

● Table 2-2-7/ The major research topics in manufacturing technology (FY 2010)

Ministry	Research organization	Subject
Ministry of Education, Culture, Sports, Science and Technology		-R&D on simulation software that becomes the base of innovation creation [literal translation]
	Japan Science and Technology Agency	-Industry-Academia Innovation Acceleration Project, Advanced measurement and analysis technology, Project on device development
	RIKEN	-Research on the establishment of technology information integration system in advanced IT
Ministry of Economy, Trade and Industry	New Energy and Industrial Technology Development Organization (NEDO)	-Development of technologies for super hybrid materials [literal translation]
		-Development of basic technologies for green sustainable chemical process [literal translation]
		-Technology for next-generation optical-wave control materials and elements [literal translation]
		-Technology for highly efficient manufacturing of three-dimensional optical device
		-Project to develop element technologies for strategic, cutting-edge robots
		-Project to develop manufacturing technology for next-generation devices combining different fields [literal translation]
-Project on basic technology development for high output multi-wavelength laser processing [Literal Translation]		

7 Social Infrastructure

Social infrastructure is a fundamental field that supports people's lives. In order to achieve a prosperous, secure, and safe society, R&D is being promoted to contribute to reducing the risks inherent in society and to improving public conveniences.

(Disaster prevention)

On March 11th 2011, the biggest earthquake since observation records began in Japan, "The 2011 off the Pacific coast of Tohoku Earthquake," occurred and many of the lives were lost due to the earthquake and the tsunami (Details on "The 2011 off the Pacific coast of Tohoku Earthquake" and the tsunamis are reported in Chapter 1 on the "Great East Japan Earthquake.") Natural disasters responsible for horrific damage occurred in Japan and abroad in a year, including a volcanic eruption in Iceland in April, the Sumatra Earthquake in Indonesia in October 2010 and the New Zealand Earthquake that occurred in February 2011. Whereas in Japan, localized heavy rains in Amamioshima in October 2010, eruption of Kirishima Mountain (Shinmoedake) in 2011 and so on occurred. Utilizing what we have learned from these lessons, it is extremely important to promote the earthquake-volcano forecasting research and disaster-prevention technologies aimed at reducing the damage caused by the disaster in the future.

Earthquake research in Japan is being promoted with the collaboration and cooperation of related administrative agencies under the Headquarters for Earthquake Research Promotion (Director: Minister of MEXT; hereinafter referred to as the "HERP") established under the Act on Special Measures for Earthquake Disaster Countermeasures (Act No. 111 of 1995). HERP compiled a new 10-year plan starting from FY 2009 with the "Next Promotion of Earthquake Research" in April 2009. This new plan suggests that research on ocean-trench earthquake and the active fault be promoted integrally and strategically



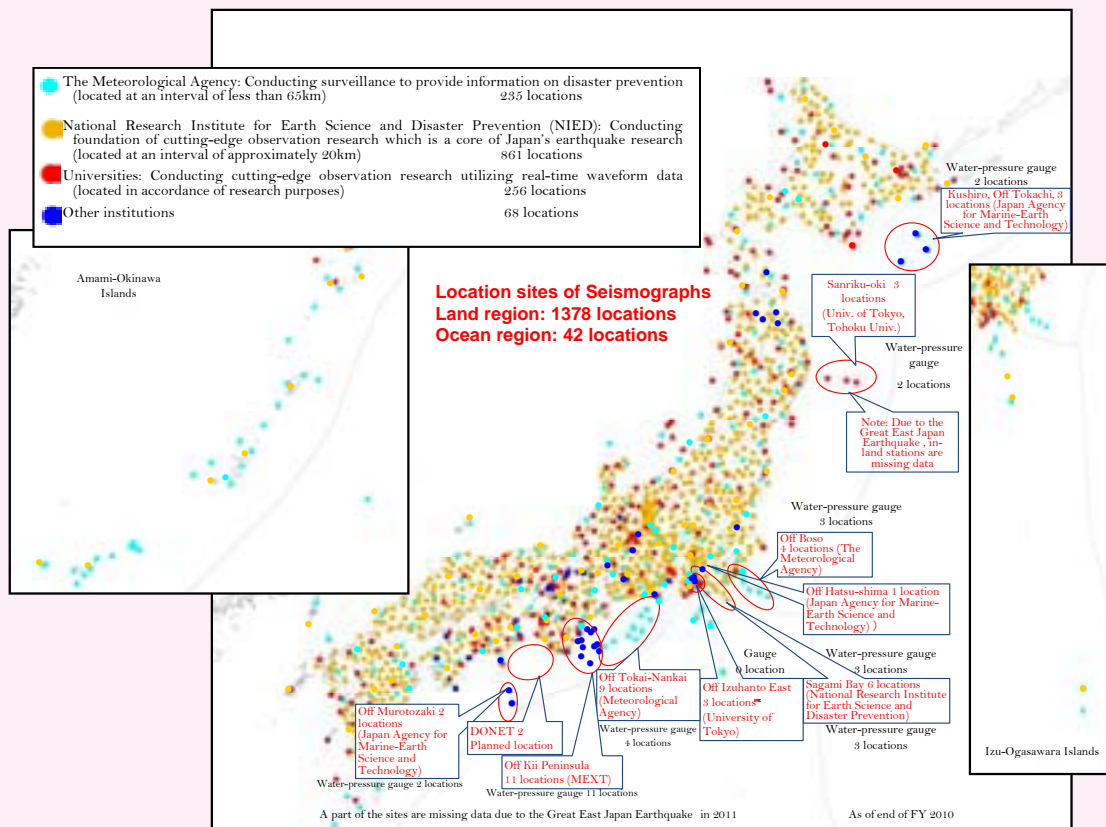
within at least the first 10 years with consideration to also be given to a 30-year timeframe and their results be applied effectively to disaster-prevention and disaster-reduction countermeasures that aim to establish a society capable of minimizing seismic damage.

With regards to research on seismic/volcanic eruption forecasting, a new 10-year plan set forth by the HERP also emphasized the importance of basic research based on the recommendation, and the research is promoted at universities from FY 2009.

In May, 2010, MEXT updated the “National Seismic Hazard Map”, which was originally published in July 2009, based on the evaluation on major active fault zones nationwide. It also considered the change in seismic probability because of the occurrence of big earthquake and passage of time. In addition, “Long-period ground motion maps (experimental), which is to illustrate the distribution of long-period earthquake ground motion, which is expected to occur locally or at a distance whenever major earthquakes of certain magnitudes occur. In order for it to be updated in FY 2011, MEXT conducted improvement of the method for numerical calculation and validity of the model for underground structure. Furthermore, a “Special Project for Earthquake Disaster Mitigation in Metropolitan Tokyo Area,” an “Intensive surveys and study on the concentrated strain zone,” “Evaluation study of continuous movements associated with the Tokai, Tonankai and Nankai Earthquake,” and other investigations and research projects were conducted targeting areas vulnerable to serious social and economic losses. MEXT also expanded its investigation into faults in coastal areas previously not investigated, and continuously promoted investigations that are necessary for evaluations on HERP.

After The Great Hanshin-Awaji Earthquake Disaster, development of dense earthquake observation network has been promoted on land areas with collaboration of related institutions. However, though there are several observation networks constructed in ocean areas including the Tokai/Tonankai submarine cable seismic observation system operated by the Japan Meteorological Agency, it is still very few in comparison to land region observation networks (Figure 2-2-8). MEXT, while commencing the test run of the high-density submarine network system equipped with seismographs and water pressure gauges that will enable real-time observation of the predicted seismogenic zones from the Tonankai Earthquake, is also promoting technology development for creating similar system for the predicted seismogenic zones from the Nankai Earthquake.

● Figure 2-2-8/ Real-time observation system using seismographs



Source: Created by MEXT

An emergency investigation research is conducted utilizing the Grants-in-Aid for Scientific Research by collaboration of researchers in research institutions such as universities on the eruption of Kirishima Mountain (Shinmoedake) and “The 2011 off the Pacific coast of Tohoku Earthquake.”

MEXT is promoting the R&D of disaster prevention S&T based on the “Promotion for the Research and Development on Disaster Prevention” In FY 2009, MEXT implemented the “Program for the Promotion of Support for Disaster Prevention Education” in an effort to promote projects on disaster education based on the results of disaster prevention research and to disseminate them throughout the country. The reports on the achievements by universities and local government, as well as other achievements such as teaching materials, training curriculum, disaster prevention teaching programs are open to the public on HERP’s Earthquake Headquarters’ homepage. It is also conducting R&D on information systems for use in times of disaster under the Project on Science and Technology for a Safe and Secure Society.

The National Research Institute for Earth Science and Disaster Prevention (NIED) is implementing R&D using experiments and research on earthquake resistance with a 3-D Full-Scale Earthquake Testing Facility (E-Defense) that contributes to the reduction of seismic damage. It is also conducting research to reduce damage from natural disasters, including research on the highly accurate prediction of rainfall with Multi-Parameter radar (MP radar)¹, the prediction of landslides, windstorms, and flood disasters, and the prediction of volcanic eruptions and volcanic disasters. In addition, NIED initiated research related to the

¹ Multi-barometer radar. Meteorological radar that utilize vertical and horizontal polarization. In comparison to conventional radar, it is possible to estimate the amount of rainfall in high precision and distinguish between rain and snow.



development of the Disaster Risk Information Platform, a system for the collection and distribution of information on various natural disasters. In particular, in FY 2010, NIED enhanced research system for prediction of localized heavy rains by constructing data analysis system utilizing the MP radars located in three major cities and in the Hokuriku regions.

JAXA operated the Advanced Land Observing Satellite “DAICHI” (ALOS), observed large-scale natural disaster areas, including the Great East Japan Earthquake and provided imaging to related disaster prevention facilities. In addition, JAXA is implementing R&D on highly accurate positioning measurement technology using a quasi-zenith satellite. These technologies are being developed and operated as technologies that make up the “Key Technologies of National Importance, Earth Observation and Ocean Exploration System,” which aims to contribute both domestically and internationally by establishing a global observation and monitoring system using satellites that essential for Japan’s overall security.

The National Institute of Information and Communications Technology (NICT) is conducting R&D of generic technologies related to Terahertz frequencies in order to develop high performance imaging sensory devices capable of recognizing local situations in hazy places or in other locations where vision has deteriorated or harmful substances detected that evade detection from conventional technologies such as X-rays, infrared rays, electric waves, etc. Furthermore, NICT is developing an on-board aircraft synthetic aperture radar which enables users to get hold of the disaster situation on any sort of weather with 30cm resolution and promoting the development of technology for providing the data promptly. In addition, it is also promoting R&D on technology allowing 3-D observations of distribution of rainfall in real time, and the next generation Phased Array Doppler, a weather radar that can predict the occurrence of localized heavy rainfall and water spouts.

FDMA is promoting R&D on fire prevention, led by the National Research Institute of Fire and Disaster, concerning the assurance of safe handling of hazardous materials by facilities in the event of earthquakes, technology to reduce damage from disasters, and research on technologies for disaster countermeasures.

The National Institute of Advanced Industrial Science and Technology (AIST) is promoting the seamless construction of a geological information system integrating information on sea and land obtained through geological and active fault investigation in coastal zones in addition to the installation and operation of integrated groundwater observation stations.

MLIT is promoting R&D on technologies aimed at realizing advanced social communities for disaster prevention that will serve as thorough precautions against disaster.

The Geographical Survey Institute (GSI) is conducting continuous GPS observation by using Electronic Reference Stations¹, observation of crustal deformation and plate motion by using state-of-the-art technologies, including a Very Long Baseline Interferometry (VLBI) and an interferometric SAR, and analysis of the data obtained from the above-stated observations.

The Japan Meteorological Agency (JMA) establishes and operates observation facilities for enhancing the surveillance system for 47 volcanoes in Japan and provides centrally integrated information, including observation data from relevant institutions. JMA also works together with NIED to conduct R&D toward further advancement of the emergency earthquake alert service.

The Meteorological Research Institute (MRI) is conducting advancement of surveillance and analysis

¹ As of end of March 2011, there are 1240 stations within Japan.



technology on crustal movement and on development of an earthquake simulator for expansion of surveillance technology on crustal activities and Nankai trough earthquake and also improving the accuracy of prediction technology of the Tokai earthquake.

The Japan Coast Guard (JCG) is promoting geodetic in the sea and investigation into submarine topography and active faults.

The Council for Science and Technology Policy (CSTP) has selected and implemented an “Emergency investigation research on eruption of Kirishima Mountain (Shinmoedake) in FY 2011” as a part of “Promotion of Measures to Address Important Political Issues with Mobility” funded by the Special Coordination Funds for Promoting Science and Technology for FY 2010.

(Antiterrorism and public safety measures)

In these troubled times with international terrorism and an evident deterioration of public order, the creation of a safe society with reduced crime is one of the most important and urgent needs of the general public. Therefore, it is extremely important to further enhance approaches to these problems utilizing the most advanced antiterrorism S&T and public safety measures.

As for antiterrorism and the prompt advanced detection of hazardous and dangerous materials, MEXT is conducting R&D under the Special Coordination Funds for Promoting Science and Technology and the Project on Science and Technology for a Safe and Secure Society, on systems for the detection of explosive materials, biological and chemical agents, and methods for the treatment of dangerous materials in a safe manner that are based on the excellence of our country’s innovative technologies.

With regard to crime-fighting measures, intensive promotion of the development of technologies and systems that can be used at the site of crime prevention, investigation support, and identification is required in order to reduce crime while limiting the use of human resources. Therefore, the National Police Agency (NPA) is conducting various R&D of technologies utilizing S&T to assist in criminal investigations, antiterrorism, and crime prevention. The Japan Science and Technology Agency (JST) is promoting R&D to ensure child safety from criminal activity.

(Transportation and transit systems)

There is an urgent need to restore safety and reliability of transportations, which are necessary to the daily lives of our citizens. It is therefore necessary to intensively promote the utilization of new technology to thoroughly prevent accidents and ensure safety by considering the expected increases in demand for air transportation in the future as well as human factors such as operators at transportation facilities, and the “discovery,” “decision,” and “operation” of car drivers.

NPA, MIC and MLIT are promoting practical application of a system designed to support safe driving through coordination with infrastructure and inter-vehicle communication as well as an information processing capacity concerned with safe driving.

In addition, MLIT allocated ITS spots¹ in approximately 1,600 locations such as expressways all over Japan from January to March FY 2011. Furthermore, it is working on advanced R&D that will lead to safer and more comfortable transportation and transit systems in the future, as well as upgrades to information

¹ Realization of various services by high speed/high capacity road-to vehicle communication based on the international standard.



and telecommunications systems. MLIT is also promoting effective development with further reduction of cost of superconducting magnetically elevated trains which is the super speed mass transportation system.

With regard to air transportation, MLIT's research is expected not only to support the maintenance and improvement of safety and environmental compatibility, but to have a ripple effect on a wide range of areas, including information and telecommunications and nanotechnology and materials.

MEXT is promoting advanced and infrastructural R&D related to aeronautical science technologies corresponding to the social needs of environmental compatibility and security. Specifically, MEXT is working on R&D for technologies to increase the performance of passenger airliners made in Japan, technologies to develop clean engines and silent supersonic aircraft, and technologies for all-weather and high-density operations, through JAXA. In addition, using the results of past R&D, MEXT supports MLIT's forming technical standards, or it cooperates with the investigation by Japan Transport Safety Board in case of air craft accident or other types of accidents.

METI is promoting R&D to add value to the Japanese aircraft industry's bid to be the world leader next-generation ecological aircrafts, while breaking away from the "component and module division," and is also making efforts to strengthen Japan's competitiveness in the aircraft industry while conducting R&D of environmentally friendly engines for small aircrafts through the New Energy and Industrial Technology Development Organization (NEDO).

The Electronic Navigation Research Institute is selectively implementing R&D on the effective utilization of airspace and capacity expansion of flight routes, R&D on capacity expansion of congested airports, R&D of improved safety and efficiency achieved by preventative safety, and technologies for ensuring the security and smoothness of air traffic.

The major research topics in FY 2010 for infrastructure are shown on [Table 2-2-9](#).

● Table 2-2-9/Major Research Projects in Infrastructure (FY 2010)

Ministry	Research organization	Subject
National Police Agency	National Research Institute of Police Science	-Research on individual identification from biological samples through the Haplotype analysis -R&D on RN material detection technologies for R (Radiological) terrorism and equipment to support on-site activities [literal translation] -Research on fast screening technology for multi-component drugs and poisons [literal translation] -Research on the sophistication of microphyte samples [literal translation] -Behavioral scientific research on interrogation methods for suspects and victims -Development of advanced traffic accident analysis technologies
Ministry of Internal Affairs and Communications	National Institute of Information and Communications Technology (NICT)	-R&D for terahertz radiation technology [literal translation] -R&D for global environmental change technology [literal translation] -R&D for subtropical environmental measurement technology [literal translation] -R&D for sensing network technology [literal translation] -R&D for visualization technology on ground surface -R&D for next generation Doppler radar technology
Ministry of Internal Affairs and Communications	Fire and Disaster Management Agency	-Expenses required for R&D system of fire safety and disaster preparedness technologies
	National Research Institute of Fire and Disaster	-Information system for supporting dramatic improvement in on-site fire-fighting/rescue activities and disaster prevention activities -Reduction in damage of dangerous facilities during large-scale earthquakes -Understanding of fire behavior in buildings and facilities designed for various purposes

Ministry of Education, Culture, Sports, Science and Technology		<ul style="list-style-type: none"> -Synthetic promotion of active fault survey -Development of Dense Ocean-floor Network System for Earthquakes and Tsunamis -Evaluation study of continuous movements associated with the Tokai, Tonankai and Nankai Earthquakes -Intensive surveys and study on the concentrated strain zone -Special Project for Earthquake Disaster Mitigation in Metropolitan Tokyo Area -Intensive promotion of earthquake research -Project on Science and Technology for a Safe and Secure Society
	Japan Science and Technology Agency	<ul style="list-style-type: none"> -Advanced integrated sensing technology
	National Research Institute for Earth Science and Disaster Prevention	<ul style="list-style-type: none"> -Earthquake engineering research utilizing the Three-Dimensional Full Scale Earthquake Testing Facility (E-Defense) -Research on the development of Disaster Risk Information Platform [literal translation] -Research on prediction of sediment, wind, and flood damage using MP radar [literal translation] -Research on forecasting volcanic eruption and preventing volcanic disaster [literal translation]
	Japan Agency for Marine-Earth Science and Technology	<ul style="list-style-type: none"> -Long-period monitoring system of excavation cavities -Sophistication of real-time seismic/tsunami monitoring system [literal translation]
	Japan Aerospace Exploration Agency	<ul style="list-style-type: none"> -Operation of the Advanced Land Observing Satellite "DAICHI" (ALOS) -High-precision positioning, navigation, and timing of experimental technology using a quasi-zenith satellite system -R&D on advanced land-observing satellites [literal translation] -Research and development of technologies for higher performance domestic passenger aircraft -R&D on clean engine technologies [literal translation] -Research and development of silent supersonic demonstrator air craft -R&D on all-weather and high-density service technologies [literal translation]
	Special Coordination Funds for Promoting Science and Technology	<ul style="list-style-type: none"> -Research and development of detection systems for nuclear substance concealed in hand-carried baggage -Program for commercialization of crime and antiterrorism technologies for a safe and secure society
Ministry of Economy, Trade and Industry	New Energy and Industrial Technology Development Organization	<ul style="list-style-type: none"> -R&D on an engine for environmentally-compatible small aircraft
	National Institute of Advanced Industrial Science and Technology	<ul style="list-style-type: none"> Maintenance technologies for land-sea integrated, seamless geological information [literal translation]
Ministry of Land, Infrastructure, Transport and Tourism		<ul style="list-style-type: none"> -Development of technologies for next generation regional public transport system -Development of inspection and surveillance technologies for preventative maintenance management of social capital -Development of earthquake resistant evaluation technologies of buildings in response to advanced earthquake information -Technology for offering broad road traffic information and information related to safe drive assistance and for collecting information on vehicle travel routes -Technologies for air traffic control/operation support via utilization of IT
	National Institute for Land and Infrastructure Management	<ul style="list-style-type: none"> -Development of base technology to support set up and selection of policies on large-scale floods due to climate change -Research on policies on smoother transportation in response to expansion of Asia International Ferry Transportation -Development of technologies for fire and safety measures in the aftermath of an earthquake for tall buildings [literal translation]



Ministry of Land, Infrastructure, Transport and Tourism	Geographical Survey Institute	-Enhancement and improvement in prediction accuracy of crustal movement monitoring/modeling for reduction of damage caused by earthquake, volcanic eruption, etc.
	Japan Meteorological Agency	-Research on advanced technology for crustal movement monitoring along the Nankai Trough and technology for prediction of the Tokai earthquake [literal translation] -Research on development of technologies to grasp magmatic activities quantitatively and make advanced judgments on volcanic activity [literal translation]
	Public Works Research Institute	-Technologies for the perception of planar analysis information of precipitation by utilizing satellite information, etc. -Technologies for reducing damage, including quake-resistant design of structures for large-scale earthquakes -Development of technologies for predicting the danger of landslide disaster caused by heavy rain and earthquakes and the alleviation of damages thereof -Technology for the qualitative improvement of river levees for improved flood control safety -Enhancement of management of social capital, etc., and reduction of life cycle costs
	Building Research Institute	-Development of reorganization of cities and buildings to accommodate population reduction of an aging society with a falling birthrate -Development of technologies for the enhancement of daily safety and security functions in residences/buildings [literal translation] -Development of technologies related to production, maintenance, and distribution for the purpose of the long use of residences [literal translation] -Development of technologies related to advanced safety measures for structures such as skyscrapers and technologies for functional maintenance and early post-disaster recovery [literal translation]
	Port and Airport Research Institute	-Research on realization of the construction of more earthquake-resistant port areas, seaside facilities, and airport facilities [literal translation] -Research on protection of local society against enormous tsunamis [literal translation] -Research on prediction of seaside change in locations with several streams of overlapping currents and waves [literal translation] -Research on life cycle management of port areas, seaside, and airport facilities [literal translation] -Research on unmanned underwater works in port areas [literal translation]

8 Frontier Science

Frontier science is a science that exists for the exploration and probing of the unknown in space and oceans and the promotion of R&D for its development and utilization as new areas of activity. In the 3rd Science and Technology Basic Plan, frontier science is positioned as an area where R&D should be promoted and focused on as an R&D issue that must be addressed by the nation. This scientific field aims to contribute to improvements in the safety, security, and overall quality of people's lives, socio-economic development, the overall security of Japan, and sustainable development of humanity by using communication satellites and positioning, navigation and timing systems, earth observation and monitoring systems, and the oceans and their abundant resources.

(1) Space development and utilization

Space development and utilization have deeply infiltrated public life as seen in the work of weather and communication/broadcast satellites that have become indispensable to our existence. As a national strategy of Japan, based on the "Aerospace Basic Act" (May 2008, Law No. 43), policies are being promoted.

R&D on space contributes to the accumulation of intellectual property of humankind. It also helps to improve security, add to people's lives, promote industry, develop society, and improve Japan's international standing. It is extremely important to advance policies that stress the utilization of space while improving technological development into the future.

The future major satellite launching plans of Japan are as shown on [Table 2-2-10](#).

● Table 2-2-10/Japan's Major Satellites Launch Schedule

Satellite	Weight (kg)	Orbital altitude (km)	Launch vehicle	Planned launch date	Major objectives
Advanced Land Observing Satellite-2 (ALOS-2)	Approx. 2,000	Sun synchronous sub-recurrent orbit(approx. 630)	H-IIA	In FY2013	To observe global forests and geography for application of the data to meet needs under normal circumstances including land and resource management as well as to attempt to gain insight into disaster situations.
Advanced small earth observation satellite Optical Satellite ASNARO (Tentative name)	Approx. 450	Sun synchronous orbit (approx. 500)	(Under review)	In FY 2012	To develop an advanced small satellite for realization of reducing time of development period and low cost and functions that is not inferior to large satellite
Advanced small earth observation satellite (Radar satellite) ASNARO 2(Tentative name)	Approx. 450	Sun synchronous orbit (approx. 500)	(Under review)	FY 2014	To conduct R&D on miniaturizing and reducing cost of high resolution X band synthetic aperture radar to supplement optical satellite which aimed at competing in the international satellite market
Global change observation mission-water satellite (GCOM-W)	Approx. 1,900	Sun synchronous sub-recurrent orbit (approx. 700)	H-IIA	In FY 2011	To observe sea surface temperature and rainfall that contribute to clarification of water circulation mechanism on a global scale.
Global Precipitation Measurement/Dual-frequency Precipitation Radar (GPM/DPR)	Approx. 3,500 (GPM Satellite)	Sun-asynchronous orbit (approx. 400)	H-IIA	In FY 2013	To observe the three-dimensional distribution of precipitation and snow using the dual frequency precipitation radar (DPR) installed in the main satellite for international global precipitation measurement (GPM) project
Global Change Observation Mission-Climate Satellite (GCOM-C)	Approx. 2,000	Sun synchronous sub-recurrent orbit (approx. 800)	H-IIA	In FY 2014	To observe vegetation, cloud, and aerosol that contribute to the clarification of climate change mechanism on a global scale.
Earth Clouds, Aerosols and Radiation	Approx. 1,200(EarthCARE Satellite)	Sun synchronous sub-recurrent orbit	Under review (Europe)	In FY2014	To observe the three-dimensional distribution of the cloud/aerosol in the atmosphere on a global scale with a cloud profiling radar mounted on the European Earth



Explorer/Cloud Profiling Radar (EarthCARE /CPR)					Clouds, Aerosols and Radiation Explorer (EarthCARE) Satellite.
Geostationary earth environment observation satellite "Himawari-8"	Approx. 3,500	Stationary orbit (approx. 35,800)	H-IIA	In FY2014	To reinforce the monitoring capacity of global environment for the purpose of preventing natural disasters, including typhoons, in Japan and in Asian/ Western Pacific regions, through enhancement of the observational function of visible infrared radiometer.
Geostationary earth environment observation satellite "Himawari-9"	Approx. 3,500	Stationary orbit (approx. 35,800)	H-IIA	In FY2016	
Mercury Exploration Project (BepiColombo)	Approx. 220 (MMO)	Elliptical polar orbit around Mercury (approx. 400-12,000) (MMO)	Soyuz Fregat 2B	In FY 2014	To observe the magnetic field, magnetosphere, the inside and the surface of Mercury from many angles through international cooperation with the European Space Agency (ESA). Japan is in charge of the Mercury Magnetospheric Orbiter (MMO).
Asteroid Explorer "Hayabusa" Succession machine	Approx. 600	Interplanetary orbit	H-IIA	In FY 2014	To explore the asteroid that contains organic materials by maintaining and developing Japan's originality and superiority through the Asteroid Explorer, the "Hayabusa"
The 26 th Scientific Satellite "ASTRO-H"	Approx. 2,400	Circular orbit (approx. 550)	H-IIA	In FY 2013	To directly observe the growth of galactic clusters and huge black holes via X-rays to help clarify the large-scale structures of space and their development and to understand the extreme situations in space.
H-II Transfer Vehicle "KOUNOTORI" (HTV)	Weight: approx. 16,500 Supply weight: approx. 6000	Elliptical orbit (200 x 300)	H-IIB	In FY 2011 (No.3)	To supply materials to the International Space Station via a Japanese transport system, H-IIB (No.3).

(Space transportation system technology)

In order to maintain Japan's overall security and autonomy in space activity, it is important for Japan itself to have the ability to transport necessary satellites to a given place in space. Because space transportation system is a huge system technology, improvement in technology level also helps to sophisticate industry and develop economy and society. That is the reason "Space Transportation System" has been selected as an essential R&D issue.

Particularly in relation to the H-IIA rocket developed as part of the "Space Transportation System," which is one of the Key Technologies of National Importance promoted under the national long-term strategy in the 3rd Basic Plan, No. 17 rocket launched the Venus exploration satellite "Akatsuki" (PLANET-C) as well as other small sub-satellites and No.18 rocket launched the first quasi-zenith satellite