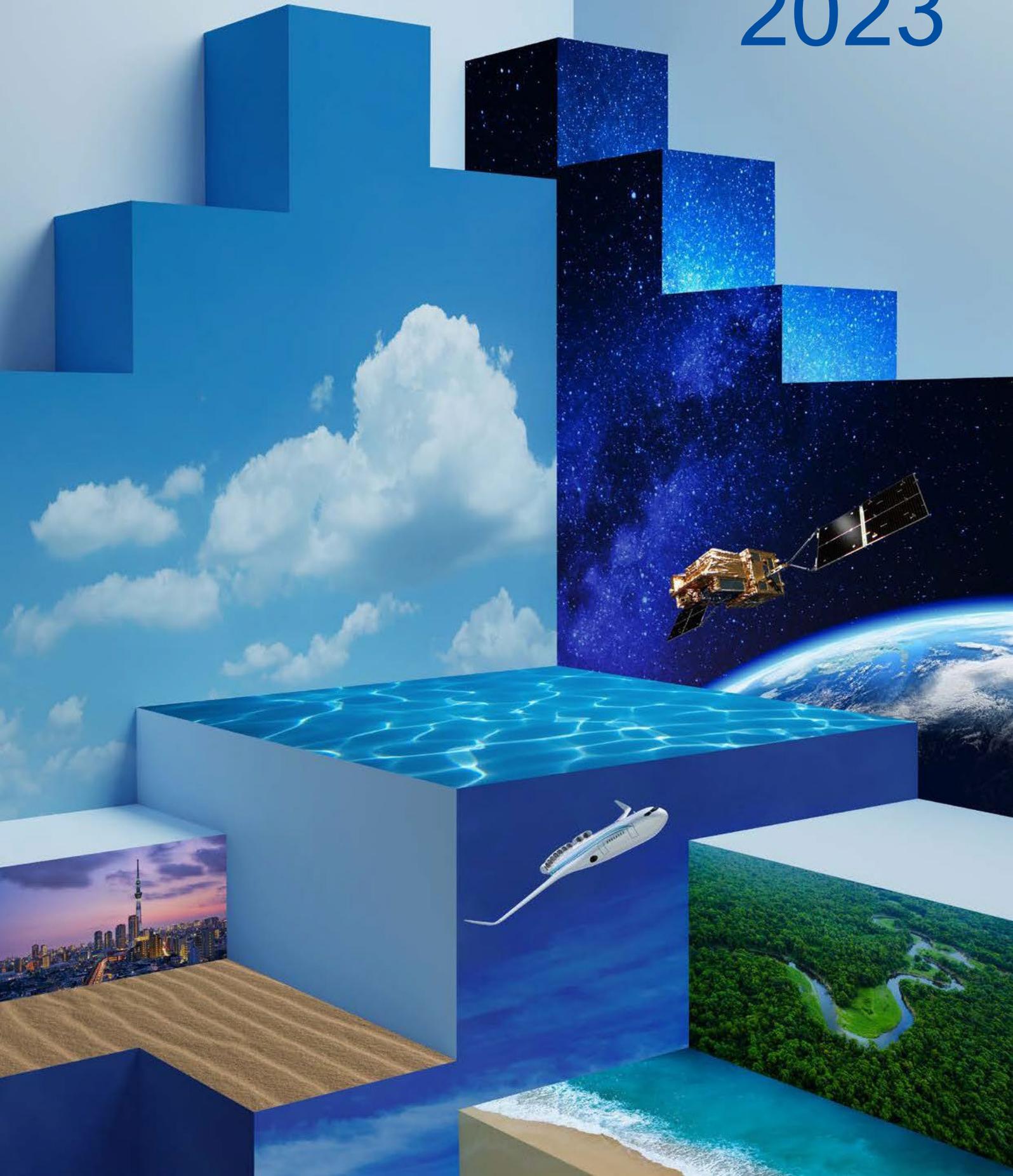




Japan Aerospace Exploration Agency
(JAXA)

Sustainability Report 2023



Introduction

JAXA's Sustainability Report describes not only our initiatives related to environmental load and social responsibility, but also our business activities in FY2022 in order to provide a better understanding of our overall business activities.

We hope that our readers will become interested in aerospace and the global environment and use it as a starting point for communication with us.

In order to realize our vision, plans, and projects, the following are JAXA's philosophy and management policies, as well as the code of conduct for JAXA employees.

Management Philosophy

To realize a safe and affluent society using space and the sky.
By utilizing leading technological developments, we will succeed and deliver our achievements along with broader wisdom to society.



Action Declaration

Jubilation for human society

We will provide enjoyment and surprise to people by evolving our lives.

Aspiration for creation

We will always aim for higher goals and continue to aspire to create by facing up to and overcoming any difficulties.

Responsibility and pride

We will faithfully act with responsibility and pride to confidently meet the expectations of society.

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Reaching Space Frontiers



Five Slogans to Keep Us Challenging

"Make the space and aeronautics field the ideal workplace"

As individuals and members of society, each of us aims for a workplace that is filled with greetings and consideration for others and contributes to mutual success by respecting each other's individuality and sharing the same feelings.

"Revitalize Japan through space and aeronautics"

By being conscious of the connection between work and society, we will foster the sense to contribute to our country and people as well as the international community through space and aeronautics.

"Improve our ability to execute in space and aeronautics"

As professionals in space and aeronautics, we will acquire the ability to create new ideas and strive to improve our planning ability, research and development ability, project execution ability, and organizational management ability to realize these ideas.

"Be proud of being involved in space and aeronautics"

We will take on challenges for space and aeronautics and act sincerely with responsibility and pride to contribute to society. Value small daily advances while maintaining a panoramic, long-term perspective.

"Increase the number of our companions in the space and aeronautic field"

We will spread the wisdom and results obtained through the activities of space and aeronautics throughout society and, in cooperation with other activities, contribute to the lives, economy, and safety of people, as well as to the resolution of international issues.

To the citizens of Japan

First, I would like to express my sincere apologies for the failure regarding the launch of the Epsilon Rocket No. 6 and the First H3 rocket test vehicle in FY2022, which resulted in the disappointment of many Japanese citizens, and for the serious non-compliance with medical guidelines that occurred in the space medicine experiment, which seriously damaged the trust in space medicine research. With regard to these launch failures and improprieties, we will do our best to respond to them with a unified voice of persons concerned so that we can live up to citizen's trust by thoroughly investigating the causes and taking truly effective measures to prevent recurrence.

In fiscal year 2022, the fifth year of the fourth medium to long-term target period, we continued to take on challenges by uniting executives and employees in all aspects of research and development including various projects, and supporting operations as the core implementing organization that technically supports our country's use of aerospace development.

From the samples (gravel) without earth contamination of the asteroid "Ryugu" brought back by the asteroid probe "Hayabusa 2," we identified amino acids and liquid water, which are the materials of protein, for the first time in the world. We also succeeded in detecting uracil, a nucleobase contained in the RNA of all life on Earth.

The enhancement and trial operation of the Space Situation Assessment (SSA) system for observing space debris, etc., from the ground, which is necessary to ensure the sustainable and stable use of outer space, including in the security field, have been surely completed and started. Furthermore, to achieve hypersonic flight, the first S-520-RD sounding rocket achieved scramjet engine combustion for 5.8 seconds (maximum Mach 5.8), exceeding the target, and we acquired a tool for predicting engine thrust (pressure integration) in actual flight from wind tunnel test data, for the first time in the world.

As a result of manned space activities, the Astronaut Wakata, who spent a long time aboard the International Space Station (ISS) and broke the record for a Japanese astronaut in his fifth space flight, achieved many results as an experienced astronaut, contributed to the safe operation of the ISS, and installed a new solar cell array, which is necessary for operation and use of the ISS until 2030, through his first extravehicular activity. These achievements further enhanced international confidence in Japan as an international partner of the ISS program, and led to the upkeep and improvement of Japan's presence in the U.S.-led Artemis program and the "Gateway," a manned base for orbiting the Moon. The conclusion of the Gateway Implementation Arrangement ensured the first Japanese astronaut to have an opportunity to engage in space activities (boarding the Gateway) other than low Earth orbit. In addition, two new astronaut candidates have been selected on the assumption that the activities of Japanese astronauts would be spread around the moon and on the lunar surface. Astronauts were recruited for the first time in 13 years, with a record number of over 4,000 applicants.

Meanwhile, regarding the sustainability (social and environmental) aspect, we are making steady efforts to improve the work environment, including taking environmental considerations such as rationalizing the energy use and improving work-life balance. Based on the basic action policy on SDGs formulated last year, the entire organization is working to promote SDGs.

Japan is one of the few countries in the world that can conduct autonomous and wide-ranging space activities. In fiscal year 2023, JAXA, as the core implementing organization that technically supports our country's use of aerospace development, will continue to unite its executives and employees to create results toward the completion of the fourth fiscal year, and will strive to give back to society while considering the environment.

September 2023

President



Details

We, JAXA, will reform the management system and change the mindset of executives and employees while emphasizing our public nature, transparency, and autonomy as a national research and development agency, with the aim of effective and efficient operations to maximize the fruits of R&D in Japan. Based on the Basic Plan for Space Policy, etc., the competent minister instructs JAXA on the Medium/Long-Term Goals for the next seven years, which specifies the goals for business operations and business efficiency improvement. We prepare a Medium/Long-Term Plan and an Annual Plan based on the Medium/Long-Term Goals to steadily proceed with operations and achieve goals.

We prepared a Medium/Long-Term Plan for the seven years from April 1, 2018, to March 31, 2025. Based on the Basic Plan for Space Policy and R&D Plan in the aeronautics field, we will reliably implement projects and promote fundamental R&D. In addition, we will strengthen cooperation with industry, academia, and government, keeping an eye on the accelerating progress of advanced technologies and will focus on giving back the achievements to the public. Thus, we aim to create outcomes in line with the following three action policies outlined in the Medium/Long-Term Goals.

Priorities for Phase 4 Medium/Long-Term Goals

1. Contribution to diverse national interests

(1) Ensuring space security

- ▶ Technical support for government studies on functional assurance of the entire space system in cooperation with security organizations
- ▶ R&D to meet the needs of space utilization in the security field, such as space debris
- ▶ Advanced R&D to improve technologies to support Japan's positioning system, and continuous R&D for optical satellite communication technologies, etc.
- ▶ Continuous operation of core launch vehicles and development of H3 and Epsilon S Launch Vehicles to secure and improve independent space transportation capabilities
- ▶ Demonstration of world-leading technologies to remove space debris at low cost in cooperation with private companies, and contribution to early establishment of international rules

(2) Contribution to disaster countermeasures, national resilience, and solutions for global issues

- ▶ R&D on improving the frequency, accuracy, and speed of satellite observation in cooperation with disaster prevention organizations, aiming at the widespread use of satellite data as decision-making information for disaster countermeasures
- ▶ Promoting utilization of satellite data for national land management and oceanographic observation, including application to maintenance and management of aging infrastructure
- ▶ Providing satellite data and promoting international cooperation to promote the use of satellite data as an indicator for decision-making and evaluation of actions on climate change
- ▶ Advanced R&D on earth observation satellites and upgrading of core technologies for satellites to provide satellite data continuously and stably and promote its utilization

(3) Creation of new wisdom through

- ▶ Strengthening the cooperation with research institutions, etc., in Japan and overseas. Formulating and implementing long-term, strategic scenarios with the aim of creating world-class research achievements, as well as promoting efficient and effective space exploration, etc., with programming.
- ▶ Strategic development of technologies that can contribute to Japan's superiority in international space exploration and/or that have a significant ripple effect on other fields.
- ▶ Promoting the creation of new wisdom and international contributions through the utilization of the space environment in low-Earth orbit activities including the International Space Station (ISS)
- ▶ Utilizing the ISS as a technical demonstration site for international space exploration and promoting open innovation and other systems for collaboration with private companies and universities, including those in non-aerospace industries.

(4) Realization of economic growth and innovation utilizing space

- ▶ Efficient processing of satellite data and creating new businesses through multidisciplinary utilization of satellite data in collaboration with private companies, which have strength in advanced technologies in different fields such as AI
- ▶ Realizing a wide range of utilization of the Japanese Experiment Module "Kibo," and launching self-sustaining businesses by private companies, etc. Promoting the participation of private companies in international space exploration
- ▶ Business planning and technology development/demonstration through partnerships with private companies to create businesses utilizing space with new ideas by the private sector. Strengthening the human resource base through personnel interchange with external parties.
- ▶ Developing the open innovation system to promote entry of different industries and venture businesses and to expand opportunities for R&D and demonstration of technologies useful for business. Promoting activities related to intellectual properties

2. Strengthening the overall infrastructure to support Japan's space activities, including industrial, scientific, and technological infrastructure

- ▶ R&D with private companies that commit to commercialization aiming to increase market share
- ▶ Innovative R&D for future business creation, such as flight demonstration using technologies for the reuse of space transportation systems
- ▶ R&D on advanced and innovative technologies related to future satellites, such as optical and digital technologies for low-cost, high-capacity, high-speed satellite communication networks, and high-precision large optical sensor technologies
- ▶ Personnel interchange with private companies to strengthen the human resources base of the aerospace industry, and incorporation of diverse human resources into the aerospace field to enhance the function of JAXA
- ▶ Support for government's investigations on the ISS as well as low-Earth orbit activities and manned space activities in international space exploration after the ISS project

3. Enhancing the aeronautics industry and strengthening its international competitiveness

- ▶ Putting priority on R&D to improve environmental compatibility, economic efficiency, and safety of aircraft in cooperation with the private sectors, etc., such as technology development for international joint development of next-generation engines
- ▶ Advanced R&D on noise reduction for supersonic aircraft to contribute to the improvement of international competitiveness of Japan's aeronautics technologies and establishment of international standards



01 > Ensuring space security

Details

In fiscal year 2022, due to the successful launch of the No. 46 H-IIA Rocket, the H-IIA/H-IIB's launch success rate (98.2%) and on-time rate (86.0%) maintained the highest level in the world.

Launch of the No. 6 Epsilon rocket (October 2022) and the First H3 rocket test vehicle (March 2023) failed. Based on these respective results, a task force headed by President Yamakawa was immediately set up to investigate the cause of the accidents, promoting factor analysis, and conducting verification tests to identify the causes. In order to meet the trust of Japanese citizen, we will continue to do our best with a unified voice of persons concerned.

As for the Space Situation Assessment (SSA) system, which contributes to space debris observation, etc., we conducted and completed a trial operation in conjunction with the SSA system of Ministry of Defense, and started operation.



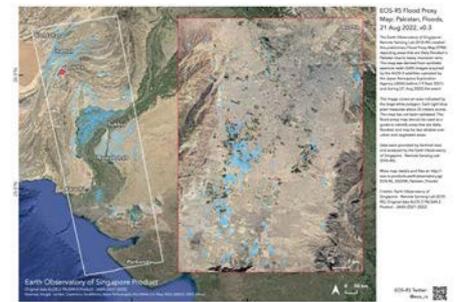
First H3 rocket test vehicle

02 > Contribution to disaster countermeasures, national resilience, and solutions for global issues

Details

The data from the Global Change Observation Mission - Climate "Shikisai" (GCOM-C) are used by 8 governmental organizations and 14 prefectures. Utilization of the satellite data has expanded, become widespread, and is established in various fields, such as science, fisheries, volcanoes, disasters, and agriculture, creating new value for social implementation. In the future, we will operate the GCOM-C in the later utilization phase with the aim of achieving the initial GCOM-C goal of continuous observation over 13 years. We also aim to create further outcomes such as establishment of the 4-dimensional global environmental change monitoring system, which covers the total earth, acquisition of scientific knowledge to contribute to the Intergovernmental Panel on Climate Change (IPCC), and contribution to the global agenda through the use for work-site operations and policy reflection, etc.

In the field of disaster prevention and response, JAXA provided observation images from the Advanced land observing satellite "Daichi 2" (ALOS-2) to disaster prevention users in the national and local governments, thereby contributing to the social implementation of framework construction for disaster prevention users to read/make out the damage information by themselves. We are also working to the advance flood forecasting technologies, including Today's Earth, which is a water cycle simulation system developed and operated jointly with the University of Tokyo.



Damage observation results of the flood in Pakistan by "Daichi-2" (August 21, 2022). Blue indicates the estimated inundation area. ©Earth Observatory of Singapore – Remote Sensing Lab (EOS-RS)/JAXA/Sentinel Asia

03 > Realization of economic growth and innovation utilizing space

Details

In addition to the "Space Innovation Partnership" (J-SPARC), which is a co-creation type R&D program designed to support the creation of new ideas for space use projects by the private sectors, the Act on the Revitalization of Science & Technology, and Innovation Creation was revised in April 2021, which allows JAXA to invest in the business operators that utilize the results of JAXA's R&D activities. JAXA aims to contribute to the maximization of JAXA's R&D results and the realization of its social implementation, as well as to the upkeep and strengthening of our country's industrial competitiveness and industrial science and technology infrastructure, through investment in business operators. To date, we have invested in companies that provide land assessment services using big data of outer space such as earth observation satellites, and companies that are working to reduce the weight and increase the life of next-generation composite material tanks. Going forward, we will continue to utilize our investment functions to accelerate business growth and fund procurement in the private space business, and to promote initiatives that contribute to maximizing JAXA's R&D achievements, realizing social implementation, and creating new markets.



Business operators that utilized results selected as investors, and the relevant staff of JAXA

©SPACE WALKER Inc.

04 > Strengthening the overall infrastructure to support Japan's space activities, including industrial, scientific, and technological infrastructure

Details

Through the development of new business areas and world-leading technological innovation, we worked on R&D to contribute to the self-reliant and sustainable development of our country's space activities and enhancement of the international competitiveness of related industries.

To strengthen the comprehensive infrastructure that supports space activities, we contributed to the flight demonstrations involving the actual combustion of the engines operating in the supersonic range, and acquisition of the world's first engine thrust prediction tool with thrust prediction accuracy exceeding the target.

As a leading R&D project to create new value in space development, we have acquired the world's first and top-level key element technology that will lead to the creation of the world's first new mission that enables high-resolution and continuous observation from geostationary orbit. As for creation of results in the field of exploration, we have acquired the low-power consumption air regeneration technology at the world's highest level using our unique technology.

In addition, we steadily promoted research and development programs for small technology innovation satellites, commercial debris removal demonstration (CRD2), and the satellite solar power system (SSPS).



As part of the "Fundamental research of fluid and combustion for hypersonic flight," we launched the S-520-RD1 sounding rocket, and succeeded in the experiment.



05 > Enhancing the aeronautics industry and strengthening its international competitiveness

Details

In fiscal 2022, we achieved results in noise reduction technology, CO₂ emission reduction technology, and equipment technology in research and development necessary for the development air transport and aircraft use in the existing form. In the research and development necessary for further use of the skies by next-generation mobility systems, we gained knowledge about the protected airspace necessary to enable safe and efficient high-density operation of manned and unmanned aircraft. In terms of research and development of basic technologies, the Aeronautical Technology Directorate utilized its accumulated knowledge of test technologies to establish ground test technologies that can accurately predict actual gas aerodynamic performance and actual gas aerodynamic heating, and contributed to the development of stable and low-cost test technologies applicable to the development of probe vehicles with atmospheric entry into Mars.



At the position with the yellow arrows, JAXA's riblet (longitudinal groove structure to reduce surface friction resistance) was processed on the aircraft. We conducted flight demonstration experiments in cooperation with the respective companies.

06 > Creation of new wisdom through

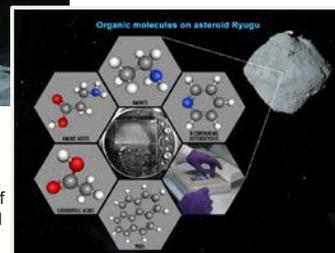
[Hayabusa2]

Details

In fiscal year 2022, the asteroid probe "Hayabusa 2" recovered samples (gravel) from the asteroid "Ryugu," the world's first asteroid samples without earth contamination, and 23 kinds of amino acids and liquid water, which are protein materials, were identified. Furthermore, we succeeded in detecting uracil, a nucleobase contained in the RNA of all Earth life. The theory that the water and organic matter necessary for life were brought about by the collision of asteroids such as Ryugu, which migrated from outside the solar system, on the Earth is expected to be supported more by the fact that Ryugu actually retains organic matter and water, and to provide valuable information in human history toward the elucidation of evolution of the solar system.



Image illustration of touchdown of the "Hayabusa 2" on asteroid Ryugu



Conceptual illustration of organic molecules found in surface samples of asteroid Ryugu

©JAXA, University of Tokyo, Kochi University, Rikkyo University, Nagoya University, Chiba Institute of Technology, Meiji University, University of Aizu, AIST, NASA, Dan Gallagher.

[EQUULEUS]

Details

OMOTENASHI/EQUULEUS, the ultra-small probe vehicles developed by JAXA and installed on the SLS rocket in the United States, were launched in November 2022. OMOTENASHI abandoned the lunar landing, but EQUULEUS was put into a lunar transition orbit and became the first in the world to successfully control its orbit beyond low Earth orbit, using a water-propelled propulsion system. In addition, as an unplanned attempt, the probe vehicle was able to photograph a long-period comet (Comet ZTF) flying into the solar system. EQUULEUS was the first in the world to photograph a long-period comet from an ultra-small probe, achieving two world firsts.

An image of the boundary between day and night on the far side of the moon photographed by EQUULEUS



Manned pressurized rover (image)

[Artemis program]

Details

In preparation for the U.S. led Manned Lunar Exploration Program (the Artemis Program), we are studying, prototyping, and testing the manned pressurized rovers, habitation modules, as well as resupplying aircrafts, and are working in cooperation with the National Aeronautics and Space Administration (NASA) and various departments. Through Japan's participation in the lunar surface as well as lunar orbits and the boarding of Japanese astronauts, we are contributing to the improvement of our country's international presence, and promoting international space cooperation.

[Japanese astronaut]

Details

Astronaut Wakata stayed on the ISS for about 5 months and for 3 consecutive years as a Japanese, becoming the first Japanese to cumulatively stay more than 1 year in space (total 504 days). He conducted his first spacewalk as well as educational and outreach activities. In addition, in light of the era of exploration, we recruited new astronauts and selected 2 astronaut candidates from 4,127 applicants, which was the maximum in the past. We are contributing to the improvement of our country's international presence and promoting international space cooperation.



Astronaut Koichi Wakata

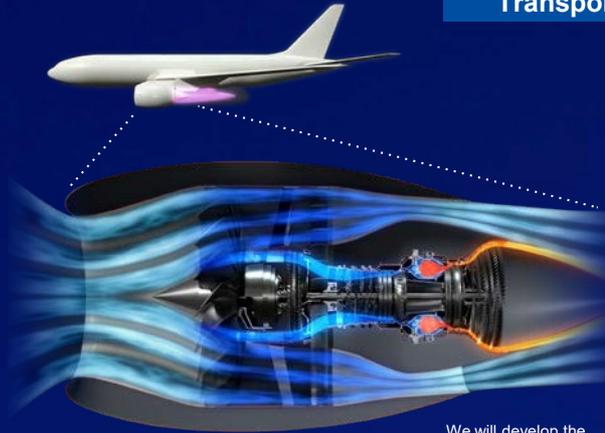


Astronaut candidates Makoto Suwa and Ayu Yoneda

In this section, JAXA's ongoing development projects are introduced.

JAXA PROJECT

Transportation and Aviation



En-core

This is a project aimed at acquiring the core engine technology for environmentally conscious aircrafts. We are working with domestic manufacturers to strengthen our international competitiveness in the aircraft engine industry.

[Details](#)

We will develop the engines with low emissions of nitrogen oxides and carbon dioxide by addressing technical issues in combustors and turbines.

Epsilon S Launch Vehicle

It is a solid fuel rocket aimed at realizing an era where everyone can use space. We aim to strengthen our international competitiveness and to enter the launch market in earnest.

[Details](#)



CALLISTO

CALLISTO is a flight experiment aimed at reusing the first stage of rockets, which is one of the measures to effectively reduce transportation costs to space. In cooperation with the French and German Space Agencies, we will develop small reusable experimental aircraft and conduct flight experiments.

[Details](#)



H3 Launch Vehicle

This is Japan's next-generation large rocket. We are working together with Japanese companies on development by making every effort.

[Details](#)



Top Management Commitment

Overview of Phase 4 Medium/Long-Term Plan Based on Medium/Long-Term Goals

Highlights of 2022

Introduction of JAXA projects

Involvement in the Environment

Initiatives to Achieve SDGs

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Third-Party Opinions/Review Results

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Introduction of JAXA projects

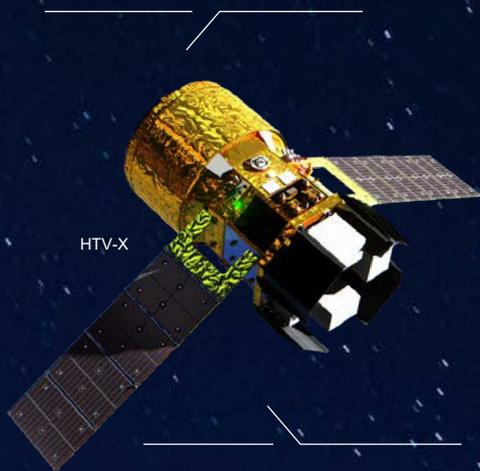
JAXA PROJECT



Manned flight/Moon

HTV-X

This is a next-generation unmanned resupplying ship that inherits the resupplying aircraft "Kounotori" for the Space Station (ISS). In addition to supplying to the ISS, it is also used for on-orbit technology demonstrations and experiments.

[Details](#)

HTV-X

Technical verification of automated docking

This is an automated docking technology necessary for international space exploration missions and free space activities. To obtain this, we will conduct on-orbit demonstrations utilizing HTV-X.

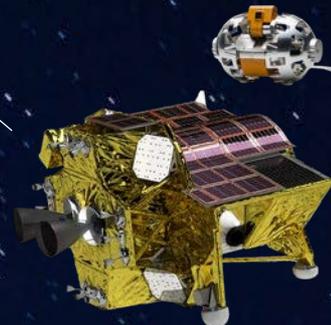
[Details](#)

SLIM

SLIM is a plan to demonstrate the precision landing technology needed for future lunar and planetary exploration with a small probe vehicle. We aim to make a major shift in exploration in "the location where we want to touch down" rather than "the location where we can touch down easily."

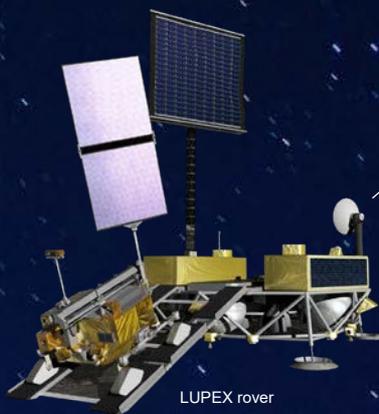
[Details](#)

Shift type lunar surface robot "SORA-Q"
©JAXA/TAKARA Tommy/Sony Group/Doshisha University



LUXEY

This is an exploration mission to confirm the abundance and availability of water as a resource in the lunar polar region. This will be implemented through international cooperation with India, etc.

[Details](#)

LUXEY rover

Gateway's habitation module

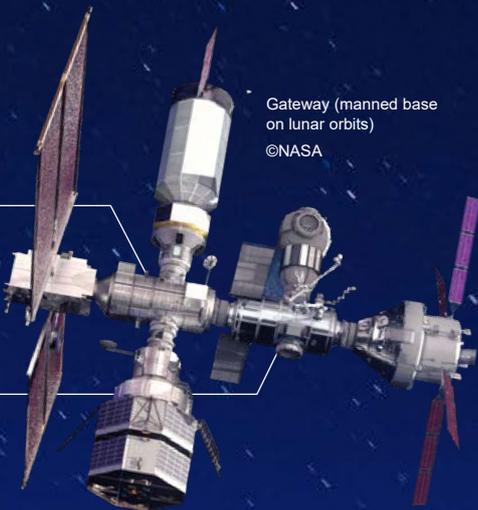
This is a transit station for the lunar surface and Mars that is being studied by the space agencies of respective countries participating in the International Space Station. JAXA envisions residential functions in the Mini Habitation Modules HALO and International Habitation Modules I-HAB, as well as contributions to supplying.

[Details](#)

Gateway (manned base on lunar orbits)
©NASA

HALO (Habitation and Logistics Outpost)

I-HAB (International Habitat)



International Space Station
©JAXA/NASA

Introduction of JAXA projects

JAXA PROJECT

Earth observation, communication and positioning

ALOS-4

This is a radar satellite that observes national land frequently. In addition to understanding the situation after a disaster, it will also contribute to early detection of volcanic activity and land subsidence by perceiving crustal and ground movements, as well as ocean monitoring.

Details

CPR (Cloud Profiling Radar)
developed by JAXA/NICT

EarthCARE/CPR

This is an earth observation satellite to be developed in cooperation with Japan and Europe. It contributes to highly accurate climate change predictions.

Details

©ESA/ATG medialab

Successor of First Michibiki
Source: qzss.go.jp

High-precision positioning system

Aiming to improve the performance of Units 5, 6, and 7 of the "Quasi-Zenith Satellite System Michibiki," which is maintained and operated by the Cabinet Office, we will develop and demonstrate a high-precision positioning system with additional satellite-to-satellite and satellite-to-ground ranging functions. This greatly improves the accuracy of positioning signals delivered to users and contributes to the realization of a seven-satellite system.

Details

GOSAT-GW

This is a satellite that observes changes in the water cycle and greenhouse gases. We observe sea surface temperature, water vapor, soil moisture, ice and snow, and observe greenhouse gases such as CO₂, CH₄ and NO₂.

Details

ETS-9

This is a technical test satellite aimed at enhancing competitiveness in the communications satellite market. We demonstrate the communication technology and the satellite bus technology to meet needs.

Details



Top Management
Commitment

Overview of Phase 4
Medium/Long-Term Plan
Based on Medium/Long-
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JAXA projects

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Social Involvement

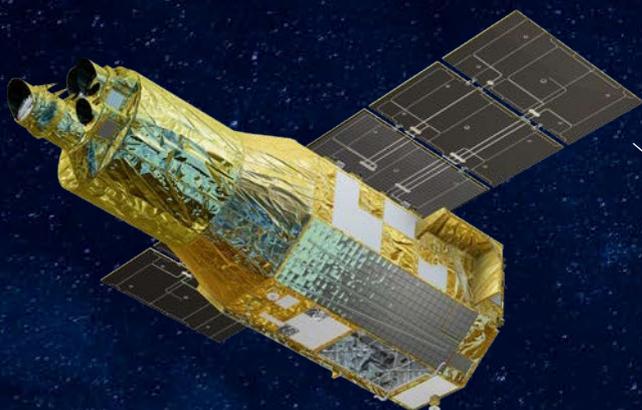
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JAXA PROJECT

Solar System and Astronomy



XRISM

This is the International X-Ray Observation Program that captures the X-ray precision spectroscopy of the "hot plasma," which is a wind blowing across the galaxy. It aims to investigate the continual changes of physical matter and energy and to elucidate the evolution of celestial bodies.

[Details](#)



DESTINY+

This is a flyby probe for the active asteroid Phaethon, the parent celestial body of the Geminis. It aims to unravel the mystery of Phaethon and acquire high-speed flyby exploration technologies.

[Details](#)

MMX

This is a martionta moons exploration (MMX) that explores the origins of two Martian moons and the evolution process of the Martian sphere. We aim to observe both satellites and confirm the presence of water and organic matter by returning samples from Phobos.

[Details](#)





Involvement in the Environment

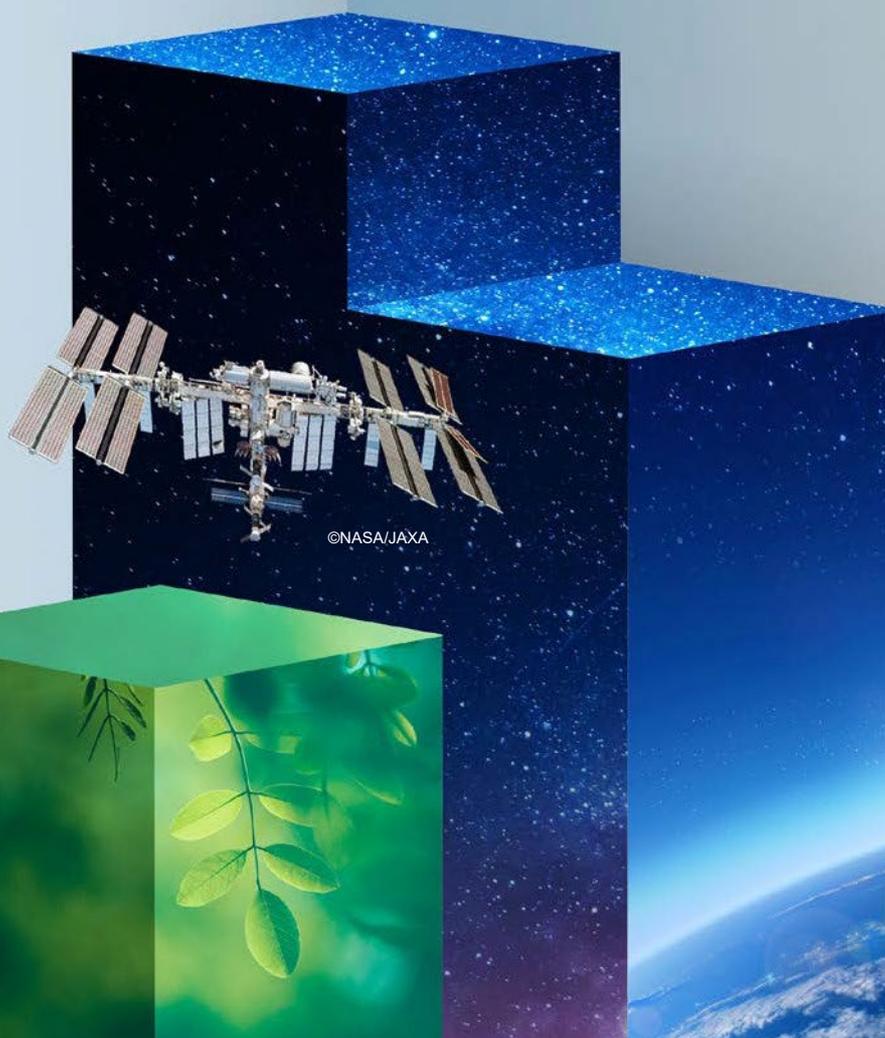
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Global Environmental Preservation:

Contribution to climate change by long-term satellite observations (GCOM)

Details

10-year observation by the satellite "Shizuku" and a sea-ice area change in the Arctic Ocean, as well as red tide observation by the observation satellite "Shikisai"

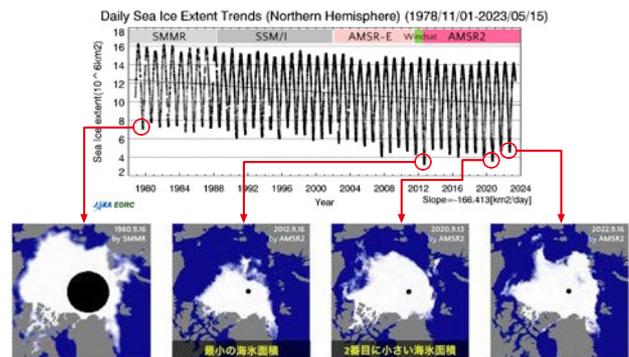
JAXA is conducting the Global Change Observation Mission (GCOM) to observe the lands, sea, and atmosphere of the whole earth over a long period of time, in order to contribute to understanding climate change and the related water cycle. To this end, we are operating two observation satellites, "Shizuku" and "Shikisai." Sea ice in the Arctic Ocean is sensitive to the effects of global warming. JAXA has been visualizing changes in sea-ice area in the Antarctic and Arctic based on the satellite observation data obtained by "Shizuku," etc., in cooperation with the National Institute of Polar Research. We introduce a part of that.

Figure X is the graph of long-term changes in the Arctic sea-ice area observed by satellite (the larger the value on the vertical axis, the larger the sea-ice area) and the figure of sea ice at the time of the minimum area observation in the characteristic year (the white part is the sea ice). The Arctic sea-ice area reaches a maximum in February to March and a minimum in September, each year. Sea-ice area reached its minimum in 2012, and its second smallest ever in 2020. There is some variation from year to year, but the long-term graph shows that the Arctic sea-ice area is gradually getting smaller. The upper part of the graph shows the sensor name of the observation satellite used (AMSR2 corresponds to "Shizuku"). In order to perceive long-term fluctuations, we also use similar observation satellite information (such as observation results from AMSR-E, the predecessor of AMSR2) for analysis. We also conduct sea ice observations in Antarctic. Compared to the Arctic, the change in sea-ice area is smaller, but in February 2023, the smallest area in the observation period was recorded. (Figure Y)

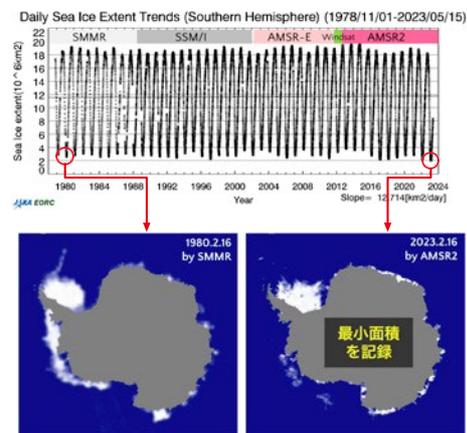
As a contribution to global environmental conservation, JAXA is also working to observe extreme changes in the environment. In the fall of 2021, a very large red tide and its damage occurred along the eastern coast of Hokkaido. Observations by satellites are useful for phenomena occurring over large areas. We provided information to the Hokkaido Research Organization and other organizations about the results of observations (Figure Z) of the "chlorophyll a" concentration (related to the red tide) by "Shikisai," which is a brother satellite of "Shizuku." For example, in Figure Z, a deep red area with high "chlorophyll a" concentration is distributed along the coast from Kushiro to Cape Erimo. By combining this satellite image data with an analytical survey of local plankton, the satellite was utilized to perceive the distribution of red tide over a wide area and to provide information to the public.

The Global Change Observation Mission - Water "Shizuku" (GCOM-W), launched in May 2012, marked the 10th anniversary of operation, and the Global Change Observation Mission - Climate "Shikisai" (GCOM-C), launched in December 2017, marked the 5th anniversary of operation. "Shizuku" captures faint microwaves emitted from the surface of the sea, ground surface, sea ice, and raindrops, etc., in the atmosphere, thereby observing precipitation, water vapor, sea surface temperature, ocean wind speed, soil moisture, and snow depth, etc. "Shikisai" observes clouds, aerosols, sea colors, vegetation, and snow and ice by using light with wavelengths ranging from near-ultraviolet to visible light to thermal infrared.

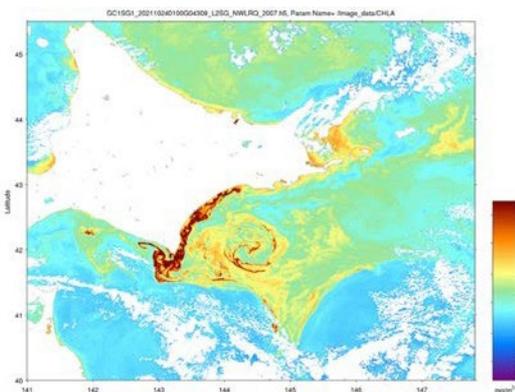
Prehension of changes over a long period of time is important for perceiving climate change, and in order to continue to steadily observe climate change in the future, we are developing the Global Observing Satellite for Greenhouse gases and Water cycle (GOSAT-GW), which is equipped with a successor sensor to the microwave radiometer mounted on "Shizuku." (We plan to launch it in fiscal 2024.)



[Figure X] Changes in the sea-ice area of the Arctic Ocean observed by "Shizuku," etc. The white part of the figure shows sea ice, and the black part in the center of the figure shows the places where satellite observation is not possible (the area is calculated assuming that there is sea ice).



[Figure Y] The observation results of sea ice distribution in Antarctic by "Shizuku," etc. The white part of the figure shows sea ice.



[Figure Z] "Chlorophyll a" concentration off the coast of Hokkaido observed by "Shikisai" on October 24, 2021 (high concentration in blue → red).



Global Environmental Preservation:



Observing the CO₂ (carbon dioxide) absorption at agricultural land in northern Cairo from space “Ibuki” and “Ibuki 2” contribute to climate change issues.

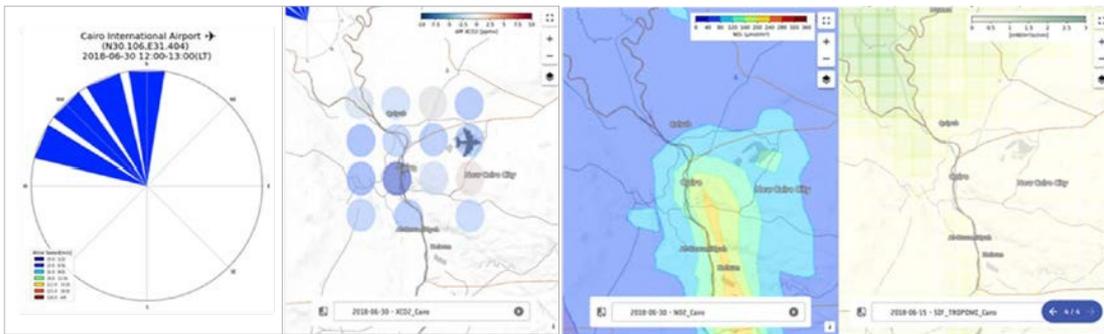
[Details](#)

CO₂ is a typical greenhouse gas, and prehension of emissions from human activities and absorption by plants is important in predicting and combating climate change in the future. JAXA, together with the Ministry of the Environment and the National Institute for Environmental Studies, has been observing CO₂ by using the satellites “Ibuki” (GOSAT) and “Ibuki 2” (GOSAT-2).

Cairo, the capital of Egypt (with Africa's largest urban population of more than 20 million), is located on the fertile floodplain of the Nile River, and has distinctive geography surrounded by farmland near the city. There, we focused on the location as a suitable place to investigate the CO₂ emissions from cities and the absorption effect by surrounding farmland, and analyzed the observation data of “Ibuki.”

Agricultural land in northern Cairo has growing seasons from May to October (hot summer) and from December to April (mild winter). According to data observed in 2018 and 2019, sunlight-induced chlorophyll fluorescence (SIF) emitted by plants in

association with photosynthesis is high on agricultural land in the Nile Delta in northern Cairo during the agricultural growing season in June, i.e., photosynthesis of the plants that take in CO₂ is active. As a result, the CO₂ concentration near the ground surface is lower than that of the air layer at higher altitude. The tendency of the wind blowing from the high SIF area on the north side to the big city, Cairo, on the south side suggests that the atmosphere with low CO₂ concentration is swept away by the wind and reaches the sky of the city. As a result, the CO₂ concentration near the ground surface of Cairo is decreased. The results of the observations by “Ibuki” show that CO₂ concentration in Cairo is low due to the strong influence of agricultural land in the Nile Delta.



Wind direction and velocity at Cairo Airport on June 30, 2018, CO₂ concentration in the lower air layer relative to the upper air layer around Cairo, etc. The leftmost figure shows the wind profile, the second figure from the left shows the CO₂ concentration at the lower layer relative to the upper troposphere layer by GOSAT, the second figure from the right shows the NO₂ column concentration by TROPOMI, and the rightmost figure shows the monthly mean SIF by TROPOMI.

Toward realization of a safe and secure hydrogen society

[Details](#)

Consolidating the liquid hydrogen equipment testing facilities for large-scale hydrogen supply chains

In order to realize a safe and secure hydrogen society, JAXA's Institute of Space and Astronautical Science (ISAS) is conducting research activities in cooperation with private companies and universities in order to give back JAXA's technology, knowledge, and ground equipment related to "liquid hydrogen" as rocket fuel, to society. From FY2019 to FY2020, the Noshiro Rocket Testing Center was equipped with the "Liquid Hydrogen Equipment Test Facility for the Large-Scale Hydrogen Supply Chain." From FY2021 to FY2022, we conducted development tests for various kinds of hydrogen-related equipment, necessary for commercialization demonstration of the hydrogen supply chain for the future. A wide range of equipment has been tested, including liquid hydrogen booster pumps, low-temperature BOG compressors, ship-to-land joints, emergency disengagement mechanisms, and large valves. This activity was carried out by the Institute of Space and Astronautical Science (ISAS) through joint research with respective manufacturers in connection with NEDO's "Hydrogen Society Formulation Technology Development Project/Large-Scale Hydrogen Energy Utilization Technology Development," and the project was completed as planned in March 2022. The Noshiro Rocket Testing Center of the Institute of Space and Astronautical Science (ISAS) continues to draw a great deal of interest as a place where demonstration tests related to large-scale liquid hydrogen can be conducted, and further technological development in hydrogen-related fields and space science fields in cooperation with even more external organizations are expected in the future.

Director, Noshiro Rocket Testing Center/Professor, Department of Space Flight Systems

Hiroaki Kobayashi



Testing state of the large valve for liquid hydrogen

Infrastructure for the hydrogen supply chain requires cryogenic valves that are larger people. From the liquid hydrogen storage tank shown in the back of the photo, we are preparing for the operation test by sending liquid hydrogen to the valve.



Global Environmental Preservation:



Top Management Commitment

Contributing to the environment through aviation-related technologies

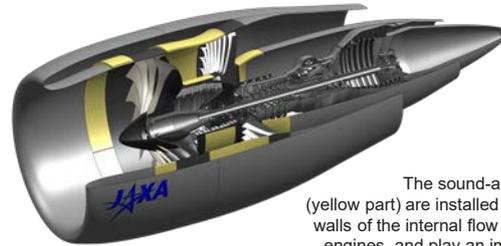
Demonstration test of the engine noise reduction technology

[Details](#)

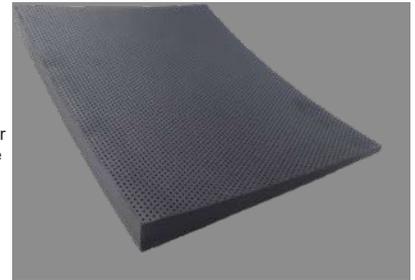
To reduce CO₂ emissions and noise from aircraft, reducing the weight and noise of aircraft engines is an important issue. JAXA has been developing element technologies for aircraft engines in collaboration with the engine manufacturer, and has been developing lightweight sound-absorbing liner technology where manufacturing cost reduction is also promoted.

In order to apply them to aircraft engines, it is necessary to evaluate structural soundness in the actual environment. Therefore, in 2022, we mounted the lightweight sound-absorbing liner specimens on a technology demonstration engine, conducted engine tests, and obtained the test data regarding the engine performance, acoustic characteristics, and vibration characteristics. We also provided the engine test results to the engine manufacturer, and transferred the technology.

We will continue to research and develop aircraft technologies for global environmental protection.



The sound-absorbing liners (yellow part) are installed on most of the walls of the internal flow path of aircraft engines, and play an important role in reducing engine noise.



We have developed a lighter sound-absorbing liner, while maintaining the sound performance and strength.

Overview of Phase 4 Medium/Long-Term Plan Based on Medium/Long-Term Goals

Highlights of 2022

Introduction of JAXA projects

Contribution for improvement of the environment around airports

[Details](#)

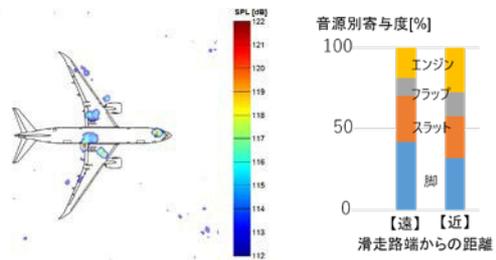
At major airports in Japan, the review of flight routes and the expansion of runways to cope with the increase in air traffic volume are under consideration, and there is growing interest in aircraft noise around airports.

JAXA has developed a sophisticated noise prediction model (J-FRAIN) that can estimate the contribution ratio of each main sound source of the aircraft, such as engines, slats, flaps and landing gear, etc., in cooperation with other universities and private institutions, which are collaborative research partners.

This will enable us to change the operation method and provide guidelines for measures to reduce noise. Together with JAXA's Aircraft Noise Reduction Technology (FQUROH), etc., which is under research and development in JAXA, it is planned to use this technology to improve the environment around airports in the future.

Associate Manager for Program Director of Aeronautical Technology, in Aeronautical Technology Directorate

Takehisa Takaiishi



Example of aircraft sound source measurement conducted near an airport, and the results

Involvement in the Environment

Initiatives to Achieve SDGs

Social Involvement

Third-Party Opinions/Review Results

Information about organization



Promotion of Green Management

We contribute to global environmental issues and promote steady and daily environmentally friendly operations.

JAXA Basic Environmental Policy

JAXA will conduct activities to maintain the environment on Earth and in space to enable sustainable development of society.

To achieve this, we will:

- ▶ Work to solve global environmental issues and reduce environmental load through research, development, and utilization.
- ▶ Promote environmentally friendly operations and make continuous improvements.
- ▶ Disclose information on our efforts to solve environmental issues and value communication with all stakeholders.

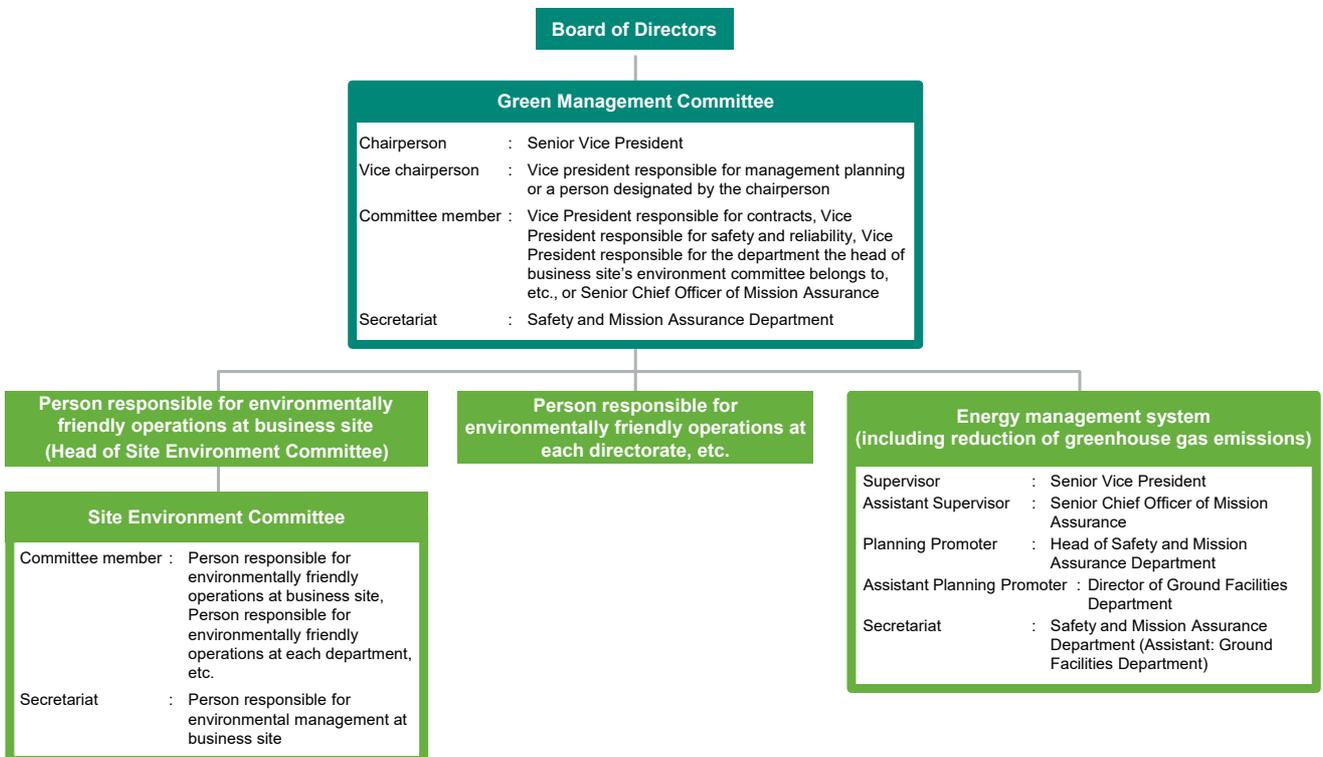
Chairman of Green Management Committee (Senior vice president)

Kazuhiro Suzuki



With social activities returning to a steady state and the operating rate of JAXA's facilities and equipment also returning to the state before COVID-19, we will take even greater consideration of the environment and steadily promote energy-saving activities and reduction of environmental impact, while continuing to eliminate environmental accidents, based on our basic policy on SDGs.

Green Management System





Report on Environmentally Friendly Operation

Environmentally Friendly Operation

Environmental Policy at Each Site

We implement environmentally friendly operations to contribute to global environment preservation and sustainable development. We established the Green Management Committee chaired by the Senior Vice President to set our goals and implementation plans for the environment such as rationalization of energy use and proper waste disposal. Based on them, plans for each site are prepared and implemented.

The results of activities are properly evaluated and reflected in the next year's plan.

We appoint a responsible person at each site and organization and clarify the roles and responsibilities to implement environmentally friendly operations.

Targets and Results for Promoting Green Management

Based on JAXA's Basic Environmental Policy, we set the targets for promoting green management in FY2022. The details of the targets and results are shown below.

Item	Setting the targets and KPI *1 in FY2022	Achievement status in FY2022	Reference
Initiatives to Save Energy	Target specified in the Energy Conservation Act. To reduce the energy consumption intensity by 1.0% or more (annually) on average for five years.	We achieved a reduction of 3.4% on average for five years.	
	Reduce greenhouse gas emissions through compliance with the Energy Conservation Act.	Increased by 7.8% from the previous FY. After investigating the cause of increase, appropriate measures have been planned.	
	Compliance with the Tokyo Metropolitan The Chofu Aerospace Center (CAC) (main office) will reduce its CO ₂ emissions by 25% of the base emissions.	Reduced by 44.2% compared to the base emissions. (Preliminary figure before notification to the Tokyo Metropolitan Government *2)	
Initiatives to Create a Recycling-Oriented Society	Continue to have zero violations of laws and regulations regarding waste disposal.	There were no violations of laws and regulations.	
	Give consideration to the reduction of environmental load in goods procurement.	In accordance with the JAXA Green Procurement Policy and Green Contract Policy 2022, we conducted procurement with consideration of the reduction of environmental load.	
Actions for environmental risks	Continue to have zero environmental incidents.	There were no environmental incidents.	
Creation of new value: Contributing to solution of social issues through business	Research, development, and utilization contributing to solution of global environmental issues.	To solve global environmental issues, in collaboration with other organizations, we developed and utilized satellites and other instruments that contribute to the elucidation of climate change and monitoring of disasters and conducted R&D in the aeronautic field that contributes to aircraft noise reduction and environmental compatibility.	
Communication with society	Communication with stakeholders on environmental issues. (Public relations and collection of opinions)	The permanent panel exhibition "SDGs × JAXA Earth Observation Satellites" was installed at "MIRAI ACTION AKIBA 2022" held at Akihabara UDX, from Oct. 1 to Nov. 5. In addition, two workshops (Oct. 16, Nov. 5) were held during the period to promote awareness of the Earth observation satellite's mission and its contribution to the climate change issues.	

*1 KPI (Key Performance Indicators): Main job performance evaluation indicators (Indicators that can be used to evaluate the action status and achievements for targets)

*2 The figure (44.2%) will be confirmed after verification by a registered verification organization under the Tokyo Metropolitan Ordinance on Environmental Preservation.

Prevention of Environmental Incidents and Legal Violations

In order to prevent environmental pollution, we ascertain the risks that may lead to environmental accidents in advance, prepare a visualized environmental risk map and a list of measures against environmental accidents, and post them in each

building at business sites for ready reference. We utilize them to set evacuation routes in disaster drills and to check actions in case of incidents and update them if revised. As a result of these efforts, no environmental incidents occurred in FY2022.



Environmental performance data

- In FY2022, the five-year average of energy intensity was reduced by 3.4%, achieving the goal specified in the Energy Conservation Act. Although the amount of CO₂ emissions in JAXA as a whole increased over last year, we investigated the main causes and took the following countermeasures.
 - Sagamihara Campus: Electricity consumption increased due to the extension of clean rooms. We are currently working to save energy in our facilities and equipment.
 - Tanegashima Space Center (TNSC): Fuel efficiency decreased because the fuel tank of the new generator could not be used due to repair work, and the old generator had to be operated. Now that the repair work has been completed, we aim to improve power generation efficiency by prioritizing the operation of new generators.
- In response to the Tokyo Metropolitan Environmental Protection Ordinance (efforts to reduce CO₂ emissions), the amount of CO₂ emissions in FY2022 were 9,981 t-CO₂, a reduction of 44.2% relative to the 25% reduction target. This was mainly due to the significant decrease in power consumption caused by the shutdown of the transonic wind tunnel facility due to the renewal of the air reservoir.
- Regarding the control (suppression) of fluorocarbons calculated leakage amount, the calculated leakage amount in FY2022 was 811.67 t-CO₂ (an increase of 523.17 t-CO₂ from the previous year), which is below the standard for reporting to the competent minister.

Environmental INPUT Data (Resources and Energy)

Resources and energy		Unit	FY2018	FY2019	FY2020	FY2021	FY2022
Electricity purchased		MWh	137,728	134,036	111,877	111,312	118,352
Water resources		km ³	440	412	403	384	435
(Breakdown)	Water supply	km ³	184	152	155	153	169
	Groundwater	km ³	33	31	12	25	49
	Rainwater	km ³	2	3	3	2	2
	Others*	km ³	221	226	234	204	216
Gasoline (including for vehicles)		kℓ	28	25	20	22	24
Kerosene		kℓ	45	49	38	27	33
Light oil (including for vehicles)		kℓ	49	44	43	39	59
Heavy oil (JIS grade A)		kℓ	8,694	8,456	7,807	6,600	8,374
City gas		km ³	1,780	1,639	870	604	630
Propane gas		t	18	28	22	8	21
Petroleum hydrocarbons		km ³	0	0	0	0	0
Liquefied natural gas		t	0	0	15	5	10
Other combustible natural gases		km ³	1	1	0	0	0
Jet fuel (including fuel for flight)		kℓ	180	215	178	214	89
Aviation gasoline		kℓ	0	0	0	0	0
Liquid nitrogen		t	3,016	2,695	2,645	2,046	4,249
Paper		t	63	51	39	23	26

● The data does not include fuel and other resources purchased by service providers due to the transfer of launch services to the private sector.

* Intake weirs and rivers

Environmental OUTPUT Data (Environmental load substances)

Environmental loads		Unit	FY2018	FY2019	FY2020	FY2021	FY2022
CO ₂ emissions	Energy related	t-CO ₂	81,809	77,955	62,134	60,500	65,200
	Non-energy related *1	t-CO ₂	314	645	502	220	250
Calculated amount of leaked CFCs		t-CO ₂	1,040	974	458	287	812
NOx emissions *2		t	306	307	273	174	139
SOx emissions *2		t	95	59	57	40	30
Soot emissions *2		t	0	0	0	0	0
Amount of wastewater *3		km ³	440	412	403	361	435
Biochemical Oxygen Demand (BOD) *4		mg/ℓ	41	26	20	20	24
Chemical Oxygen Demand (COD)*4		mg/ℓ	6	3	3	3	3
General waste		t	209	184	97	117	125
Industrial waste		t	1,073	1,297	657	1,324	722
Specially-controlled industrial waste		t	39	7	13	17	13
Class I designated chemical substances		t	5	4	3	8	4

*1 Non-energy related CO₂ emission amount include emissions of CH₄, N₂O, and SF₆.

*2 NOx, SOx, and soot emissions are measured from units generating soot or smoke regulated by the Air Pollution Control Act.

*3 In cases where the amount of wastewater is not measured, it is calculated based on the assumption that the amount of used water is the amount of wastewater.

*4 BOD and COD are calculated based on the measured values at business sites having specified facilities under the Water Pollution Prevention Act, and the total amount of wastewater at the business sites (per year).



Initiatives to Create a Recycling-Oriented Society



Promotion of Green Procurement and Green Contracts

Of the 150 items procured in accordance with the JAXA Green Procurement Policy in FY2022, we achieved 100% procurement of specified procurement items for 136 items. With regard to the remaining 14 items, supervisors checked that there were no substitutes, and we made every effort to procure items that are as environmentally friendly as possible. In addition to these items, 20 items classified as public works were procured.

Among the 6 types of contracts covered by the Green Contract Law, there were 13 contracts for supply of electricity (contract amount: 103,286 MWh), one contract for design and maintenance of buildings, one contract for purchase and lease of automobiles, and 8 contracts for disposal of industrial waste.

JAXA Green Procurement Policy (Promotion of Procurement of Eco-Friendly Goods)

Results of Procurement of Goods and Green Contracts

Results of procurement of goods that do not meet the criteria

	FY2020	FY2021	FY2022
Procurement of goods that do not meet the criteria	16	12	14

Results of green contract

	FY2020	FY2021	FY2022
Contracts for supply of electricity	9	6	3
Contracts for purchase and lease of automobiles	2	1	1
Contracts for energysaving renovation projects	0	0	0
Contract for design and maintenance of buildings	0	0	1
Contracts for disposal of industrial waste	7	7	8

Actions in the Value Chain

[Details](#)

For goods other than those specified in the JAXA Green Procurement Policy, we select goods that have the least environmental load possible while ensuring appropriate price, function, and quality. In addition, we encourage contractors (including subcontractors) for delivery of goods, provision of services, and construction to promote green procurement as much as possible.

If multiple bidders quote the same price when selecting a contractor, we give priority to the bidder with the best commitment to environmental activities by evaluating the issuance of environmental reports including ISO14001 reports, acquisition of ISO14001 certification, or implementation of equivalent environmental activity evaluation programs.

Enhancement of environmental education



● Enhancement of environmental education

We provide environmental education not only to our employees but also to people belonging to other companies who work within

JAXA, and the importance of environmentally friendly activities is recognized. It is an e-learning system that allows students to take courses at any time.



Main environment-friendly activities at business sites

01

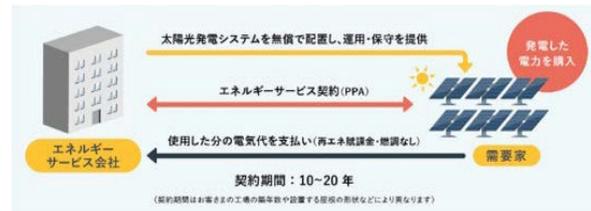
Enhancement of energy resilience and BCP On-Site PPA Business Plan for Installation of Solar Power Generation Facilities

The JAXA Ground Facilities Department is promoting various energy business plans in order to improve energy resilience and to enhance the countermeasures such as securing spare power in case of disasters (response to BCP). We would like to introduce one of them, the PPA project for introduction of photovoltaic power generation systems.

[About PPA (Power Purchase Agreement) Business]

It is an electric power purchase agreement under which a business operator can borrow the roofs of JAXA's facilities and idle land, install power generation facilities for free, and JAXA uses all the generated electricity, to enable reducing electricity charges and CO₂ emissions. JAXA can use renewable energy without holding any property.

At the installation of a photovoltaic power generation system for Tanegashima Space Center (TNSC), it was decided to adopt an On-Site PPA after a comparison between leasing and in-house installation, etc. In this way, we plan to optimize the power system at the launch site by combining our own regular power generation facilities with a large-capacity power storage system, and to reduce CO₂ emissions while using the system as a fuel in normal times, and to use it as a preservation power supply in case of a power failure, etc., by self-sustained operation.



Framework of PPA (from the HP by Ministry of the Environment)

02

Efforts to Reduce Food Loss

Efforts to reduce food loss (waste) are being implemented at the cafeterias of each JAXA business site through services of the operating companies. For example, following measures are taken. The number of meals to be prepared in advance is set so that there is no surplus, and additional cooking is done while observing the situation at the site, the amount of rice is made selectable, cut vegetables are utilized, and ingredients are used up before the expiration date, etc.

At Tanegashima Space Center (TNSC), the number of applicants for the daily special set meal is ascertained in advance. However, when employees who requested the set meal are suddenly absent due to reasons such as a rocket launch date change, the surplus daily special set meal is sold in the form of a lunch box, and efforts are being made to reduce food loss in accordance with the circumstances unique to the office.



With the cafeteria staff who are cooperating (Tanegashima Space Center)

03

Coexistence with Local Nature

At the Kakuda Space Center (KSPC), we collect garbage twice a year in collaboration with our cooperative firms. In FY2022, we collected a total of 92.3 kg (46.1 kg in FY2021) of waste such as bottles, cans, and PET bottles. The Katsuura Tracking and Communications Station has been collecting garbage since FY2001 in support of the annual Zero Waste Movement conducted in Katsuura City. In FY2022, we collected a total of 13 bags including combustible garbage,

bottles, cans, and PET bottles. In Tanegashima, sightseeing spot cleaning is carried out by sponsorship of Tane-Yaku Corporation Association's Minami-tane Branch and NPO Corporation Spacecraft Tanegashima every year, and on June 25, Tanegashima Space Center staff and related companies participated in the cleaning of Takezaki Beach. Cleaning of Takezaki Beach was also carried out on December 3.



Cleaning around Kakuda Space Center (KSPC) twice a year



Participating in the Katsuura City's Zero Waste Movement



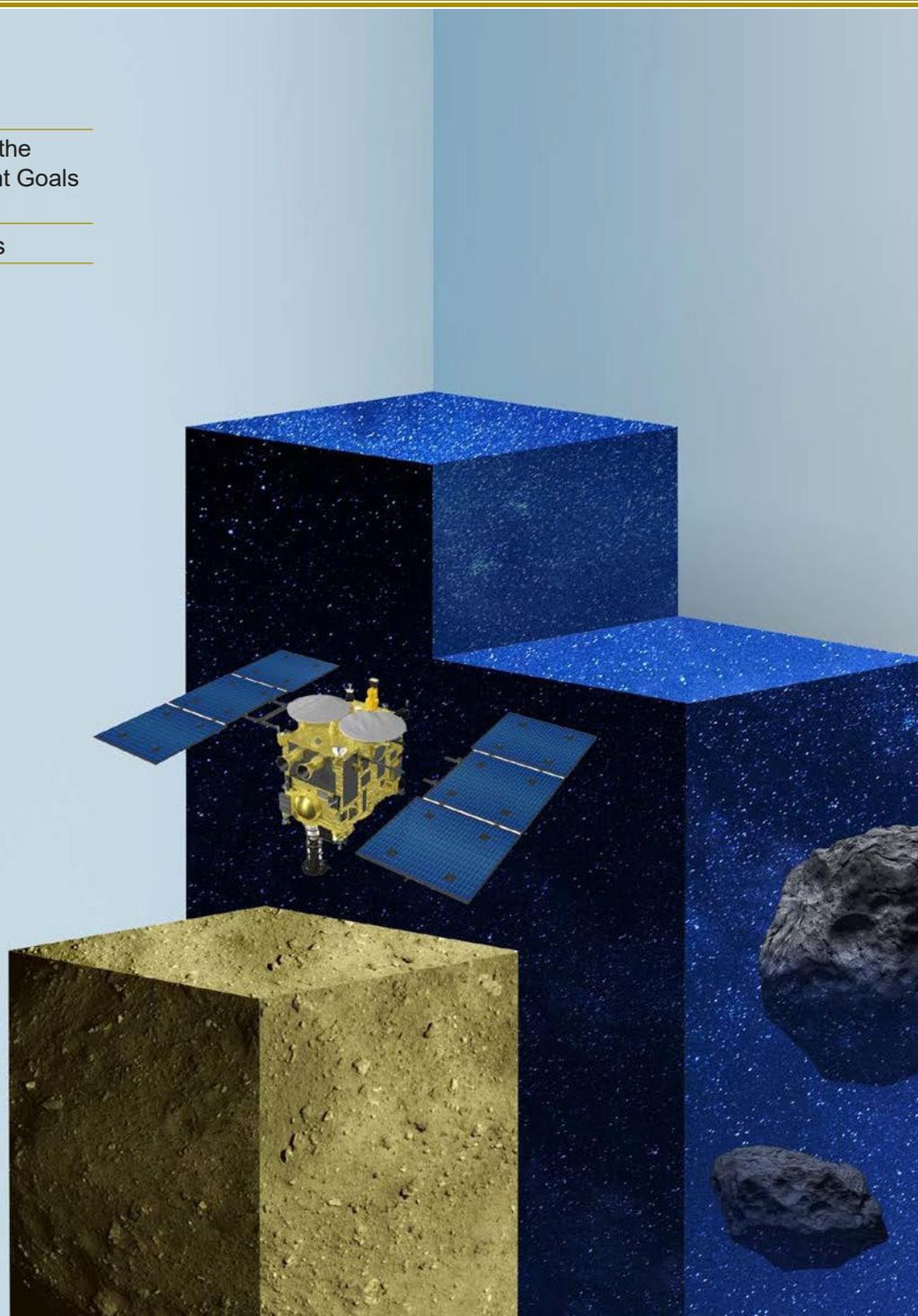
Cleaning of Takezaki Beach in Tanegashima



Initiatives to Achieve SDGs

Table of Contents

- 20 Basic Action Policies on the Sustainable Development Goals (SDGs)
- 21 Efforts to achieve SDGs





Basic Action Policies on the Sustainable Development Goals (SDGs)

Details

With the revision of the Basic Plan for Space Policy in June 2020 clarifying the contribution to SDGs as one of the space policy goals, the environment surrounding SDGs and the aerospace sector has changed significantly. In light of these environmental changes, JAXA formulated the basic policies on SDGs in March 2022, and newly appointed a Vice President responsible for SDGs promotion since April 2022, to further accelerate initiatives to achieve SDGs and raise employee awareness.

JAXA's SDGs Mission Statement

(Corporate philosophies and social missions related to SDGs concretized into action guidelines)

Utilizing the SDGs as a global common language for solving social issues and as an opportunity for innovation, JAXA will work with various partners to realize a sustainable, safe, and prosperous society by conducting pioneering R&D and developing findings.

Action Guidelines

The above statement is presented from three perspectives of business, individual, and outside the organization, so that it can be more easily understood and lead to action and initiatives.

Business perspective

Leading R&D

We solve earth and space issues through leading R&D and development of the results.

Individual perspective

Bringing out the creativity of each individual

In addition to utilizing JAXA's organization, capabilities, and assets, each of us will exercise our creativity, sympathize with the principles of the SDGs, and take action to realize them.

Perspective outside the organization

Working with partners around the world

By collaborating with diverse stakeholders around the world, we will create synergies in our projects and maximize the return of results to society.

High-priority fields for JAXA

Efforts for the **Global environment**

~ Protecting the rich and beautiful global environment ~

[Priority fields]

- Contributing to a decarbonized and recycling-oriented society
- Engaging in research and development of green space aviation systems
- Providing the scientific evidence for promoting climate change measures, global environmental preservation, SDGs, and ESG

Efforts for **Space**

~ Expanding areas of human activities sustainably ~

[Priority fields]

- Taking on challenges in the space frontier and returning findings to the earth
- Construction of space infrastructure/institutions and rules for sustainable space activities

Efforts for **Society**

~ Supporting a sustainable and safe society ~

[Priority fields]

- Management/toughening, and disaster prevention of national land, infrastructure
- Building the infrastructure to support Society 5.0
- Solving global issues, and achieving economic growth and innovation

Efforts for **Governance**

~ Organizations that sustainably contribute to society ~

[Priority fields]

- Promoting fair and responsible organizational management and diverse partnerships
- Creating joy and wonder and developing human resources



Efforts to achieve SDGs

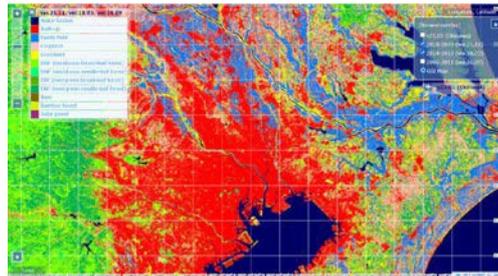
As a core implementing agency that supports aerospace development and utilization through technology, JAXA is promoting various initiatives that contribute to the achievement of SDGs toward realization of a sustainable, safe, and prosperous society by conducting the pioneering R&D and developing the results, in cooperation with various partners. Some of these initiatives are as follows:

Contribution to the development of livable communities by utilizing Earth observation satellite data

[Details](#)

(Space Technology Directorate I)

From the viewpoint that the balance between population and the area of towns and cities is important for sustainable community development, the Global Index 11.3.1 "Ratio of Population Growth Rate and Land Utilization Rate" has been established as one of the SDGs indices. In Japan, this information was calculated and released in 2022 using urban cover information from the High-resolution land utilization and land cover map published by JAXA, and population information from the national census published by the Ministry of Internal Affairs and Communications (per administrative district/per mesh). This index can be used to perceive and compare the trends in population change and expansion or contraction of urban development, in the unit of municipalities and regions.

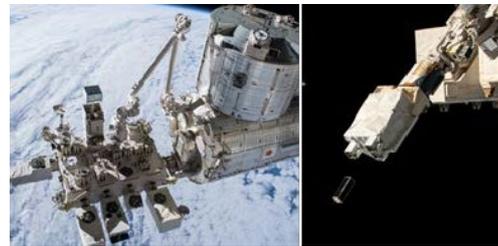


Providing opportunities for the release of microsattellites from the Japan Experiment Module of the International Space Station "Kibo," and supporting small satellite development technologies in emerging and developing countries relevant to space

[Details](#)

(Human Spaceflight Technology Directorate)

We provide opportunities for emerging and developing countries, which do not have established the satellite development technologies, to utilize and demonstrate satellites in outer space. In addition to supporting the development of microsattellites, we are contributing to the improvement of space-related technologies in emerging and developing countries, the building of space utilization capabilities, and the development of human resources through satellite development, by releasing the satellites into space from the Japan Experiment Module of the International Space Station "Kibo."



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"JAXA's SDGs" from the perspective of space and air

[Details](#)

JAXA's initiatives on the SDGs have been divided into four areas: "Society," "space," "global environment," and "governance," and we newly released the HP (website) for introduction. While exploring the four MAPs, it is possible to learn about JAXA's various initiatives relevant to the SDGs. Moreover, we also release the various kinds of information about JAXA's SDGs serially on this homepage.



From the director responsible for promoting SDGs



Director responsible for SDGs Promotion
Yasuo Ishii

JAXA, as the core implementing organization that supports the government's overall aerospace development and utilization through technology, aims to realize the major changes required by 2030 with the power of space aeronautics with initiatives to achieve SDGs by taking advantage of our organization's strength and business from basic research to development and utilization. In particular, we believe that sustainable activities in space while protecting the environment are essential for the future of humankind and the sustainability of society on Earth. We believe that JAXA will be able to create new value for a sustainable society that goes beyond the SDGs by promoting SDGs in space including the sky as a high-priority field and collaborating with various partners in industry, government, and academia.

[Details](#)

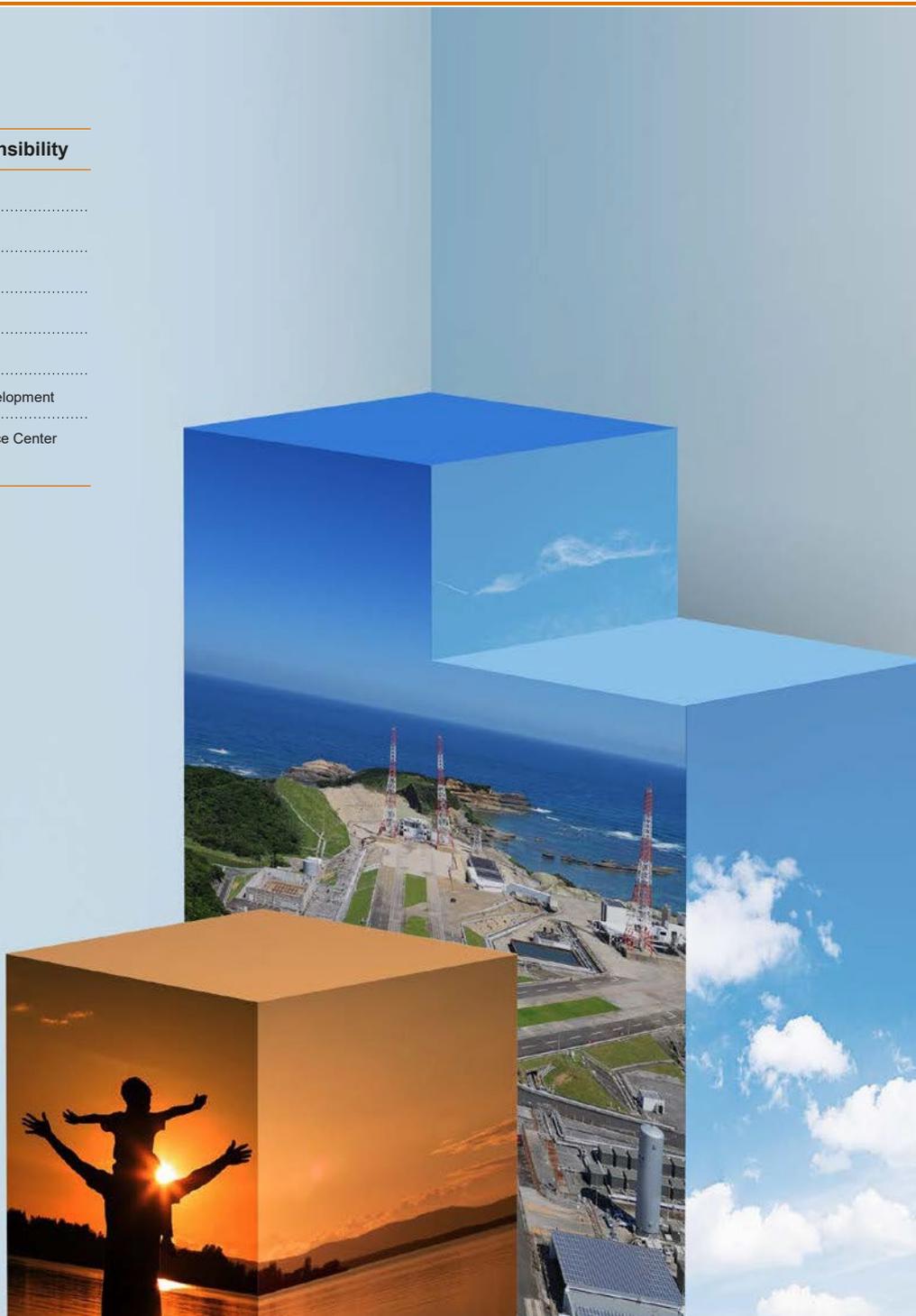


Social Involvement

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Organizational Governance

Internal Control

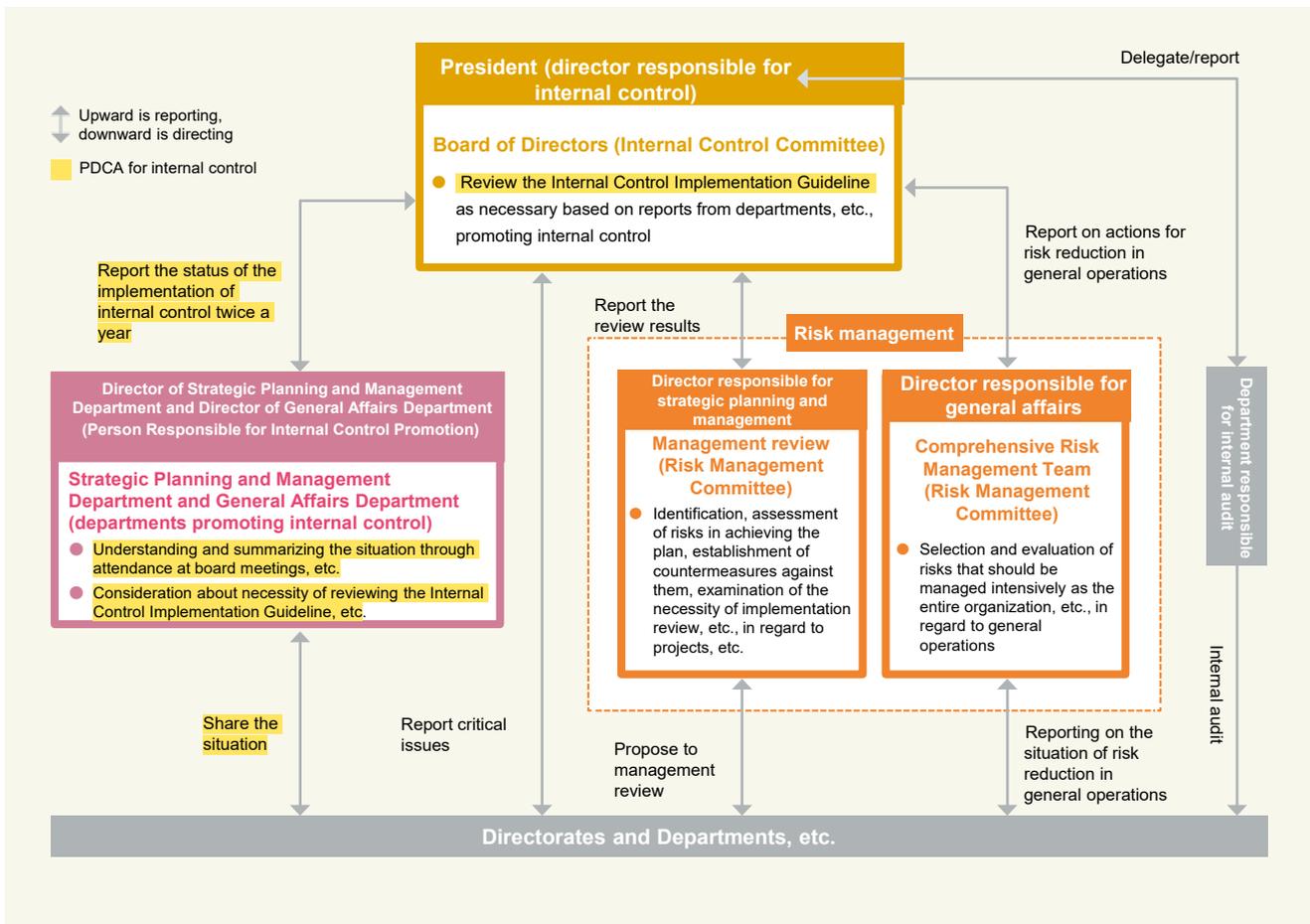
Since becoming a national research and development agency in April 2015, we have been working to strengthen internal control. Specifically, in response to the revised Act on General Rules for Incorporated Administrative Agencies, we specified the internal control system in our business procedures and established the “Internal Control Implementation Guideline” to strengthen internal governance. We will continue to fulfill our missions as a national research and development agency in an effective and efficient manner while complying with laws and regulations and implementing internal control.

Main items included in the Internal Control Implementation Guideline

- | | |
|--------------------------------|----------------------------------|
| 1. Control environment | 4. Information and communication |
| 2. Risk assessment and actions | 5. Monitoring |
| 3. Control activities | 6. ICT introduction |

[JAXA Internal Control Implementation Guideline](#)

Overview of internal control system



Audit System

We established a system to check that internal control is functioning well by combining the audits conducted by the auditors and accounting auditors based on the Act on General Rules for Incorporated Administrative Agencies and the internal audits conducted by the Evaluation and Audit Department independent of the business execution departments. Audits are conducted for the purpose of ensuring appropriate and efficient business execution and contributing to the improvement of business operations, and audit results are reported to the President as needed and shared at board meetings, etc.

In addition, information regarding the audits is described on our HP (website) in accordance with Article 22 of the “Act on Access to Information Held by Independent Administrative Agencies.”

[Audits in JAXA](#)



Organizational Governance



Promotion of Risk Management

In JAXA's projects, etc., we identify risks in each project and implement risk reduction activities.

We have also established a Comprehensive Risk Response Team to promote comprehensive risk management for risks in general operations other than projects and other businesses. Specifically, we select risks that should be intensively managed, such as ICT and security risks related to information systems and risks related to disasters and external threats. Each division and department set activity targets to reduce these priority management risks in their respective business plans, and addressing risk reduction as part of their daily operations.

Preparing for Large-Scale Disasters, etc.

We established the Business Continuity Plan at each site to prepare for disasters. The Business Continuity Plan defines the operations that we should prioritize to ensure the safety of executives and our employees as well as the continuation and prompt recovery of operations, daily preparation for disasters, and initial response in the event of a disaster.

Based on the plan, we are striving to improve our business continuity capability by establishing communication systems including a safety confirmation system, stockpiling spare equipment and supplies necessary for initial response, maintenance, and recovery, and conducting large-scale earthquake drills.

Ensuring information security



In light of recent social circumstances such as sophisticated cyber-attacks, we are taking information security measures such as strengthening information security management systems, enhancing visualization, protective measures, and monitoring of information systems including telework environments, and improving employee training. We also contribute to nationwide initiatives to reduce security incidents that go beyond the activities of a single organization, such as preparing industry-specific security guidelines with related organizations, discussing and sharing overseas initiatives, and sharing the threats identified by JAXA with security specialized companies and relevant organizations, etc.

Consumer Issues

Disclosure and Provision of Information

Under the "Act on Access to Information Held by Independent Administrative Agencies," anyone can request JAXA to disclose corporate documents. We follow the procedures for information disclosure in response to requests for disclosure in accordance with this law.

Request for Information Disclosure and Various Public Information

Protection of Personal Information



To protect the rights and interests of individuals while ensuring the appropriate and smooth operation of our business, we specified matters concerning the protection of personal information in our Personal Information Protection Regulations to protect personal information.

Regulations to Protect Personal Information and Request for Information Disclosure

Top Management Commitment

Overview of Phase 4 Medium/Long-Term Plan Based on Medium/Long-Term Goals

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Fair Operating Practices



Promotion of Compliance



To ensure the proper execution of our business in accordance with laws and regulations, we established a whistleblowing hotline to receive reports of violations of laws and regulations.

In addition, in order to receive consultations widely on issues that do not fall under the above whistleblowing, we have established a compliance hotline, and are receiving consultations on JAXA's compliance from both inside and outside of JAXA. Furthermore, we educate and train our directors and employees on a regular basis to raise awareness.

System to Manage Conflict of Interest



We have introduced a system to manage conflict of interest to promote collaborative activities with universities and industries. We require self-assessment of our directors and employees and established a Conflict-of-Interest Management Committee and a Conflict-of-Interest Management Advisor (external lawyer) to provide advice and check to ensure that our directors and employees appropriately conduct industrial collaboration activities.

Q Actions for Compliance & Conflict of Interest

Export Control



In response to the global consensus on preventing the proliferation of weapons of mass destruction, Japan established laws and regulations such as the Foreign Exchange Act and Export Trade Control Order that specify regulated export items and export license systems.

We established internal regulations based on these laws and regulations and are working to ensure the implementation of export control by examining export cargo, educating staff, and conducting audits.

In accordance with the revision to the statutes pertaining to the Foreign Exchange Law that came into effect in May 2022, we are also reviewing the operation for "deemed exports" and taking appropriate measures such as checking whether they fall under a specific category.

Management of Intellectual Property



Based on the intellectual property policy, JAXA is striving toward the creation of businesses that utilize the results of R&D and the promotion of efforts to stimulate open innovation by identifying and protecting the technological results it has created as intellectual property, and by appropriately transferring them to the Japanese industry, etc.

In addition, we are working to respond appropriately to the non-disclosure system of patent applications under the Economic and Security Promotion Act.

Q Intellectual Property Policy

Fair Execution of Research and Appropriate Use of Research Funds



In order to thoroughly enforce the rules and raise employee awareness, we have established the "Code of Conduct for Researchers" (for fair execution of research) and the "Basic Policy and Code of Conduct" (for appropriate use of research funds). Under the Research Ethics Committee and the Office for Prevention of Misconduct in Competitive Research Funds, we are working to prevent misconduct and ensure proper operational management.

In FY2022, through the research on stress accumulation assessment in a long-term closed environment (simulated space habitation environment), non-conformity to the government's medical guidelines was confirmed. In response to this, we submitted a report to the Minister of Education, Culture, Sports, Science and Technology and the Minister of Health, Labour and Welfare, based on the guidelines. Based on this incident, we have conducted factor analysis, including background factors, and are strengthening our efforts to prevent research misconduct. In FY2023, we will work to further prevent misconduct by expanding our research support system for medical research and enhancing educational activities throughout the agency.

Q Prevention of Misconduct in Research and Appropriate Management of Research Funds

Appropriate Contracts



As an agency that uses the national budget, JAXA strives to fairly conduct projects by attaching importance on transparency and fairness in contracts. As an example, discretionary contracts that exceed the criteria for the small-amount discretionary contract are reviewed by the Contract Review Committee to check that competition is promoted and that the contract processes are in accordance with the regulations. The concluded contracts are announced on our website.

In recent years, the scope of procurement management has been expanded for project operations, and the Procurement Department has been involved from the stage of selecting companies in charge of development to promote dialogue with those companies. Thus, we promote actions to ensure fairness and rational procurement.

Q JAXA Procurement Policy

Labour Practices



Efforts to Utilize Human Resources

We are working to develop human resources throughout the organization by establishing the Phase 4 Human Resources Development Implementation Policy as the priority in medium to long-term human resources development, aiming to both realize the career design of each employee and maximize the results of the organization.

JAXA's vision of human resources

Human resources who have the motivation and ability to propose and create new value to society through aerospace based on their specialized skills and continue to take on challenges

Phase 4 Human Resources Development Policy

Actions	Results of actions related to human resources in FY2022
Strengthen the human resource base in the aerospace field by enhancing the mobility of human resources	We are continuously focusing on increasing the recruitment of experienced personnel in order to secure industry-ready personnel with diverse backgrounds and careers. The number of newly hiring experienced personnel in FY2022 was 23, thanks to efforts such as the year-round hiring schedule and the introduction of Web interviews, etc. In response to the recent rapid changes in social conditions and technological trends, and diversification of needs, we relaxed the requirements for side jobs and accepted and managed applications from employees for side jobs to provide them with a variety of experiences and opportunities to strengthen their technical and proposal skills.
Exchange of human resources with the private sector and promotion of new aerospace business	Under the cross-appointment system, 14 new employees were accepted and 2 JAXA employees were newly sent out to external organizations. We strengthened the human resource base through human resource exchanges with external organizations, such as promoting space utilization/development with JAXA's knowledge and expertise. In FY2022, including the cases that continued since the previous fiscal year, a total of 33 employees were accepted from external organizations, and 4 employees were sent out from JAXA.
Operation of work systems that enable diverse and flexible working styles	By creating an environment in which employees can choose diverse and flexible ways of working by combining work attendance, telework, and flextime systems in accordance with the job type and life stage of individual employees, we have established a "new way of working" so that employees can demonstrate their abilities and work with new ideas. In line with the expansion of telework duties, paying the actual cost of commuting allowance and payment of telework allowance have been started.
Healthy management that enables employees to work healthfully both in body and mind	As initiatives related to employee health, we established the "Health Management Policy" featuring health promotion activities as the management foundation and raised the awareness of each employee of health management with organizational cooperation, thereby leading to the revitalization of the workplace.

Retention Rate of New Staff



The retention rate after three years of employment is 97%. (Targeted at 29 new graduates hired in FY2020) We provide generous support, such as guidance through on-the-job training at the assigned department (OJT system) in the first year, and follow-up training and career counseling in the second year.

Number of new employees by gender in FY2022

	New graduates hired	Experienced employees hired
Male	23 people	20 people
Female	8 people	3 people

Reemployment after Retirement

In accordance with the revised Act on Stabilization of Employment of Elderly Persons, we established a system to rehire those who wish to work after retirement until the end of the fiscal year when they reach 65 years of age. Currently, about 110 rehired employees are working in various workplaces, while making use of their rich experience and specialized abilities.

Health Promotion

We started the fit motto project since 2021 in response to our health management policy. The "Fit motto project" aims to create more comfortable workplaces where employees can work actively and healthier (fit) with "health" as a motto. [Fit motto is a coined term from "fit" and the Japanese word "motto (more)."] After completing the second year, autonomous health management is becoming more widely adopted to suit each employee's new way of working. Under the hybrid working system, we have devised ways to communicate with each other in the workplace to create a "comfortable working environment," and we have been making company-wide efforts to adjust various work environments.

Safety Management



In FY2022, we continued to foster safety awareness through e-learning based safety education reflecting past accidents and other incidents, and conducted activities such as identifying dangerous areas and implementing countermeasures through safety patrols, near-miss reporting, and sharing information that contributes to preventive safety. In addition, we continue to achieve "zero" accidents involving students, which is a target of our accident prevention efforts within JAXA sites. Based on the results of analysis of past accidents, we will continue to conduct safety management tailored to the circumstances at each site, and implement measures to achieve "zero" work-related accidents resulting in injury leave.

Labor-Management Relations

In accordance with the Labor Standards Act, we respect labor management autonomy and make decisions on matters related to working conditions (wages, working hours, benefits, etc.) through consultations with the labor union.



In addition, with regard to the outbreak of COVID-19, health staff were able to minimize the impact on the progress of the business by supporting the return to work of those affected and taking measures against workplace infections in accordance with the guidelines. We also provide health counseling for our employees at any time. Under JAXA's Health Management Policy, we will continue to implement various health promotion programs and promote changes in employee health awareness and behavior in order to exert the maximum performance of each employee in a workplace where psychological safety is ensured and to continue working cheerfully and energetically.



Labour Practices



Top Management Commitment

Actions for a better Work-Life Balance (WLB)

In April 2023, we formulated a new action plan with the aim of verifying further measures to promote women's active engagement and resolving the issues that arose while promoting the working system "New way of working."

[Details](#)



Overview of Phase 4 Medium/Long-Term Plan Based on Medium/Long-Term Goals

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Unified action plan of the Act for Measures to Support the Development of the Next Generation and the Act on the Promotion of Women's Active Engagement in Professional Life

(April 1, 2023 - March 31, 2025)

(1) Targets and Measures for Supporting the Development of the Next Generation

Target	<ul style="list-style-type: none"> Creating a totally comfortable working environment for employees at various life stages, through review of the leave system from the user's perspective, such as making it easy to understand and to use. With regard to the balance between childbirth, child rearing and work, JAXA's work system in general is to obtain satisfaction by 80% or more of those who have a right to use the maternity/paternity (childcare) leave system.
Counter-measures	<ul style="list-style-type: none"> With regard to taking the WLB (work-life balance) leave and other types of leave, we promote publicity and prevalence of the utilization method at various life stages, such as not only for child rearing, but also for minor nursing care, self-rehabilitation, and refreshment. (During FY2023) With regard to the utilization of special leave, we will promote its utilization through improvement of convenience while maintaining the purpose of the system, by responding to the "new way of working" and reviewing the conditions for taking it. (During FY2023) The dissemination of information that promotes male participation in child rearing, such as providing information on taking male childcare leave and introducing case examples, are to be enhanced. (During FY2023) Satisfaction questionnaires are to be administered to users (both men and women) of the maternity/paternity (childcare) leave system after the period during which they can obtain the leave, and follow-up surveys are to be conducted. (During FY2023)

(2) Goals and Measures for Promoting Women's Active Engagement

Target	<ul style="list-style-type: none"> Reducing the annual total number of overtime workers who work more than 80 hours per month (including managers, and employees in discretionary work systems) by 20% from the average for the past 3 years (FY2020 to FY2022). Maintaining and improving the ratio of female managers to 10% or more, continually. From a long-term perspective, we will support female schoolers and students from junior high schools, high schools and universities to enter science universities and graduate schools in the future, and to help choosing the career paths to researchers, etc.
Counter-measures	<ul style="list-style-type: none"> Overtime hours including trends in departments and periods are to be periodically reported at the meetings attended by management staff, and the current situation is to be shared with the management staff. (From April 2023) In particular, among employees working more than 80 hours of overtime in managerial positions and discretionary work systems, those who have worked more than 80 hours of overtime for more than one month are to be interviewed, including interviews with the head of the department and the employee, and concrete measures such as improvement of operational efficiency and application to related departments are to be included. In addition, measures to improve organizational operation are also to be considered, such as examining the appropriate amount of work for staffing as an organization. (During FY2023) Continual research towards the formulation of a women's leadership pipeline is to be conducted, and long-term measures are to be considered. (During FY2023) The training for all executives and employees to promote a change in awareness through the awareness of unconscious bias is to be continually conducted. (From April 2023) To increase the number of female managers, the strategic personnel assignments by imaging career paths are to be performed. (During FY2023) Study sessions are to be held regularly for candidates for management positions and their reserve groups. (From April 2023) Career support is to be provided by offering career counseling opportunities for female students and presenting role models for women's advancement, by utilizing various event opportunities such as special exhibitions of offices and external lectures. (From April 2023) A network among students (mainly undergraduate and graduate students) and researchers is to be established to facilitate two-way information exchange. In addition, by enhancing web contents for information dissemination, the information for becoming a researcher, and the information for reference to enter a graduate school are to be provided. (From April 2023) Looking ahead to the next action plan period (starting in 2025), we will consider implementing measures and systems necessary to realize an environment in which young people can play an active role, in addition to the measures for "expanding the range," with reference to the case examples of initiatives by other R&D corporations, etc. (During FY2023)

Labour Practices

Systems that support a better work-life balance



	Actions	Description
Career Advice	Career advice for next generation	Opening the facilities to the public, and dissemination of information at online events, etc.
	Career Terakoya (discussion meeting), mentor system	Supporting the growth of employees by holding discussion meetings, etc.
Support for Childcare and Nursing Care	JAXA Hoshinoko Nursery School / JAXA Soranoko Nursery School	Tsukuba Space Center / Chofu Aerospace Center
	Subsidized childcare (babysitter) programs for sick and post-sick children	
	Work system supporting childcare and nursing care	Paternity leave (for men), shorter working hours for child rearing, shorter working hours for nursing care, etc.
	Lunch networking event for childcare	A place to exchange information
Work Style Reform	Nursing care seminar	Provision of information
	Review of flextime/intermission system, etc.	Flexible working system, reduction of overtime, and management of working hours according to working conditions
	Teleworking	Promoting new ways of working by easing conditions
	Use of IT tools	Utilizing information systems and web conferences
	Measures against harassment	Establishing the Harassment Committee and upgrading the Counselor System in order to create a harassment-free work environment in which each employee can work comfortably
	Paperless	Streamlining meetings, etc., and abolishing the use of signatures and seals
	Consciousness raising	Conducting unconsciousness bias training

Career Advice

● Career advice for next generation

We held a talk event and a video broadcast at the special opening of our office, and introduced female employees' career choices, contents of the research and development (R&D), and a story of male employees' experiences in pursuit of balance between work and child rearing, as role models for career formation. In FY2022, we also held an online counseling session for female junior and senior high school and university students.

In addition, through international networks, such as co-hosting the official side events of the 28th Asia-Pacific Regional Space Agency Forum (APRSAF -28), the participants exchanged views on women's active engagement and promotion of diversity in space agencies in the Asia-Pacific region.

● Mentoring program

This is a system in which experienced mentors (senior workers), separate from direct supervisors in the workplace, interact with the mentees (junior workers) to help them solve their problems and concerns in career formation, and support their personal growth. In FY2022, we held a new discussion meeting with key employees called "Career Terakoya" with the aim of providing them with opportunities to help them chart their own future. In addition, as our efforts to change in consciousness by the awareness of unconscious bias (unconscious assumptions) due to a mind for social gender roles and assumptions from experience, etc., we continued to implement unconscious bias training for all employees, following last year.

Support for Childcare and Nursing Care

● Various leave systems

JAXA has established various leave systems such as annual paid leave, special leave, nursing leave for children and nursing care leave. Special leave includes leave given for volunteer work and for donating bone marrow for bone marrow transplantation. We also have the leave system, such as family care leave, childcare leave, and leave with spouse.

● Establishment of Hotlines

We aim to create a comfortable working environment by setting up a contact point where anyone who works at JAXA can consult with us, and by offering consultations on balancing family life and work, such as marriage, childbirth, child rearing, and family care, as well as on the work environment.

● On-site nurseries

We operate on-site nurseries at two sites, the Tsukuba Space Center and Chofu Aerospace Center, to provide a comfortable working environment where employees can balance work and childcare.

● Work system supporting childcare and nursing care

We allow employees to limit overtime and late-night work and to work shorter hours for childcare until their children reach the third grade. In addition, subsidized childcare (babysitter) programs for sick and post-sick children are available until their children reach the sixth grade. In September 2019, we were certified by the Minister of Health, Labor and Welfare as a "childcare supporting company" (Kurumin certification) based on the Act on Advancement of Measures to Support Raising Next-Generation Children.

For nursing care, in addition to leave and vacation, employees can limit overtime and late-night work and work shorter hours while caring for a family member in need of constant nursing care. In addition, we hold nursing care seminars & briefing sessions describing our support systems to provide information to our staff.

● Lunch networking event for childcare

Our offices in Chofu, Tokyo, Tsukuba, and Sagamiara hold monthly lunch networking events for childcare during lunch breaks. In this event, anyone, regardless of gender, can participate in exchanging information, including employees who are raising children, who have subordinates raising children, and who want to gather information for their future child rearing.



Labour Practices

Work Style Reform

● New way of working

With the aim of transforming work and life, JAXA has been promoting diverse and highly productive working styles of respective employees by preparing a healthy and vibrant work environment. In addition, in response to COVID-19, we are actively working for expansion of the telework system, adoption of a new flextime work system by eliminating the restrictions on core hours, etc., review of the break time system such as eliminating simultaneous breaks at lunch time, introduction of a break system that allows employees to divide their daily working hours into multiple portions, and utilization of online meetings, etc.

In addition to enforcing the suspension of setting a regular meeting on the recommended date for taking leave, we are also trying to set the recommended period for taking long leave to promote taking long leave, which is considered to have a highly refreshing effect, and improving the work environment. We will continue to promote new ways of working regardless of time and place, including establishment of a new telework allowance from FY2022, and provision of information on flexible working style, by utilizing flextime work and telework to “ensure work-life balance.”

● Use of IT tools

We have introduced secure IT tools to support various ways of working. Staff members are provided with lightweight mobile computers equipped with webcams as standard, allowing them to participate in web meetings. In addition to the introduction of tools, we are also working to improve the literacy of our employees to use them. Furthermore, we reviewed and abolished the use of seals and signatures in line with the government’s Regulatory Reform Implementation Plan.

Activities to Improve Employee Engagement

In the midst of difficult situations during the COVID-19 pandemic, JAXA held JAXA FESTIVAL 2022 in a hybrid form, with the concept of providing a forum for employees to freely and openly exchange opinions on the present and future of JAXA, regardless of their position or title. More than 1,000 executives, employees and partners participated. It was highly evaluated as an opportunity to learn about the thoughts and ideas of the executives and the activities within JAXA outside of their own department, and it was effective in enhancing the sense of unity of ALL JAXA and the sense of belonging as well as psychological safety of employees and partners. (Satisfaction level with participation in the questionnaire: 89%)



The situation of JAXA FESTIVAL 2022

Human Rights



Efforts to Prevent Harassment



● Establishment of Training and Hotlines for harassment prevention

Comprehensive compliance training, code of ethics training, and harassment prevention training are provided to raise awareness and prevent harassment. To ensure that employees do not take on their concerns about harassment and the work environment alone, we established a hotline and strive to improve and solve their problems.

- Hotline for various harassment such as sexual harassment, power harassment, and academic harassment (external consultation service)
- Harassment hotline
- Compliance hotline

● Establishment of the Harassment Committee

In October 2021, we established the Harassment Committee, chaired by the Vice President responsible for personnel affairs, based on the results of a study by the Harassment Countermeasures Study Team (composed of labor and management), which was established to study new measures against harassment based on the “Act on Comprehensive Promotion of Labor Measures, Stabilization of Employment of Employees, and Enrichment of Their Working Lives” (Act No.132 of 1966) and other related laws and regulations. The Harassment Committee, which is composed of not only members from JAXA such as the Human Resources Department but also representatives of workers and external lawyers, performs harassment recognition for individual consultations, and promotes measures based on the analysis of JAXA’s current situation to realize harassment-free workplaces.

Elimination of Discrimination against the Disabled



In response to the enactment of the “Act for Eliminating Discrimination against Persons with Disabilities” on April 1, 2016, we established internal regulations on what kind of recognition our executives and employees should have regarding the Act, etc., and have been implementing various activities. In addition, the Compliance Hotline provides consultation on discrimination against persons with disabilities as a part of its wide range of services.

Community Involvement and Development

Public Relations and Events

In FY2022, there were a number of incidents in which the expectations of the public were not met, including the failure to launch Epsilon Rocket No. 6 and the first H3 rocket test plane, as well as the case of non-compliance with medical research targeting humans and accountability as an organization and regaining trust are still urgent matters.

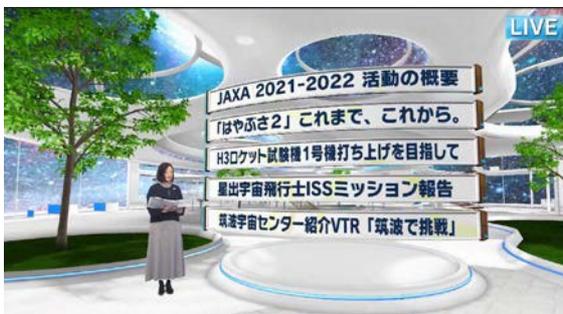
Due to the spread of COVID-19 since 2020, public relations activities have had to be conducted online rather than in person, but with the easing of restrictions, we are taking advantage of the respective strengths of both face-to-face and online activities.

Results of implementation in FY2022

	FY2022	FY2021
Number of visitors to the exhibition hall	401,000 people *1	156,000 people *2
Press release	168 times	171 times
Press conferences and briefings	53 times	41 times
Number of staff dispatched for lectures/Number of audience members	354 times/98,388 people	376 times/181,113 people

*1 Including visitors to the exhibition of the facilities

*2 To prevent the spread of COVID-19, it was closed based on the government's declaration of a state of emergency and the actions of local governments. Even after it is reopened, the number of visitors was limited by appointment to prevent the spread of infections.



JAXA Symposium 2022 (virtual event)

Exhibition facilities and open day to the public

[Facility Tour](#)

We operate 14 exhibition facilities nationwide. At the special exhibition of each business site, there was an increase in the number of sites opened face-to-face after an interval of three years, by making arrangements such as reservations and limiting the number of visitors.

Situation of the special exhibition at Misasa Station, Usuda Deep Space Center



Situation of the special online distribution of Sagamihiro Campus

Web site, SNS, live streaming



We actively provide highly transparent information through JAXA's official website, concierge and community site "Fan! Fun! JAXA," SNS, and YouTube.

In FY2022, the YouTube JAXA Channel released 165 new videos (147 in the previous fiscal year). With the hope of having a ripple effect on young people who have relatively little interest in space, we have been developing short videos on social networking services (SNS) that are highly friendly to young people. Based on the behavior of young people, the program is distributed once a week with subtitles so that the content can be understood even when played without sound, resulting in a threefold increase in the number of accesses. In addition, immediate information on the launch and other missions was distributed in two languages (Japanese and English) to enhance the international presence.

Bulletin JAXA's

It is available in two media: an easy-to-read tabloid (paper) version and a web version. The web version includes all the contents that were not included in the tabloid version due to limited space.



We have invited people from different fields to appear in the paper, as a part of our efforts to spread our message to various fields beyond the aerospace field.

Press conferences and press releases

To provide information on the significance and achievements of JAXA projects in a timely manner, we provide a wide range of opportunities for thorough explanation and dialogue to the press and media, such as press releases, press conferences and press briefings.

In FY2022, from the viewpoint of preventing the spread of infections, we held press conferences and briefing sessions online in principle, as we did in the previous fiscal year. Depending on the cases, face-to-face meetings were emphasized, and face-to-face conferences were held in consideration of infection control measures.

[About "JAXA's"](#)



Press conference on selection results of JAXA Astronaut Candidates



Community Involvement and Development

Support to Space Education for the Next Generation

Using space as material, we will raise children with curiosity, sprits of adventure, and craftsmanship, based on the preciousness of life.

In 2005, under the motto "Space ignites children's minds," the Space Education Center started with the aim of "fostering young people with broad insights and fertile minds" making use of knowledge and technologies gained through space exploration and space development. In collaboration with educators who are directly responsible for the development of children, we have been developed projects that utilize our various achievements in the aerospace field. We will continue to contribute to the development of human resources who will pave the way for the future.

Activities by Space Education Center - Program Map

Support for school education	Training for teachers	Class collaboration	SEEC dispatch program	Educational information magazine "Sora no Tobira" (Portal to Space) Space Education Symposium Regional Forum on Space Education Subcommittee of APRSAF Space Education for All
Support for social education	Cosmic College	Space School	Space Education Leaders Seminar	
Provision of experience-based learning opportunities	JAXA academy	Aerospace School	The space mission you create (Kimission)	
	ISEB Student Dispatch Program	APRSAF Poster contest		



Major Space Educational Support Activities in FY2022

In this fiscal year, various activities were held online or in a hybrid form, and digital educational materials were produced. In response to the lingering COVID-19 pandemic, we were able to actively implement measures to promote the creation of an environment where space education can be practiced anytime, anywhere, and to continue and expand the provision of learning opportunities.

Holding the Space Education Program in a Hybrid Form

The Cosmic College and Space Education Leaders Seminar, implemented in cooperation with space education instructors and educators from all over the country, was actively held online and in hybrid form (face-to-face and online), and the number of participants increased by 17% from the previous year. It also contributed to the promotion of local educational activities.



Start of "JAXA academy"

JAXA has started a trial of the "JAXA academy" for higher education (first and second-year college students) as a new attempt for JAXA's STEAM education. We set summertime homework regarding the "track design, swing by" and "Ryugu samples," and invited high achievers to the Sagamihara Campus to carry out a presentation event.

In addition, at the JAXA Academy Kids, elementary school students presented their freely compiled ideas to Astronaut Wakata who stayed aboard the International Space Station.



Production of educational materials

We produced digital educational materials on the subject of MMX (martiana moons exploration), which meets the GIGA School Concept recommended by the Ministry of Education (one unit per person), and published it online in March. In March, we published "Aim at Space! A Great Picture Book of Scientific Experiments" which is a collection of experiments published by the information magazine "Uchuu no Tobira" (Door for Space/Universe).



We promoted production of educational materials with which children can study anywhere and anytime.



50th anniversary of Tsukuba Space Center (TKSC)



Tsukuba Space Center (TKSC) was established in Sakuramura, Niihari-Gun on June 1, 1972. Since then, after 50 years, Sakuramura was transformed into "Tsukuba City," and the Tsukuba Space Center (TKSC) was transformed from the business sites and headquarters office of National Space Development Agency of Japan (NASDA) into the Central office of operations where the largest number of people work, and the largest number of departments actively operate in the Japan Aerospace Exploration Agency (JAXA). We introduce a few of the 50-year anniversary memorial events where the catch phrase was "50 years of gratitude and technology, to the future!"



At the time of establishment
The water tower, where high boots were essential in the old days, is the same as it always was



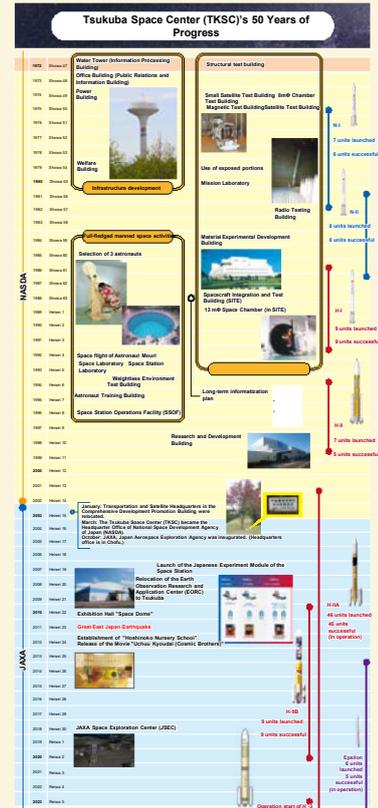
Present time
Around the magnetic test building there is no magnetic area, and there is a beetle paradise in the forest.

01 Resumption of "Special exhibition" and "Commemoration ceremony"

A special exhibition of the Tsukuba Space Center (TKSC), which had been postponed due to COVID-19, was held on Saturday, November 12, 2022. On the day of the event, which was held after an interval of three years, 5,000 people visited by advance reservation, and looked back on the footprints for the 50-year anniversary with photos and memorabilia.



As a culmination of the 50-year anniversary celebrations, a commemoration ceremony was held on Saturday, June 17, 2023 at the Tsukuba International Conference Center, where approximately 250 guests and participants celebrated.



02 Collaboration with local communities

In collaboration with Tsukuba City, we collected postcards and messages for the 50-year anniversary of Tsukuba Space Center under the theme of "Future Tsukuba" from elementary school students living in Tsukuba City. The collected works were introduced at the site of the 50-year anniversary commemoration ceremony and exhibited in the lounge of the Tsukuba Space Center's Public Relations and Information Building from mid-June to the end of August.



03 Memorial planting

In June 2023, with sunny weather in between the rainy season, Terada, Director of the Tsukuba Space Center, planted a weeping cherry tree to commemorate the 50-year anniversary of the Tsukuba Space Center's establishment in the turf area in front of the regulating pond. Cherry blossoms are said to wake up from sleep by being exposed to the winter cold for a certain period of time and start preparing to flower. In order for the commemorative weeping cherry trees to continue blooming over the centuries as an indicator of preventing global warming, we expressed our gratitude and hope to connect technologies to the future (next 50 years).





Kimiharu Saita

Kimiharu Saita

[Short Biography]

He majored in marine meteorology at Hokkaido University and became a certified weather forecaster while he was a student there. After working as a journalist, he has worked as a weather caster for NHK since 2006. He currently appears on "News Watch 9." Currently appears on "News watch 9." As the representative director of Himmel Consulting Co., Ltd., space weather project manager of ABLab General Incorporated Association, and chairman of the Outreach Subcommittee of the Space Weather Users Council, he is promoting efforts in preparing for new disasters.

I think many people watched the live broadcast of the launch of Epsilon Rocket Unit 6 in October 2022, and the first H3 rocket test vehicle in March 2023, with breathless interest. Since I was one of them, I looked over the report with the concern about how back-to-back failed launches may affect Japan's space development.

At the beginning of "Top Commitment," there was a mention of failed rocket launches and a scandal in the space medicine experiment, followed by the confirmation of amino acids and liquid water in samples brought back from the asteroid Ryugu by "Hayabusa 2," the acquisition of a tool to predict engine thrust for the realization of hypersonic flight, and two world-first results, by which I was able to read with expectations. The next page summarizes the "Overview of the Fourth medium to long-term plan based on the medium to long-term target," in which specific targets can be confirmed.

As JAXA PROJECT, the introduction with illustrations classified in four categories consisting of the "transportation, aviation" "manned flight, moon" "earth observation, communication, positioning" and "solar system, astronomy" has links to the Web pages with the details, and many people will have their interest aroused by them.

As for the "Involvement in the environment," the 10-year observation of the satellite "Shizuku" and a sea-ice area change in the Arctic Ocean are introduced. New technology development is important, but continuous observation over a long period of time is also indispensable for global environmental conservation, and its contribution is significant.

In "Initiatives to achieve SDGs," JAXA's priority areas are introduced by being classified into four categories: "Society," "Space," "Global environment," and "Governance." I looked at the new website, and it looks like people can enjoy learning with the animation effects.

In "Social involvement," "Organizational governance" is described first as an approach to social responsibility. The outline of the internal control system is schematized, and it can be seen that a comprehensive risk response team has been established to promote risk management for the risks in general operations other than businesses such as projects.

Finally, there is an introduction to the 50-year anniversary of the Tsukuba Space Center (TKSC). Along with the catch phrase "50 years of gratitude and technology, to the future!" we were able to see a glimpse of collaboration with local communities. Looking ahead to the next 50 years, I expect that JAXA will continue to contribute to the realization of sustainable space use and a safe and prosperous society.



To Enhance the Reliability of This Report

In order to enhance the reliability of the “Sustainability Report 2023” (hereinafter referred to as “this report”), the Japan Aerospace Exploration Agency (JAXA) utilized a checklist and an internal audit system to evaluate the activity reports of all divisions in accordance with the “Environmental Reporting Guidelines” issued by the Ministry of the Environment.

Using the Self-assessment Guide for Enhancing the Credibility of Environmental Reports as a reference, we used a checklist to check that the information (numerical data, etc.) and descriptions about environmental load contained in this report comply with the Environmental Reporting Guidelines.

September 2023
Head of Safety and Mission Assurance Department

李野 正明

In order to ensure the reliability of the information (numerical data, excluding those on papers) about environmental load contained in this report, we conducted audits of the following business sites out of all JAXA’s business sites in June 2023 to verify the consistency of the source documents and business forms with the numerical data in this report, and checked that there were no problems.

- Okinawa Tracking and Communications Station
- Usuda Deep Space Center

September 2023
Head of Evaluation and Audit Department

大関 恭彦

[Details: Self-assessment Checklist](#)

[Editor’s Note]

Thank you for reading “JAXA’s Sustainability Report 2023.”

The words “Trust” and “Responsibility” were in mind when creating this cover picture. JAXA regularly carries out projects, research and development, and organizational management with your understanding and support. With presence of various challenges, such as failure of the launches last year, we must aim to achieve our goals again, and earn the trust of society by fulfilling our responsibilities.

This report describes how JAXA’s aerospace business contributes to various environmental and social issues. Further information is also posted on JAXA’s official website, so please take a look. Also, we would like to utilize this report as a tool to communicate with you, and would appreciate your cooperation in the questionnaire.

[Scope of the Report, etc.]

Scope All business sites except overseas

Target period April 1, 2022 to March 31, 2023 (including some data after this period)

Guidelines for reference “Environmental Reporting Guidelines 2018” issued by the Ministry of the Environment, “ISO 26000: 2010 Guidance on Social Responsibility” issued by Japanese Standards Association (General Incorporated Foundation)

Improving Reliability Conducting an Internal Assessment to Improve the Reliability of this Report

Rounding of numbers Rounding to the nearest whole number

[Copyright]

The illustrations, photographs, and other materials contained in this report are copyright JAXA, unless otherwise noted.

[Publication]

September 2023 (Vol. 18)

Editor in chief Masaaki Mokuno, Director, Safety and Mission Assurance Department

Issue of the next report September 2024

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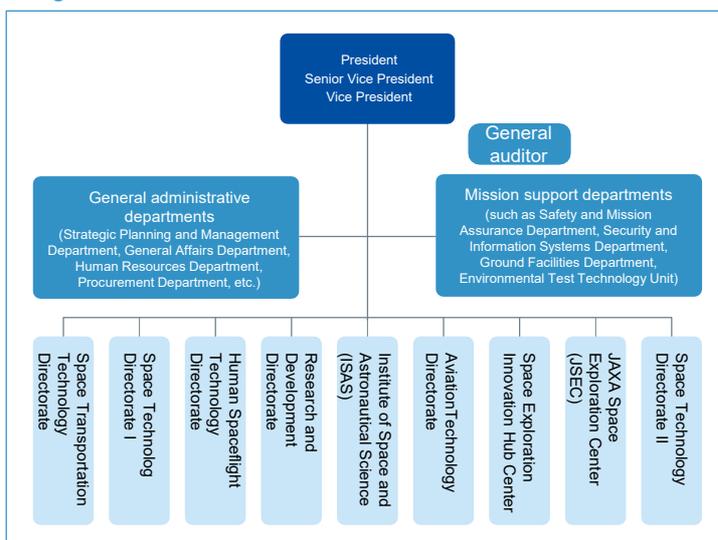
About JAXA

Japan Aerospace Exploration Agency (JAXA), a national research and development agency
Japan Aerospace Exploration Agency

- Headquarters** 7-44-1 Jindaiji-Higashimachi, Chofu City, Tokyo TEL:0422-40-3000 FAX:0422-40-3281
- Establishment (History)** An Incorporated Administrative Agency, the Japan Aerospace Exploration Agency (JAXA) was established in October 2003 in accordance with the Act on the Japan Aerospace Exploration Agency, Incorporated Administrative Agency (Act No.161 of December 13, 2002), merging three aerospace organizations, the MEXT Institute of Space and Astronautical Science (ISAS), the National Aerospace Laboratory (NAL), and the National Space Development Agency of Japan (NASDA). It became a National Research and Development Agency in April 2015.
- President** Hiroshi Yamakawa
- Number of directors** one senior vice president, seven vice presidents, two general auditors
- Number of employees** 1,586 (As of March 31, 2023) (Number of permanent employees)

Organization Chart

As of March 31, 2023



[Details](#)

Personnel-related data

	Unit	FY2018	FY2019	FY2020	FY2021	FY2022	
Number of employees	people	1,517	1,554	1,652	1,589	1,586	
Average number of days of paid leave taken	days	12.7	13.5	11.13	11.9	12.5	
Number of employees taking childcare leave	people	48	56	59	53	63	
Number of employees taking sick/injured childcare leave	people	168	190	135	167	133	
Percentage of female managers	%	10.4	10.2	10.5	10.9	11.2	
Percentage of disabled employees	%	2.49	2.65	2.66	2.52	2.4	
Number of compliance hotline calls	cases	54	45	25	32	31	
Use of the whistleblowing system	cases	0	1	0	0	1	
Work-related accidents*	Accidents during work	cases	14	12	7	13	6
	Accidents during commuting	cases	8	2	3	1	5

* The number of work-related accidents occurred to employees of subcontractors is also included.

Summary of Balance Sheet

(Unit: million yen)

Assets		Liabilities	
I. Current assets	397,058	I. Current liabilities	334,081
II. Fixed assets		II. Fixed liabilities	324,961
1. Property, plant and equipment	348,439	Total liabilities	659,043
2. Intangible fixed assets	8,181	Net assets	
3. Investments and other assets	24,291	I. Capital	544,250
Total fixed assets	380,910	II. Capital surplus	(417,528)
		III. Retained earnings	7,797
		(including total loss in this year, 15,228)	
		Total net assets	118,926
Sum of liabilities and net assets	777,968	Total liabilities and net assets	777,968

Summary of Profit and Loss Statement

(Unit: million yen)

Classification of profit and loss	
Ordinary expense	280,717
Ordinary income	238,782
Extraordinary loss	64
Extraordinary profit	42
EBIT	41,957
Corporate income tax, corporate residents' tax and enterprise tax	25
Net loss	41,982
Total loss	41,982

FY2022 (Budget and Results) and FY2023 (Budget)

[Click here for financial statements, etc.](#)

(Unit: million yen)

Classification	FY2022		FY2023
	Plan	Actual	Plan
Income			
Subsidy for operation	163,688	163,688	122,689
Subsidy for facility improvement	5,688	8,250	6,584
Subsidy for the ISS development	30,251	22,085	19,529
Subsidy for R&D on earth observation systems	5,995	5,995	5,891
Subsidy for promotion of advanced core rocket technology	13,408	7,477	681
Commission income	27,388	60,567	31,255
Other income	1,090	1,188	1,090
Total	247,507	269,250	187,719

Classification	FY2022		FY2023
	Plan	Actual	Plan
Expenses			
General and administrative expenses	4,844	5,222	5,982
Business expenses	159,933	140,520	117,798
Expended subsidy for facility improvement	5,688	8,077	6,584
Expended subsidy for the ISS development	30,251	22,074	19,529
Expended subsidy for R&D on earth observation systems	5,995	5,691	5,891
Expended subsidy for promotion of advanced core rocket technology	13,408	7,473	681
Commission expenses	27,388	61,875	31,255
Total	247,507	250,931	187,719

Sustainability Report 2023

Japan Aerospace Exploration Agency