Chapter 10 Utilizing ICT and Promoting Technology Research and Development

Section 1 Promoting Innovation in the Fields of Land, Infrastructure, Transport, and Tourism Through the Use of ICT

Information technology initiatives in the fields of land, infrastructure, transport and tourism within the Declaration to be the World's Most Advanced IT Nation (revised on June 30, 2015) are being promoted in coordination with the IT Strategic Headquarters (Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society) as headed by the Prime Minister.

1 Promoting ITS

Intelligent Transport Systems (ITS), a system created through the integration of people, roads, and vehicles using the latest Information and Communications Technology (ICT), enables advanced road use, the safety of drivers and pedestrians, the dramatic improvement of transport efficiency and comfort, solves various social problems such as traffic accidents and congestion, environmental and energy problems, and is leading to the creation of new markets in the related fields of the automotive industry, information technology industry, and others.

We are also proactively promoting initiatives pertaining to the collection and distribution of road traffic information effective for safety measures, congestion measures, and disaster countermeasures in accordance with our aim to realize the world's safest, environmentally friendly, economical road traffic society based on our Declaration to be the World's Most Advanced IT Nation, which was endorsed by the Cabinet in June 2013 and revised in June 2014 and June 2015, and our Public-Private Partnership-Based ITS Concept and Roadmap, which was endorsed by the IT Strategic Headquarters in June 2014 and revised in June 2015.

(i) The Spread of ITS in Society and its Effect

(A) Promotion of ETC and its Effects

Electronic Toll Collection (ETC) is now available on all national expressways, as well as most of the toll roads in Japan. The total number of new setup onboard units is roughly 51.25 million as of September 2015 and its usage rate on all national expressways is roughly 90.0%. Congestion at tollgates, which used to account for roughly 30% of the cause for expressway congestion, has been mostly alleviated and has contributed to reductions in CO_2 emissions and environmental burdens. Additionally, measures utilizing ETC are being implemented, such as the introduction of Smart IC dedicated to ETC interchange and discounts for ETC vehicles. In addition to such toll road uses, it is also possible to use ETC for parking payments and boarding procedures for ferries, showing the spread and diversification of services utilizing ETC.

(B) Improvement of Providing Road Traffic Information and its Effects

Vehicle Information and Communication System (VICS)-compatible onboard units aim to advance travel route guidance and, as of September, 2015, roughly 48.37 million units have been shipped. By providing road traffic information such as travel time, congestion conditions, and traffic restrictions in real-time through VICS, drivers' convenience is improved. This ultimately contributes to better mileage and reduces environmental burdens, including the reduction of CO_2 emissions.

(ii) Technological Development and the Popularization of New ITS Services

(A) Utilizing ETC2.0

We are committed to promoting several "smart use of roads" measures. These include introduction of flexible toll rates to reduce congestion and accidents and promotion of highly productive logistics management system, through the use of

vehicle speed data, travelled route and travel time data, and other various big data carefully collected from the ETC2.0 onboard units, which became available in the market in August 2015.

Figure II-10-1-1 Wide-area traffic congestion information is provided by ETC2.0.

Source) MLIT

(B) Promotion of the Advanced Safety Vehicle (ASV) Project

Regarding the ASV promotion plan, efforts are underway for the development, commercialization, and widespread adoption of Advanced Safety Vehicles (ASV) that assists the drivers to drive safely by using advanced technology such as ICT technology. In FY 2015, studies were conducted on measures to counter driver overconfidence, the trend towards greater complexity in systems, and the promotion of the development of safe driving support systems based on the use of communications, including communications between vehicles and communications between pedestrians and vehicles.

Figure II-10-1-2 Illustration of a Telecom Use-Type Safe Driving Support System (Advanced Safety Vehicle (ASV))

Source) MLIT

2 Realizing Automatic-Driving Systems

Japan has been appointed to jointly chair the Intelligent Transport System and Automatic Driving Informal Working Group (established in November 2014) and the Automatically Commanded Steering Function Informal Working Group (established in February 2015), which were established under the UN World Forum for Harmonization of Vehicle Regulations (WP.29), and is spearheading studies of international safety regulations applicable to automatic driving systems.

Domestically as well, we will engage in studies on demonstration experiments for the commercialization of communications-based driving support systems and on safe and smooth methods of system communications with drivers in the context of the Cross-ministerial Strategic Innovation Promotion Program (SIP), a collaborative measure undertaken by relevant ministries and agencies. A meeting to review the automatic-driving business was held jointly with the Ministry of Economy, Trade and Industry and the direction that automatic-driving systems should take as we focus on a point fifteen years down the road and the issues that need to be addressed for the realization of this direction were sorted out.

3 Realizing a Society that Utilizes Geospatial Information in a Sophisticated Manner

In order to utilize location and spot information or "geospatial information [Note] " in a more sophisticated manner through ICT, initiatives are being promoted to realize a G Spatial Society (Sophisticated Utilization of Geospatial Information Society) where the necessary geospatial information can be utilized by anyone at anytime and anywhere in accordance with the Basic Plan for the Advancement of the Utilization of Geospatial Information, which was enacted by Cabinet Decision in March 2012.

Note Information that indicates the position of a specific point or area in geospace (including temporal information pertaining to said information) as well as any information associated with this information. Also called G-spatial information (Geospatial Information).

(1) Maintaining and Updating Geospatial Information as the Foundation of Society

The Digital Japan Basic Map [Note 1] and Fundamental Geospatial Data [Note 2], which can be commonly used by the entire society as the basis for utilizing various geospatial information, is being rapidly developed and updated with the coordination of various administrative organizations. Various types of information regarding national land are being developed, such as aerial photographs, geographical name information, National Land Numerical Information, and continuous monitoring of crustal movements with GNSS-based control stations. In addition, the system is being constructed, enabling prompt assessment and provision of the information on national infrastructure, such as maintenance of information on the topographical classification used as the basic material for developing hazard maps prepared for future disasters, and urgent photography of aerial pictures during disasters.

(2) Initiatives to Promote the Utilization of Geospatial Information

Developed geospatial information is broadly provided via the Internet. Also, initiatives are being taken by industrial, academic, and government parties to further promote a geospatial information library that allows for the searching, browsing, and downloading of various types of information, as well as to improve GSI maps [Note 3], thereby facilitating the layering of various types of information on the Web and further promote the sharing and mutual use of such information with society as a whole. In order to further disseminate such information among members of the public and generate new industries and services, we have been carrying out verification projects that are effectively used for disaster prevention and mitigation, the creation of local areas, and regional revitalization. In addition, G Spatial Expo 2015 was held in November 2015 through cooperation among industrial, academic, and government parties.

4 Realizing an Electronic Government

Following the "Declaration to be the World's Most Advanced IT Nation", various initiatives are being carried out to realize an electronic government. In particular, regarding the online usage, initiatives are being taken to improve convenience for citizens as well as making administrative operations simple and efficient, based on the reform policies to improve the convenience of online procedures.

Regarding automobile ownership procedures, a "One-Stop Service (OSS)" that allows for the execution of various procedures, –such as inspection, registration, automobile parking space certification, and payment of various vehicle taxes—online and at the same time, is being promoted through the cooperation of various ministries, and is currently being implemented for the new registration of brand new cars in 11 municipalities. Based on the "Basic Policy Regarding the Reform of Independent Administrative Institutions" approved by the Cabinet on December 24, 2013, initiatives are underway to realize nationwide deployment and increase the procedures handled by the OSS by the end of FY2017. A study of convenience improvement measures comprising the use of the My Number Card in automobile inspection registration procedures is being promoted in accordance with the 2015 revised version of the Japan Revitalization Strategy (Cabinet decision made June 2015) and Declaration to be the World's Most Advanced IT Nation (Cabinet decision made June 2015).

5 Development and Opening of Optical Fiber for the Management of Public Facilities and Its Housing Space

The development and opening of optical fiber for the public facilities management and its housing space is being

Note 1 New electronically compiled maps that serve as our nation's basic maps instead of the traditional paper maps including the 1:25,000 scale topographic maps. In addition to depicting our national territory appropriately, it serves as the most fundamental information of our national land's conditions with geospatial information developed by the Geospatial Information Authority of Japan.

Note 2 Serves as the basis for the position determined for geospatial information on the digital map such as positional information for the geodetic control points, coastlines, boundaries of public facilities, and administrative boundaries. Criteria and standards are defined by ministerial ordinances of MLIT. The Geospatial Information Authority of Japan completed the preliminary development in FY2011, and it is currently being updated along with the Digital Japan Basic Map.

Note 3 Web maps operated by the Geospatial Information Authority of Japan (http://maps.gsi.go.jp/). More than 1,200 pieces of geospatial information have been distributed.

promoted in rivers, roads, ports, and sewage, as a response to the "e-Japan Priority Policy Program". As of April 2015, the total extent of the optical fiber controlled by the government for river and road management was about 38,000 km, and of this a portion of core cable roughly 18,000 km that does not interfere with the facilities management was opened to private sector business, and in 2015 there were new applications for additional use of about 400 km.

6 Sophisticated Water Management and Water Disaster Prevention Utilizing ICT

In light of the new developments in information technology of recent years, new technology is being applied in the field to further the sophistication of water management and water disaster prevention.

Regarding the monitoring of rivers and their basins, XRAIN (MLIT X Band MP Radar Network), which allows for the near real-time observation of local rainfall, is being harnessed for rainfall observations. For the observation of flow amounts and water levels, the introduction and practical application of new technology, such as ADCP (Acoustic Doppler Current Profiler) and image analysis based on the utilization of CCTVs and other types of images, are being promoted. In ascertaining the extent of flooding during a disaster, emergency observations were made (Figure II-10-1-3, Diagram 1) with a satellite-based SAR system (Daichi No. 2) during the heavy rains that fell in the Kanto and Tohoku regions in September 2015. The use of big data, including SNS posts and various types of locational data, is being studied.

In addition to obtaining high precision topographic data through aerial laser profiling (LP), initiatives to improve the efficiency and effectiveness of maintenance and management by utilizing the image data obtained through Mobile Mapping Systems (MMS) are being promoted.

Further crisis management is being promoted by initiatives like flood simulation and risk understanding (Figure II-10-1-3 Diagram-2) based on "Distributed Rainfall-Runoff Model", an advanced flood prediction model compared to the conventional one, that uses the information obtained through such rain volume, water level, and high precision topographic data.

Also, for sediment-related disasters caused by heavy rains and other factors, unusual conditions are always monitored through such means as a radar rain gauge that can observe the rainfall situation over a large area with a high degree of accuracy, volcano monitoring cameras, and landslide monitoring systems. Additionally, in preparation for the occurrence of a deep-seated catastrophic landslide, the development of the Deep-seated Catastrophic Landslide Monitoring and Warning System, which detects the location and scale of an occurrence at an early stage, is being promoted for rapid emergency restoration measures as well as the prevention and mitigation of damage through appropriate warnings and evacuations.

In the sewerage field, investigations to implement

Figure II-10-1-3 Example of ICT Utilized for Sophisticated Water Management and Flood Prevention

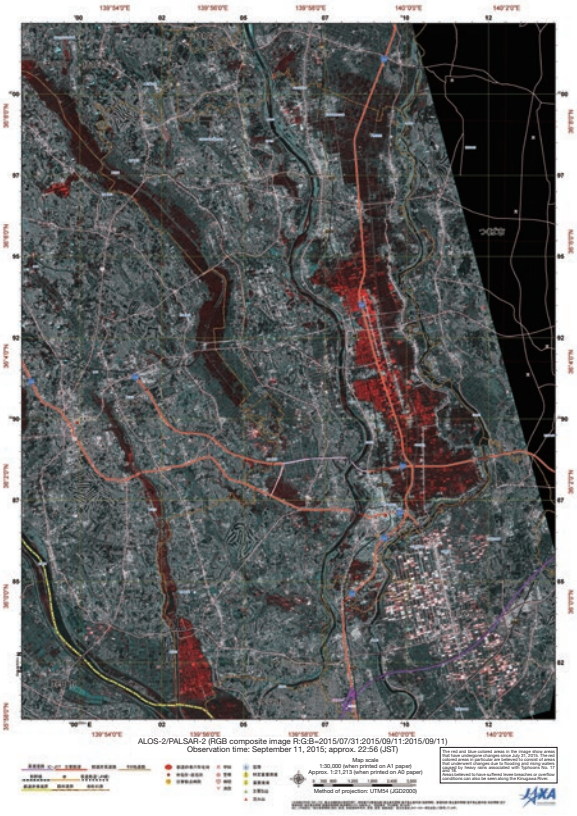


Diagram 1 Observational image captured by a SAR system during heavy rains that fell in the Kanto and Tohoku regions in September 2015 (near Joso City, Ibaraki Prefecture).

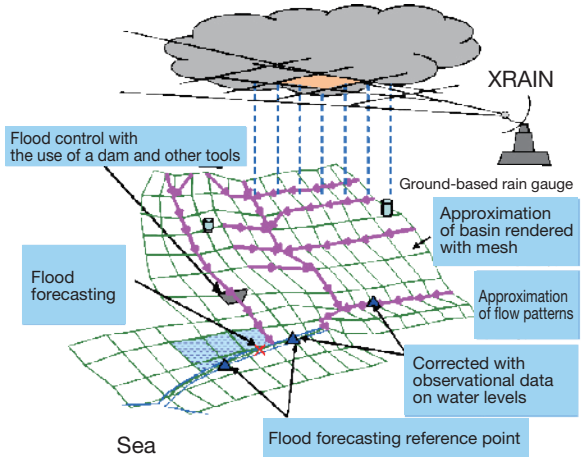


Diagram 2 Flood prediction by distributed hydrological model
Source) MLIT

improvements in terms of the sophistication and efficiency of site investigations by sensors, the efficient management of drainage through the consolidation of big data and analysis techniques, and precise facility operations based on the use of simulation technology and prediction techniques are being promoted.

7 Support for Innovations Benefitting Local Route Bus Businesses With the Use of Big Data

(1) Support for Innovations Benefitting Local Route Bus Businesses With the Use of Big Data

Thanks to a declining population, a dwindling birthrate, and an aging population, the business conditions of route bus businesses particularly in local regions are worsening and giving rise to concerns that public transportation networks will shrink and service levels will suffer further. The stabilization of the management of route bus businesses and the restructuring of sustainable local public transportation networks are pressing issues, such that management improvements by operators and plans for the reorganization of public transportation by local governments are being studied in many localities.

In response, we formulated in FY 2015 a business model for supporting innovations benefitting local route bus businesses based on the possibility of using big data and the methodology applicable to data analysis as studied through a survey on the ICT-based activation of public transportation carried out in FY 2014. Business innovations will be attempted by utilizing big data to conduct market surveys to ascertain the actual state of human mobility and the needs of residents and carry out management analyses to evaluate the state of income and expenditures tied to buses; reorganizing bus routes and schedules; planning management improvement measures; and undertaking implementation, evaluation, and review actions on an ongoing basis.

In verifying the practicability and effectiveness of a business model formulated upon implementing model projects for the city of Niigata and Niigata Kotsu Co., Ltd., which adopted BRT and reorganized their bus routes, as part of a study conducted in FY 2015, it was determined that the adoption and dissemination of this business model in different regions will be promoted based on the outcome of this process.

(2) Utilization of Automobile Related Information

In order to promote the dissemination of telematics insurance services according to the Future Vision on the Utilization of Automobile-Related Information as formulated in January 2015, verification results were shared and accident reduction effects were ascertained through the cooperation of insurance companies that have begun offering these services ahead of the rest of the industry. Verification and evaluation activities to determine whether close rates pertaining to the purchasing of pre-owned vehicles are a function of the existence of traceability data have been carried out to verify effects with a view to realizing traceability services that are based on the collection and use of vehicular history information. In this way, specific initiatives have been undertaken for the creation of new services and to promote industrial innovations through the use of automobile-related information. We will continue to study frameworks for evaluating the feasibility of introducing new services and for collecting, managing, and providing information for the purpose of realizing new services and otherwise proactively advance the development of an environment for promoting the utilizing of automobile-related information.

Section 2 Promoting the Research and Development of Technology

1 The Position of Technological Research and Development in Technology Policies and Comprehensive Promotion

In the "Japan Revitalization Strategy" as revised in 2015 (Cabinet decision, June 2015), one of the pillars of the revitalization plan for Japanese industry is the "*promotion of science, technology, and innovation*" and expectations for the role played by science, technology, and innovation are increasing as seen by the intent to vigorously promote the Comprehensive Strategy on Science, Technology, and Innovation 2015 (Cabinet decision, June 2015).

The MLIT takes into account the government's overall policy, including the Science and Technology Basic Plan, to further improve the framework for coordination between industry, academia, and government, as well as the comprehensive promotion of cross-sectoral technological research and development, in accordance with the Third Ministry of Land,

Infrastructure, Transport and Tourism Technology Basic Plan and is actively adopting the resulting outcomes in public works, the construction and transport industries, and elsewhere.

(1) Initiatives in facilities and Other Organs, Extraordinary Organs, External Bureaus, and National Research and Development Agencies

Key initiatives undertaken by facilities and other organs, extraordinary organs, external bureaus, and national research and development agencies under the jurisdiction of MLIT are as outlined in the figure. National research and development agencies selectively and efficiently conduct research according to social and administrative needs for the purpose of securing maximum results from research and development for the sound growth of our national economy through improvements in the level of science and technology in Japan and other benefits.

Figure II-10-2-1 Major Initiatives for FY2015 by Facility Organizations, Special Organizations, and External Bureaus

Organizations, etc.	Summary
Geospatial Information Authority of Japan	Operating under the auspices of the Geography and Crustal Dynamics Research Center, the Geospatial Information Authority of Japan engages in research and development activities in order to realize a society that utilizes geospatial information in an advanced manner and to contribute to disaster-prevention and environmental objectives by Development of a system to monitor slip deficit rate and forward slip on plate boundaries based on wide-area crustal movement data, engaging in research on ionospheric correction technology for the sophisticated monitoring of crustal movements based on the use of satellite-based SAR interferometry, Efficient creation method of land vulnerability information for producing earthquake hazard maps, and Improvement of orthoimage productivity by full-automated aerial triangulation.
Policy Research Institute for Land, Infrastructure, Transport and Tourism	The Policy Research Institute for Land, Infrastructure, Transport and Tourism carries out surveys and research activities for the purpose of making broad contributions to the formulation of policies in the field of national land and transportation. In FY 2015, topics of research that was carried out include the following: organizational safety management methods of transport companies; use of big data for the administration of land, infrastructure, transport, and tourism; strategic public infrastructure maintenance and renewal through integrated partnerships among various players; and method for predicting the domestic visit area distribution of foreign tourists visiting Japan.
National Institute for Land and Infrastructure Management (NILIM)	The National Institute for Land and Infrastructure Management engages in research and development work with a primary focus on research concerning the maintenance of infrastructure, an area that includes methods for diagnosing the soundness of road structures, design methods pertaining to repairs and reinforcement work, and sewage inspections and deterioration diagnostic techniques; research concerning disaster prevention, disaster mitigation, and crisis management, an area that includes high-precision methods for predicting the occurrence of sediment-related disasters through the use of real-time observation and monitoring data, river embankment technology for prolonging the period prior to collapse as much as possible, and technology for improving safety while residents flee from a tsunami striking a port or harbor; research concerning the intelligent use of methods for quantitatively assessing technologies to facilitate the more effective use of roads through the use of ETC2.0 and technologies for incorporating energy-saving design into the varied skeletal structures of homes in an area; and research concerning innovations into work procedures, such as in terms of new approaches to the execution of a project through a public-private partnership.
Meteorological Research Institute	Conducted research on understanding the phenomena of weather, climate, earthquake volcanoes, and the ocean as well as predictions to contribute to “strengthening measures for typhoons and torrential rains”, “strengthening measures for earthquake, volcano, and tsunami disasters”, and “strengthening of measures related to climate change and global environment”.
Japan Coast Guard	Conducted testing and research for equipment and materials used for Coast Guard duties, testing and research for forensic science at sea, and advancing observation technology for seafloor crustal movements.

Figure II-10-2-2 Key initiatives undertaken by national research and development agencies under the jurisdiction of MLIT in FY 2015

National research and development agency	Summary
Public Works Research Institute*	Conducted research and development to contribute to the efficient creation of quality social capital and the development of Hokkaido such as “Research on prevention, mitigation, and early recovery from more intensified and diverse natural disasters”, “Research on strategic maintenance and management of social capital stocks, and “Research on innovative technology for greener social infrastructure”.
Building Research Institute*	Conducted research and development on technologies related to housing, building, and urban planning such as “Research and development related to the promotion of low-carbon housing, building, and cities”, and “Research and development on technology to improve the safety of buildings against earthquakes, etc.”
National Traffic Safety and Environment Laboratory	Conducted test research related to the safety assurance of land transport and environment preservation, technical standards conformity assessment of automobiles, and technical evaluations related to recalls, including “Promoting the development and commercialization of next generation heavy vehicles” and “Survey on the requirement for communication between a pedestrian and a vehicle.”
National Maritime Research Institute*	Conducted research on ensuring the safety of marine transport, preservation of marine environment, marine development and advanced marine transport including, “Research for advanced analysis technology for high precision reproduction of marine accident occurrence conditions”, “Research on green evolution of ships that contribute to revolutionary technology to reduce the environmental burden”, and “Research on advancing and developing a safety evaluation method on renewable marine energy production systems”.
Port and Airport Research Institute*	Conducted research and development to contribute to the formation of a safe and secure society, the maintenance and creation of excellent environment in coastal areas, and the creation of an energetic economic society including “Research on community protection from large scale earthquake and tsunami”, “conservation and recovery of ecological system along coastal areas and CO_2 absorption, and “Environmental improvement of enclosed coastal seas”, and “Research on strategic maintenance and management of ports and harbors and airport facilities”.
Electronic Navigation Research Institute*	Implemented research and development for advancing air traffic management systems such as “Expanding the capacity of airways”, “Expanding the processing capacity of congested airports”, and “Safety and technology that connects air and land”.

*National research and development agency

(2) Initiatives of Regional Development Bureaus

Technical and Engineering Offices as well as Port and Airport Technology Investigation Offices coordinate with relevant offices in their jurisdiction for tests and research of civil works material and water quality, hydraulic tests and design for the effective and efficient development of facilities, development of environmental monitoring systems, and other matters for technology development, as well as the utilization and promotion of new technology tailored to the region.

(3) Promoting research and development technologies of construction, traffic and transportation fields

Of the important research issues concerning construction technology, issues that are especially urgent and involve a wide range of fields are taken up with the governmental departments taking the lead with the coordination of industry, academia and government to comprehensively and organizationally implement research for the "comprehensive technology development projects" where in FY2015, research and development was conducted for a total of five issues including the "Development of function continuity technology for the disaster site buildings."

Also, for the traffic and transportation fields, technological research and development that contributes to ensuring safety, improving convenience, and protecting the environment are being promoted efficiently and effectively with the coordination of industry, academia and government. In FY 2015, we engaged in the development of technology that could be used for upgrading public transportation systems utilizing high-precision positioning technology.

(4) Supporting Private Sector Technological Research and Development

To promote private sector investments in research and development, support is given through preferential tax measures for experimental and research expenses.

(5) Promoting Open-Type Research and Development

In order to promote technological innovation in the construction sector, an open call for the development of technologies to solve policy issues (targeted commercialization in two to three years) was made through the Construction Technology Research and Development Subsidy Program, which invites proposals concerning technological research and development to help upgrade and enhance the international competitiveness of construction technology under the purview of MLIT and further promote research and development carried out by MLIT. In FY 2015, nine new issues and six ongoing issues were adopted.

In FY 2015, an open call for research issues on five research themes—including anti-aging measures of disaster prevention and mitigation measures, and appropriate maintenance and renewal of transport infrastructure—was made through the Transportation Technology Development Promotion System, which selectively carries out at a national governmental level basic research truly needed for resolving policy issues identified in the MLIT basic plan on technology. Three new issues and six ongoing issues were accordingly adopted.

2 Promoting the Utilization and Adoption of New Technology for Public Works

(1) New Technology Utilization System for Public Works

In order to actively utilize promising new technology developed by private sector businesses, a "new technology utilization system for public works" that utilizes the New Technology Information System (NETIS) is under operation. Up to now, there were 23 recommended technologies and 53 runner-up recommended technologies chosen as innovative new technologies that will further raise the level of technology concerning public works. Also, to promote efficiency of maintenance and management in the field, for the adoption of new technology in the field and the promotion of further technological development, NETIS is leveraged to set technical themes to use and evaluate the submitted technologies in the field.

(2) Supporting the Utilization of New Technology

In order to promote the utilization of new technology in public works and other areas, utilization is evaluated at every design stage, and technology that provides great utilization benefits are designated by the ordering party when construction is contracted. With respect to new technologies whose use is being proactively considered by ordering offices, a provisional

unit price that helps with streamlining the contracting process was created for seven technologies from FY 2012 to FY 2015.

Section 3 Improving Construction Management Technology

1 Improving Costing Technology for Public Works

For the purpose of ensuring the transparency of public works, various price data standards are made public. In FY 2015, i-Construction, a method of improving productivity by incorporating ICT into studies, surveys, design functions, construction work, inspections, maintenance functions, and updating processes, was promoted and new estimation standards for ICT construction were enacted.

In addition to the promotion of i-Construction, estimation standards have been revised to facilitate the realization of attractive construction sites made possible by increasing the productivity of all construction site processes through the reinforcement of standards based on the cultivation of the maintenance sector, to be achieved in part by reviewing new bridge preservation work and methods of estimating maintenance work costs, and on amendments to laws on the verification of quality, to be achieved in part by reviewing enhancements to major metropolitan correction functions and the approach to the posting of accounts taken by transportation guidance and security personnel.

In addition, the standard percentages for civil engineering work were revised. In FY 2015, an expansion of construction categories subject to percentages for maintenance and repairs and corresponding percentage revisions as well as percentage revisions reflecting improvements in construction efficiency based on the latest in construction conditions were carried out to accommodate the aging of societal infrastructure.

Also, for construction machinery depreciation costs, field studies were carried out for the construction machinery owned by the contractors and the base value, maintenance and management costs, and operation costs were assessed and revisions are being implemented.

2 CIM and BIM Initiatives

Construction Information Modeling/Management (CIM) endeavors to seamlessly connect processes at all stages by linking and developing three-dimensional models from the survey, planning, and design stages to the construction and maintenance management stages and promoting the sharing of information among concerned parties involved in the entire project. With trial operations having begun in FY 2012, studies on adopting and promoting CIM were carried out in FY 2015 in both systemic and technical terms through collaborative efforts on the part of industrial, academic, and governmental players.

Since FY 2010, the adoption of Building Information Modeling (BIM) to help visualize design content and integrate and consolidate building information has been subject to trial operations to verify the effect of the adoption of BIM and any issues that might consequently arise. In addition, Guidelines on the Development and Use of BIM Models in Government Building Projects, which outline the basic principles and considerations to be taken into account when using BIM for government building projects, were compiled in March 2014. Since FY 2014, a track record of cases involving BIM introduction to which the guidelines were applied has been maintained.

Section 4 Technology Development for Construction Machinery and Mechanical Equipment

(1) Development and Supply of Construction Machinery

In order to carry out the appropriate maintenance and management of rivers and roads managed by the national government and respond quickly to disaster recovery, initiatives are being carried out across the nation to implement machinery for maintenance and management, as well as machinery for disaster measures. In FY 2015, an extra forty-one machines were added and 279 aging machines were updated.

Furthermore, in order to improve efficiency, conservation of labor, and safety of construction associated flood control projects and road development projects, studies as well as research and development for construction machinery and construction processes are being undertaken.

(2) Streamlining and Improving the Reliability of the Maintenance and Management of Machinery

For the protection of citizens' lives and properties from disasters, the construction of floodgate facilities, storage and drainage pump facilities, and road drainage facilities were furthered, starting around late 1965, and many of the facilities are becoming decrepit. As such mechanical equipment is required to function reliably during floods, the Technical Standards Applicable to Dams and Flood Gates Facilities (Draft) was revised and the Procedures for Inspecting and Developing River Gates and River Pump Systems (Draft) were newly formulated.

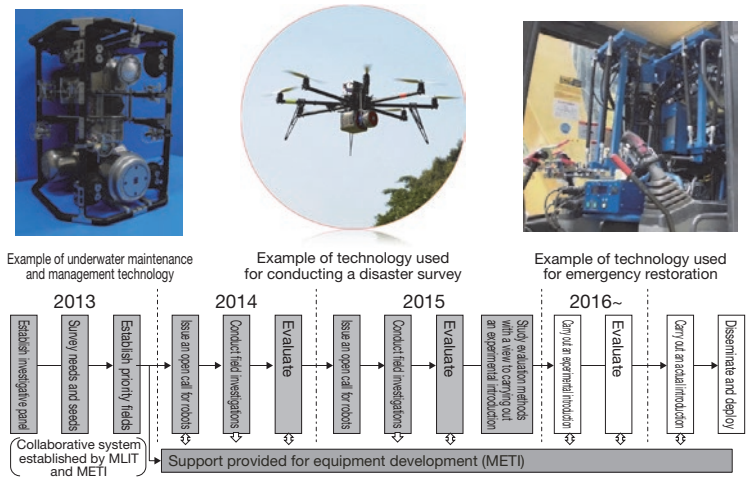
(3) Utilizing the Accomplishments of Construction Technology Development

In order to safely and swiftly carry out restoration activity at disaster sites where the danger of secondary disasters such as large-scale floods, sediment-related disasters, and slope collapses are high, a hydraulic shovel that can be remotely controlled, dismantled, and airlifted was developed. Eleven units have been deployed nationwide and shovels have been dispatched for disaster-recovery efforts.

(4) Promotion of Development and Introduction of Robots for the Next Generation Social Infrastructure

The social infrastructure of Japan is facing problems such as progression of aging, rise in the disaster risks of earthquake, storm and flood damage. Therefore, for the "5 emphasis fields" (Maintenance and management: Bridge, Tunnel, and Water; Disaster Response: Investigation and Emergency Restoration) that require the development and introduction of robots, initiatives are underway for the maintenance and management of the social infrastructure and improvement of effect and efficiency during disaster, by planning for the development and introduction of highly useful robots. In FY 2015, we made a public appeal to private companies and universities for robots capable of addressing our five priority fields with a view to their experimental introduction beginning in the next fiscal year. Testing and evaluations at sites under our direct authority were conducted for eighty submitted technologies under the supervision of the Committee for Field Investigations on Next-Generation Social-Infrastructure Robots, and the results of this process were subsequently released to the public.

Figure II-10-4-1 Promotion of Robot Development and Introduction for Next Generation Social Infrastructure



Source) MLIT