd. / Sumitomo Mitsui Banking Corporation / MUFG Bank, Ltd. / JOYO Bank, Ltd. / Mitsui Sumitomo Insurance Company, Limited / Tokio Marine & Nichido Fire Insurance Co., Ltd. / Aioi Nissay Dowa Insurance Co., Ltd. / Sompo Japan Nipponkoa Insurance Inc.</p>		
Directors And Auditors/ Organization	<table border="0"> <tr> <td data-bbox="409 1451 691 1927"> <p>Directors And Auditors</p> <p>Chairman of the Board Toshikazu Koto</p> <p>President / Member of the Board Teru Aruga</p> <p>Managing Director / Member of the Board Shinichi Amatatsu Taichi Nakamura</p> <p>Director / Member of the Board Yoshinari Akeno Kunio Kondo Hiroshi Takeshita</p> <p>Auditor & Supervisory Board Member Nobuo Fujishima</p> </td> <td data-bbox="691 1451 1314 1927"> <p>Organization</p> <pre> graph TD Board[Board of Directors] --- President[President] President --- Compliance[Compliance Department] President --- Strategic[Corporate Strategic Planning Department] President --- Business[Business Development Department] President --- Assurance[Safety and Mission Assurance Department] President --- Eng[Engineering Management and Quality Assurance Department] President --- ISS[ISS Utilization and Operations Department] President --- Manned[Manned Space Systems Engineering Department] President --- Space[Space Business Department] Audit[Audit & Supervisory Board Member] </pre> </td> </tr> </table>	<p>Directors And Auditors</p> <p>Chairman of the Board Toshikazu Koto</p> <p>President / Member of the Board Teru Aruga</p> <p>Managing Director / Member of the Board Shinichi Amatatsu Taichi Nakamura</p> <p>Director / Member of the Board Yoshinari Akeno Kunio Kondo Hiroshi Takeshita</p> <p>Auditor & Supervisory Board Member Nobuo Fujishima</p>	<p>Organization</p> <pre> graph TD Board[Board of Directors] --- President[President] President --- Compliance[Compliance Department] President --- Strategic[Corporate Strategic Planning Department] President --- Business[Business Development Department] President --- Assurance[Safety and Mission Assurance Department] President --- Eng[Engineering Management and Quality Assurance Department] President --- ISS[ISS Utilization and Operations Department] President --- Manned[Manned Space Systems Engineering Department] President --- Space[Space Business Department] Audit[Audit & Supervisory Board Member] </pre>
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