Chapter 6

ICT Policy Directions

Section 1   Comprehensive Strategy Promotions

1. Promotion of National Strategy

The Basic Act on the Advancement of Public and Private Sector Data Utilization was promulgated and put into effect in December 2016 for the purpose of allowing the national government to comprehensively and efficiently develop an environment for the better utilization of public and private sector data. In response to this, the Cabinet decided at its meeting in May 2017 the "Declaration to be the World's Most Advanced IT Nation Basic Plan for the Advancement of Public and Private Sector Data Utilization" from the perspective of taking world leadership in creating a model of a Society Fully Utiliz-ing Public and Private Sector Data where people can enjoy true affluence.

In order to lead the realization of the growth strategy to make the Japanese economy strong again by the overcoming strong yen and deflation, toward redevelopment of the Japanese economy, the Future Investment Conference has been held under the Headquarters of Japan's Economic Revitalization since September 2016. Based on the discussions there, the Cabinet decided 'Growth Strategy 2017' in June 2017.

2. Promotion of MIC's ICT Comprehensive Strategy

(1) Promotion of Introduction of ICT in the Entire Society in View of 2020

Envisaging sustainable growth after the 2020 Tokyo Olympic and Paralympics Games, MIC has been deliberating the establishment and implementation of an Action Plan at its Conference on the Promotion of Introduction of ICT in the Entire Society in View of 2020. The Action Plan specifies goals, detailed content and schedules for each sector, including the development of a free Wi-Fi environment, sophistication of multilingual voice-based translation systems to eliminate the "language barrier," overseas distribution of broadcast content to communicate the attractive points of Japan, promotion of the use of 4K/8K and digital signage, realization of the 5G mobile communication system, utilization of open data, and cyber security measures.

(2) New Information Communication Policy toward Creation of Society 5.0

MIC consulted the Information and Communications Council concerning the "New Information and Communications Policy *to* IoT/ Big Data Era" in September 2015. The ministry developed the "IoT Comprehensive Strategy" organizing concrete measures to be taken roughly by 2020 and has promoted the measures.

In addition, MIC set up the Board for Making the Future of the IoT New Era in September 2017 to discuss visions of new information communication policies with the view toward the period ranging roughly from 2030 to 2040 when challenges accompanying Japan's structural change are expected to become more apparent. The committee created a concrete picture of the future in the 2030s and discussed the goals to be achieved. Then the committee discussed ways to achieve the goals, which include: improvement of the competitiveness of the ICT industry; sustainable development of the economy and local communities; education to develop human resources needed in the future, and support for ICT utilization by the elderly and people with disabilities. In June 2018 the committee compiled the "Grab the future by TECH Strategy" as a plan to execute reform through aggressive ICT introduction.

Specifically, recognizing the need for a change of thinking of the entire society of Japan in order to implement the reform, the committee came up with eight points to promote reform under the concept of Move Fast.

-Moonshot: Set a desirable future and formulate measures to realize it.

-Opportunity: Create a social climate to seize budding opportunities with flexible and ready approaches.

-Value: Shift evaluation criteria from volume to quality to reflect the values of a mature country

-Economics: Improve productivity and increase income, while vigorously stimulating demand at home and abroad

-Focus: Place emphasis on sustainability and stop waste through selection and concentration.

-Aggressive: aggressively introduce ICT in every field in the era of population decline and aging

-Superdiversity: Change standardizations based on age groups, etc. and create systems for active participa-

tion by everyone based on his/her desire.

-Trust: Build trust by establishing controllability, social ethics, avoidance of misuse of advancing technologies

Based on the above, the committee looks to the future it wishes to realize in 2030s from the perspectives of human cultivation, community building and industry development, while depicting concrete life scenes as shown below. Then it proposes a policy package through back casting:

-Inclusive: Inclusive society where everyone can enjoy rich lives with diverse values and lifestyles regardless of age, gender, disabilities, nationality, income, etc.

-Connected: Create a connected society to maintain connected communities with declining population and create new ties through downsizing by concentrating and utilizing regional resources and networking that enables remote use.

-Transform: Create a "transformation society" that develops through adaption to technology innovations and changes in the market environment with the approach of flexibility and readiness assuming design changes

(3) Promotion of Information and Communications Policy in Public-Private Collaboration

In October 2015, 'the IoT Acceleration Consortium' was established with the aim of building a system for promoting the development and demonstration of technologies and the creation of new business models to facilitate IoT use in government-industry-academia collaboration amid global changes in industrial structures being brought about by the advancement of IoT, big data and AI, etc. Through the consortium, public, private and academia partners collaborate to promote technology development, demonstration and standardization concerning IoT, compile recommendations on regulatory reforms necessary for creation and implementation of various IoT projects, study guidelines concerning security of IoT devices and discuss challenges in the fields with high needs for data distribution, etc.

(4) Promotion of IoT Use and Data Utilization
A. Promotion of IoT Use
(A) Project to Support Creation of IoT Services (Familiar IoT-related Project)

In accordance with the aforementioned interim reports (the first to fourth versions), the "New Information and Communications Policy in View of the IoT and Big Data Era" compiled by the Information and Communications Council, MIC has been striving to promote data utilization through developing rules based on regional experiments on IoT services. Specifically, the respective responsible entities consisting of local governments, universities, and user companies carry out empirical projects on leading IoT services in sectors closely related to everyday life, such as agriculture, forestry, fisheries, medical care, welfare and the sharing economy, to create reference models for solving problems in communities, and clarify rules necessary for promoting data utilization.

(B) Taskforce to Promote Regional IoT Implementation

Ahead of full-scale commercialization of IoT or other technologies, MIC started to hold 'the Taskforce to Promote Regional IoT Implementation' in September 2016 to disseminate the outcomes of past experiments throughout Japan. The Taskforce compiled and publicized the "Road Map to Promote Regional IoT Implementation (revised in May 2017 and April 2018)" and the "Primary Proposal for Achievement of Roadmap" in December 2016 and the revised the Secondary Proposal in May 2017.

B. Development of Environment for Open Data Distribution

Since FY2012, MIC has been advancing efforts such as preparation and revision of guidelines for disclosure and utilization of open data (standardization for open data), construction of use cases leading to effective utilization of open data, and promotion of introduction of open data by local governments in cooperation with open data evangelists and regional informatization advisors through demonstration tests for open data utilization in various sectors, including public transportation systems, grounds, and public facilities, and through collaboration with 'Vitalizing Local Economy Organization by Open Data & Big Data (VLED)' and other relevant entities and ministries

C. Promotion of AI Networking

MIC set up 'the Conference toward AI Network Society' in October 2016. The conference compiled and published "Draft AI R&D Guidelines for International Discussions" organizing items of attention in AI development and "Report 2017," consisting of assessment of impact and risks assuming specific use cases of AI systems (Scenario analysis.)

The conference is studying the prospect of ecosystems that will be formed with the progress of AI networking (formation of networks with other AI, information systems, etc. through the Internet) and items of attention in utilization of AI. Based on the past studies, the conference is planning to compile the "Report 2018" including "Draft AI Utilization Principles" in July 2018.

(5) Promotion of Utilization of Individual Number Cards

Individual number cards ensure not only identity verification based on the information on the card (name, address, birth date, gender, individual number and a face photo of the person) but also safe and ensured online identity verification/personal authentication using the public personal authentication service mounted on the card. In order to improve the convenience of public/private services in various scenes of everyday life, MIC is advancing efforts to promote utilization of individual number cards by the national and local governments and in the private sector.

At the "Roundtable Meeting on Desirable Promotion of Utilization of Individual Number Card, Public Personal Authentication Services, etc." hosted by the Minister of Internal Affairs and Communications, experts, local governments and business communities are studying

methods for utilization of individual number cards, expansion of the range of use and diversification of access means to the public personal authentication service.

Section 2   Developments in Telecommunications Policy

1. Promotion of Fair Competition

(1) Smooth Transition of the Fixed-line Telephone Networks to IP Networks

In light of the decline in the number of subscribed telephones and the end of the useful lives of PSTN switchboards around 2025, NTT announced its vision to migrate the public switched telephone networks (PSTN) of NTT East and West to IP networks in November 2015.

In this context, MIC consulted with the Information and Communications Council regarding the ideal smooth transition of the fixed-line telephone network in February 2016 to study IP networks after the transition and models of the transition. In response, Telecommunications Policy Committee and the Board for Smooth Migration of Telephone Networks of the Council conducted vigorous survey and deliberation for one and a half years and compiled the first report "Ideal IP Network after the Transition" in March 2017, which was followed by the second report "Model of Smooth Transition toward Final Form" in September of the same year.

The second report clarified the transition process and schedule for smooth transition to IP networks and also showed the direction of responses to individual challenges in light of the efforts made based on the first report.

The transition to IP networks requires examination from two aspects of "service transition" including contract change by users and "equipment transition" including response to the network by businesses. In the study of the transition process and schedule at the Board for Smooth Migration of Telephone Networks of the Council, the focus was on "service transition" that is directly linked to use of the services and influence users, while ensuring that "equipment transition" would not affect "service transition" in light of the state of consultation by the businesses.

MIC found it appropriate to begin development of systems necessary to ensure smooth transition of the fixed-line telephone networks to IP networks in light of the following:

-Service transition: because preparation and initiatives for transition to metal IP telephones will be fully in progress by 2021 at the latest, it is necessary for government to check initiatives involved in abolition/transition and introduce rules for their sorting and publication beforehand.

-Equipment transition: it is necessary to develop (i) technical standards, etc. compatible with IP-IP connection that will start in 2021, and; (ii) systems to ensure proper management and use of telecommunications numbers in response to the system of number controls for sending and receiving IP-IP connection (number solution based on the ENUM method, etc.)

Responding to the reports, MIC introduced into the Diet the "Bill for partial amendment of the Telecommunications Business Act and the Act on the National Institute of Information and Communications Technology, National Research and Development Agency" which include "protection of users concerning suspension or discontinuation of telecommunications businesses" and "efficient use and proper management of telecommunications numbers" in March of this year. The amended bill was promulgated in May of the same year.

(2) Promotion of Mobile Services

MIC requested major mobile operators to reduce user charges for smartphones and established the Guidelines on Appropriate Bonus for Smartphone Purchase. In 2017, the ministry established the Guidelines on Mobile Service Conditions and Terminals toward shortening the period required for unlocking SIM codes and improving sales practices of smartphones

Since December 2017 the Commission to review fair competition in the mobile market conducted a study toward further promotion of fair competition, etc. Based on the report of the commission MIC will continue to promote fair competition among businesses including MVNOs in the mobile market to ensure improvement of user benefits through provision of diverse services meeting user needs and lowering of charges.

(3) Ensuring Fair Competitive Terms in the Era of IP Networks

In March 2017 MIC started to hold meetings of the Study Group on Calculation of Interconnection Charges. The group studied calculation methods of interconnection charges of NGN, subscription optical fiber, etc. and their collocation, facilitation of interconnection charge negotiation and other matters and compiled the first report in September of the same year.

Later from October 2017 to June 2018 MIC held meetings of the group for follow-up and other purposes. In February the ministry revised a part of the Ordinance for Enforcement of the Telecommunications Business Act by reviewing the provisions of the scope of Category I designated telecommunications facilities, connection functions (unbundling functions), and the matters to be stated in connection contracts.

(4) Functions of the Telecommunications Dispute Settlement Commission

The Telecommunications Dispute Settlement Commission is a specialized organization established for the purpose of quickly and fairly handling increasingly diverse conflicts in the telecom field. The Commission has three functions: (i) performing mediation and arbitra-

tion to resolve conflicts between carriers and other businesses; (ii) deliberating and releasing reports in response to consultations from the Minister for Internal Affairs and Communications, who intends to issue an order or ruling; and (3) giving recommendations to the

Minister for Internal Affairs and Communications regarding improvements to competition rules or other matters as part of its mediation, arbitration, and consultation responses.

2. Development of a Safe and Secure Environment for Use of Telecommunications Services

(1) Promotion of Measures for Consumer Support

In order to ensure proper implementation of consumer protection rules and a viable system, MIC formulated the Basic Policy for Supervision of User Protection Discipline of Telecommunication Businesses. To this purpose, MIC also holds the Regular Meeting to Monitor Implementation Status of Consumer Protection Rules, with participation of experts and relevant trade associations to share and assess the status.

(2) Proper Handling of User Information

MIC investigated issues surrounding the widespread use of privacy policies and the promotion of a system for third parties to verify operational and technology aspects of apps. From FY2014 to FY2016, MIC carried out tests prior to constructing a third-party verification system. The results were compiled and published as the Smartphone Privacy Outlook (SPO) IV in July 2017. The Smartphone Privacy Initiative (SPI) III that is a guideline for handling user information was also formulated and published.

Section 3   Developments in Radio Policy

1. Promoting Effective Radio Spectrum Use

(1) Studies on How to Encourage Effective Radio Spectrum Use

With the aim of clarifying the future vision of radio spectrum use to respond to future population decline/aging and other changes in the social structure as well as measures to realize the vision, MIC has been holding 'the Roundtable Meeting on Effective Use of Radio and Growth Strategy' since November 2017. The roundtable is mainly studying (i) measures to promote effective use of frequencies for public use; (ii) future vision of use of radio and measures for its realization, and; (iii) measures for effective use of radio waves in the future.

(2) Promotion of Overseas Deployment of Radio Systems

With the aim of promoting strategic efforts in public-private collaboration for global deployment of Japan's radio systems with focus on Asian countries, MIC has been holding the Council for the Promotion of Overseas Expansion of Radio Systems since January 2017. Specifically, the council is studying (i) strategic goals for promotion of overseas deployment; (ii) public-private cooperation to achieve the goals, and; (iii) practical action plans for promotion of overseas deployment.

2. Radio Usage Advancement and Diversification Initiatives

(1) Efforts toward Realization of 5G

Recently 5G is expected worldwide to become the next mobile communication system following 4G. In addition to ultra-high speed communication developed by 3G and 4G, 5G will enable "multiple concurrent connections" to simultaneously connect a large number of devices and "ultra-low latency" for smooth operation of robots, etc. in remote areas. Through these developments, mobile phones will evolve from tools of communication between people into infrastructure of IoT society where everything is connected to the Internet and mutually controlled. For example, the technology is expected to be used for self-driving, full automation of factories and construction sites and telemedicine, which will contribute to improvement of the productivity of the entire society.

Toward realization of 5G by 2020, MIC is promoting (i) R&D and comprehensive demonstration experiments, (ii) enhancement of international collaboration/

cooperation, and (iii) specification of frequencies for 5G and technical requirements.

Specifically, MIC has been working on R&D of element technologies essential for realization of 5G since FY2015. In FY2017, the ministry started to construct a test environment assuming actual use and has been conducting comprehensive demonstration tests of 5G with participants from various utilization fields toward creation of new markets.

MIC is also actively contributing to 5G standardization activities at the International Telecommunication Union (ITU) and making efforts to strengthen international cooperation with Western and Asian countries based on the recognition that 5G will become universal economic/social infrastructure.

Furthermore, in order to swiftly secure frequencies for 5G, the Information and Communication Council is studying approaches to securing of 5G frequencies, sharing of frequencies with existing radio systems, for-

mulation of technical requirements of 5G and other matters in the light of the international trends.

(2) Promoting Intelligent Transport Systems

To realize the safe and convenient movement of people and goods, MIC is pursuing initiatives to reduce traffic accidents and resolve traffic congestion with Intelligent Transport Systems (ITS).

With the spread and development of connected cars that are connected to a network, the arrival of a connected car society is expected in which everybody can freely enjoy safe and convenient mobility services. Toward creation of safe and secure connected car society in which new values and businesses will be created, MIC had held meetings of 'the Study Group Focusing on Creation

of Connected Car Society' since December 2016 to study a new social image brought about by connected cars utilizing wireless communication networks and measures to promote related initiatives. The result was compiled in August 2017.

(3) R&D toward Realization of Autonomous Mobility Systems

Toward realization of autonomous mobility systems that enable safe, secure and high-confidence and accuracy self driving, MIC is conducting R&D to establish technologies to enable real-time exchange of a large variety and amount of information by a huge number of moving bodies (powered wheelchairs, autonomous robots, etc.) and technologies to make the best use of limited radio wave resources.

3. Establishing Radio Usage Environments

(1) Promoting Measures to Counter Bioelectromagnetic Environmental Issues

MIC promotes initiatives to establish environments where radio waves can be used safely and securely. With regard to the impact of radio waves on humans, MIC has set up radio protection guidelines and safety standards on the strength of radio waves in the Radio Regulations. MIC has ensured these standards are equivalent to international guidelines.

In light of the trends of wireless system development and international organizations in recent years, MIC has been holding 'the Committee to Study Research Strategies Concerning the Bioelectromagnetic Environment' since January 2018. The committee analyzed the trend of research on bioelectromagnetic environment for the past 20 years or so, discussed the direction and roadmap of medium- to long-term studies on the safety of radio waves up to around 2040. The first report was compiled in June 2018.

(2) Promoting Measures to Counter Electromagnetic Interference

With the growth in all kinds of electrical and electronic devices, it is increasingly important to take measures to protect wireless applications from unnecessary radio waves emitted by these electrical and electronic devices. 'The Radio Wave Utilization Environment Committee', established under 'the Information and Communications Technology Subcommittee' at 'the Information and Communications Council', surveys and studies measures to counter electromagnetic interference and contributes to debates on international standards at CISPR (Comité International Spécial des Perturbations Radioélectriques). Receiving a report from the Information and Communications Council, MIC has promoted related standardization in Japan and made efforts to eliminate and prevent interference by unnecessary radio waves to wireless facilities and electrical and electronic devices.

Section 4 Developments in Broadcasting Policy

1. Encouraging Distribution of Broadcast Content

Encouraging Overseas Expansion of Broadcast Content

With a broad range of participating stakeholders, including broadcasters, rights organizations, trading companies, and ad agencies, the Broadcast Program Export Association of Japan (BEAJ) was established in August 2013 as a joint public-private cross-industry organization that supports the overseas expansion of Japanese broad-

cast content. MIC works closely with BEAJ and relevant ministries and agencies to continuously support initiatives wherein Japanese and foreign broadcasters jointly produce broadcast content to communicate the appeals of Japan and broadcast such content in foreign countries.

2. Advancements in Broadcast Services

(1) Promotion of 4K/8K

At present, MIC is promoting 4K/8K broadcast services as part of its initiatives for sophisticating broadcasting. 4K is four times and 8K is 16 times the current high definition in terms of pixels. 4K/8K broadcasting provides viewers with realistic ultra-high-definition 3D images. In addition, the introduction of High Dynamic

Range (HDR) imaging technology to expand luminance expression enables more natural expressions of scenes with large luminance difference that cause blown out highlights and blocked up shadows.

4K/8K is used not only in broadcasting but also in medical care, crime prevention, art, and other fields as a means for problem solving. Its economic effect is esti-

mated to reach 36 trillion yen by 2020 through vitalization of image-related markets and strengthening of the international competitiveness of related industries. In this way it is expected to contribute to Japan's economic growth.

MIC started to hold '4K/8K Roadmap Follow-up Meetings' in February 2014. The second interim report compiled in July 2015 took a view of the future of 4K/8K and revised the 4K/8K Roadmap, including extension of the target period to about 2025.

Toward the launch of practical 4K/8K broadcasting business through BS/east longitude 110 degree CS (new 4K/8K satellite broadcasting) in accordance with the roadmap, MIC developed systems for authorization of broadcasting businesses in fiscal 2016. In January 2017, the ministry authorized 19 programs of 11 companies including NHK and private key stations who plan to launch practical broadcasting through BS/east longitude 110 degree CS on December 1, 2018 or later. MIC also created a subsidy system to support study of the technical requirements of satellite broadcast reception equipment and 4K/8K broadcasting program relaying apparatus as well as the shift to optical transmission lines.

From 2015 to now, practical 4K broadcasting has been launched in CS (some CS broadcasting using communications satellite), cable television and others in accordance with the roadmap. Especially cable television started practical service of 4K-VOD (Video On Demand) in May 2015, and Cable 4K, a practical 4K broadcasting in December of the same year. Cable 4K is a community

channel that is the first 4K broadcasting of nationally unified program scheduling in the cable television industry.

BS started 4K/8K test broadcasting in 2016. The 8K test broadcasting was the first attempt in the world. In April 2017 the 4K test broadcasting through BS/east longitude 110 degree CS left rotation started first in Japan.

MIC will continue to actively promote 4K/8K in cooperation with related organizations and businesses so that many people can enjoy dynamic and vibrant images by 2020 when the Tokyo Olympic and Paralympic Games will be held.

(2) Advancement of Broadcasting Service

The environment surrounding cable television is undergoing a great change including 4K/8K and video distribution service in recent years. In this context, with the aim of studying the future image for cable television to continue to play in its public roles, MIC has been holding the Cable Television Working Group under the Separate Meeting on Securing of Information Distribution in Communities, Commission to Study Challenges Surrounding Broadcasting, since November 2016. In May 2017, the result of the study by the working group was compiled as the report "Cable Vision 2020+." Based on the report, MIC is subsidizing introduction of optical cables to cable television networks (program to promote introduction of optical cables in cable television networks) with the aim of improving disaster resistance of cable TV networks and ensuring a 4K/8K transmit-receive environment.

3. Various Issues concerning Broadcasting Policy

MIC consulted with the Information and Communications Council regarding the measures for promoting production and distribution of broadcast content in response to changes in the viewing environment in October 2016. The aim is comprehensive study of the (i) direction of sophistication of broadcasting services in utilization of broadband; (ii) broadcasting and communication infrastructure to support sophistication of broadcasting services, and: (iii) ways to ensure proper and smooth production and distribution of broadcast content. The interim report in July 2017 includes: study of a

distribution system to provide disaster and other information, and estimation of communication demand through demonstration projects by multiple broadcasters in order to create an environment to facilitate simultaneous distribution by a large number of broadcasters including local broadcasters, and: in promotion of fair transaction of broadcast content, the guidelines on fair production and transaction of broadcast content covers satellite broadcasters and cable operators in addition to terrestrial television broadcasters in order to reflect the status of transactions.

Section 5   Promoting Cybersecurity Policy

1. Examinations of Execution Plans for Cybersecurity Measures

(1) Efforts by the Government

The Cybersecurity Strategic Headquarters was established under the Cabinet to lead the cybersecurity policy of the government in January 2015 based on the Basic Act on Cybersecurity that was enacted in the previous year. The headquarters based on legal grounds will promote unified and cross-sectoral information security measures in the public and private sectors.

Based on the study at the headquarters, a new Cyber-

security Strategy was decided by the Cabinet in September of the same year.

In July 2017, the current cybersecurity strategy was reviewed in light of the latest trends of threats. The result was compiled as "Cybersecurity in 2020 and After – Interim review of Cybersecurity Strategy" (decision by the Cybersecurity Strategic Headquarters).

(2) Efforts by MIC (Cybersecurity Task Force)

Today the Internet has become the infrastructure of every aspect of people's lives and socioeconomic activities, but frequent cyber attacks at home and abroad in recent years have had a big impact on people's lives and socioeconomic activities.

In light of this situation, MIC's Cybersecurity Task Force consisting of security experts formulated the Comprehensive Measures for IoT Security by sorting challenges to be addressed toward comprehensive promotion of IoT security measures in October 2017. The task force suggests the need for measures to address vulnerability of IoT devices over their life cycle (design/production, sales, installation, operation/maintenance and use stages) and development of a system for implementation of vulnerability survey.

Public wireless LAN is becoming widely available for the purpose of tourism and disaster prevention toward the 2020 Tokyo Olympic and Paralympic Games. In this context, the Separate Meeting on Public Wireless LAN Security set up under the Cybersecurity Task Force started study on security measures for public wireless LAN and measures to spread public wireless LAN services taking security into consideration, while considering the balance of convenience and safety in November 2017. In March 2018, the Separate Meeting compiled a report and formulated and published the "Action Plan toward Secure Public Wireless LAN Environment."

Some private companies are strengthening measures against increasingly complicated and sophisticated cyber attacks. For further promotion of these initiatives, it is necessary to build a system where companies with security measures are recognized by third parties including the market. To this purpose, the "Separate Meeting on Information Disclosure" was set up under the task force in December 2017. The meeting sorted challenges for disclosure of information of security measures by private companies and studied measures necessary for dissemination of such efforts, while stressing that they are voluntary. Based on the study at the Separate Meeting, the "Report of the Separate Meeting on Information Disclosure" was published in June 2018.

2. Strengthening Cybersecurity Policy

(1) Efforts for organizations

In FY2013, MIC started to run CYDER (CYber Defense Exercise with Recurrence), a hands-on cyber defense exercise to improve cyber attack response skills through experience of a series of responses to incidents caused by cyber attacks while operating actual equipment in a large-scale virtual LAN environment simulating the actual network of the organization.

(2) Initiatives for Individuals

MIC, in partnership with internet service providers (ISPs) and security vendors, has been involved with the ACTIVE (Advanced Cyber Threats response InitiatiVE) since FY2013. ACTIVE is a joint public-private project that prevents and eradicates internet users' malware infections. Since fiscal 2018, the ministry has been implementing the initiative at ICT-ISAC.

(3) Initiatives pertaining to IoT

With the progress of IoT as social infrastructure, there is a concern about IoT devices being vulnerable to cyber attacks. MIC introduced into the Diet the "Bill for partial amendment of the Telecommunications Business Act and the *Act* on the National Institute of Information and Communications Technology, Independent Administrative Agency" in March 2018. The amendments include adding the investigation of IoT devices with defective password settings to NICT operations, and third-party organizations being enabled to gather, analyze and verify information concerning command servers and share the information with telecommunication carriers. The amended acts were promulgated in May of the same year.

Section 6   Promoting ICT Use and Application

1. Promoting ICT Application in the Education, Medicine and Other Fields

(1) Promoting ICT Use and Application in the Education Field

MIC in cooperation with the MEXT has been implementing the Smart School Platform Demonstration Project since FY2017. Specifically, the project includes promotion of the cloud and safe, effective and efficient information sharing between the school affairs system used by teaching staff and the teaching/learning system that is also used by students to enable improvement of teachers' work efficiency, and adaptive educational and student guidance by utilizing the data of the two systems.

(2) Promoting ICT Use and Application in the Medical, Nursing, and Health Fields

a. Sharing and Utilization of Information through Networking in the Medical and Other Fields

MIC has advanced dissemination and expansion of the inexpensive Electronic Health Record (EHR) model using cloud technology. For further promotion of networking using ICT in the medical, nursing and health fields, the ministry is also implementing demonstration projects toward solution of technical challenges facing rulemaking for online medical care and cooperation between medical institutions and nursing homes.

b. Utilization of Medical Data

MIC has been carrying out the "Project for Promotion of Study of Health Guidance Systems Using AI" by the Japan Agency for Medical Research and Development (AMED) for three years starting from FY2017. The project collects medical checkups, receipts, cases, evidence and other data accumulated in local governments and analyzes them using artificial intelligence (AI) in order to respond to challenges facing communities and individuals and propose appropriate health guidance measures.

c. Application of 8K and Other High-definition Imaging Technologies to the Medical Field

As research projects by AMED, MIC is developing endoscopes (hard mirror) taking advantage of 8K technology for three years from FY2016 and diagnosis support system using AI for three years from FY2017. The ministry aims to further advance medical care through these efforts.

2. Promoting Teleworking

Teleworking enables, through the use of ICT, flexible working arrangements that make better use of time and location. Teleworking can realize flexible working styles suited to the life stage and lifestyle of every citizen, including families with small children, senior citizens and persons with disabilities. It can be an ace in the hole of working-style reform. MIC is carrying out various measures to address challenges in introduction of teleworking.

(1) Telework Security Guidelines

MIC has formulated and published "Telework Security Guidelines" to help private corporations wipe out anxieties about information security in implementing teleworking and introduce and utilize teleworking with security. In FY2017 the ministry revised the guidelines and published "Telework Security Guidelines 4th Version" in the light of the recent social and technology changes (e.g. spread of cloud service and SNS) and new security threats (e.g. vulnerability of wireless LAN, appearance of ransomware and targeted attacks.)

(2) Network of Companies Promoting Telework

MIC in cooperation with the MHLW set up "Network of Companies Promoting Telework" participated in by companies with achievements including improvement of productivity and work-life balance through introduction of teleworking in November 2016. Participating companies share their schemes and knowhow and provide specific advice to companies planning to introduce teleworking.

(3) 100 Pioneers in Teleworking and MIC Minister Commendation

Since FY2015 MIC has been selecting "Pioneers in Teleworking" from among corporations introducing and utilizing telework. Proven pioneers are named publicly as "100 Pioneers in Teleworking." In FY2016 the ministry established the "100 Pioneers in Teleworking – MIC Minster Commendation" to commend outstanding initiatives among "100 Pioneers in Teleworking."

(4) Telework Day – a National Movement Project toward 2020

MIC, MHLW, METI, MLIT, the cabinet Secretariat and the Cabinet Office in cooperation with the Tokyo Metropolitan Government and entities concerned are calling for nationwide implementation of teleworking by corporations as "Telework Day" on July 24 every year up to 2020. July 24 is the day when the opening ceremony of Tokyo Olympic Games is scheduled. The purpose is to reduce traffic congestion through teleworking during the Olympic Games and establish teleworking across the nation.

(5) Telework Month

The Telework Promotion Forum (organized in response to the call by MIC, MHLW, METI and MLIT) set November as Telework Month starting from 2015. Accordingly, the Telework Promotion Forum is concentrating its PR and other activities to spread telework in this month.

(6) Promoting "Furusato (Hometown) Teleworking"

"Furusato (Hometown) Teleworking" is a working style of doing jobs of urban area at local satellite offices or other places as teleworking. Promotion of Furusato Teleworking will contribute to regional revitalization by creating flows of people and jobs from urban areas to local areas, and also contribute to work-style reform by encouraging flexible working arrangements that make better use of time and location in rural areas. Since FY2018 MIC has been promoting an initiative "Machigoto Telework" to encourage formulation of town telework promotion plans by analyzing the current state and challenges in introducing telework for each town (municipalities, chambers of commerce and other local business associations) and studying effective measures, for example.

3. Regional Development Using Information and Communications Infrastructure

(1) Town Development using ICT

Toward the Smart City that upgrades city functions through utilization of IoT, big data, and other technologies, MIC started "ICT Smart City Promotion Projects"

in FY2017. The purpose is to solve various challenges facing cities by promoting "smart city based on data utilization" where an open data coordination platform for participation of diverse entities including venture companies is constructed and expanded to neighboring local governments and others to maximize ripple effects.

(2) Promoting the Development of Free Wi-Fi Environment

For developing an environment to allow tourists to more smoothly use Wi-Fi services, MIC conducted a demonstration test for realizing authentication cooperation in line with the policies, which MIC formulated in February 2016. Based on the results of the demonstration test, the Wireless LAN Certification Organization was established in September 2016 and new services

adopting the certification method commercialized by this Organization were commenced in October 2016. In July 2017, seamless cross-business Wi-Fi connection was realized at more than 200,000 places.

(3) Establishing Support Systems through the Deployment of ICT Experts Directed at Regional Stimulation

MIC has been conducting initiatives to build up local economies and communities by making use of ICT since FY2007. Activities include sending Regional ICT Advisors — experts with knowledge and insight into regional ICT development — to regions motivated to revive their communities through ICT, providing assistance to build success models and propagating the results of these efforts nationwide.

4. Creating an Environment where Everyone Can Enjoy Convenience through ICT

(1) Promoting support for ICT Utilization by Elderly/Handicapped Persons

MIC runs a subsidy program to promote the development and provision of communications and broadcasting services for people with challenges, with the goal of eliminating the digital divide due to disabilities and aging. Under the program, MIC assists with necessary funds for enterprises or other organizations developing or providing communications and broadcasting services to people with physical disabilities (such as phone-relay services for hearing-impaired people).

MIC also runs "Research and Development of Technology Project for Bridging the Digital Divide" to subsidize the funds required for companies conducting R&D of technologies for communication/broadcasting services for handicapped and elderly persons.

(2) Promoting Broadcasting for the Vision and Hearing Challenged

MIC established the Guidelines for Government Administration to Promote Broadcasts for the Vision and Hearing Challenged. The Guidelines set targets for the percentage of closed captioned broadcasts, sign language broadcasts and broadcasts with audio commentary so that people with vision and hearing impairments can readily obtain information via broadcasts. The ministry also established the Guidelines concerning Information Accessibility in the Broadcasting Field in February 2018 to set targets in 2018 and beyond.

(3) Promoting Programming Education

In FY2016, MIC started the Program to Promote Youth Programming Education to train local people as mentors and conduct demonstration tests nationwide wherein programming education is provided after school or on holidays outside the curriculum by sharing and utilizing teaching materials and know-how on the Internet (cloud platforms) at 85 schools of 35 prefectures across Japan. Since 2018 the ministry has been running the Program to Promote IoT Learning in Com-

munities in order to spread the Community ICT Clubs nationwide as a place for bonding of new era so that children, students, working adults, handicapped children, elderly citizens and others can enjoy learning ICT from each other.

(4) Raising ICT Literacy

a. Promoting e-Net Caravans

MIC takes actions for the safe and secure use of the internet by children in partnership with MEXT and communications organizations, and runs e-Net Caravans, a series of rotating lectures given across the country to guardians, teachers, and juvenile students. In FY2017 the Caravan was held at 2,309 places across the country.

b. Improvement of the Internet Literacy Levels of Young People

MIC developed the Internet Literacy Assessment Indicator for Students (ILAS) as a test to accurately ascertain the internet literacy levels among young people. MIC has been using the test on first-year high school students across Japan since FY2012. In FY2017, increasing the participants to approx. 17,200 students from 95 schools, MIC conducted a questionnaire on the use of smartphones and ICT devices together with a test measuring the internet literacy levels of young people. The results of the questionnaire were tabulated and analyzed and were released in April 2018 as the "FY2017 Youth Internet Literacy Indicators."

Section 7　Promoting ICT Research and Development

1. Promoting Research and Development Strategies

In order to realize productivity improvement and rich and secure living in Japanese society amid the fierce competition in the era of IoT, BD and AI, the technology Strategy Committee, Information Communication Technology Subcommittee, Information and Communications Council compiled the third interim report in July 2017. The report consists of "the next generation AI commercialization strategy" and "next generation AI × ICT datability strategy" to ensure commercialization of the next generation AI technologies and promote ICT datability for utilization of super mass data that will drive the commercialization. In order to study medium- to long-term technology strategies for technological prob-

lems and promotion of technology development and commercialization in the ICT field toward solution of future social challenges including the aging society and vitalization of local communities, the review meeting to study technology strategies in the ICT field has been held since December 2017.

Through these efforts, MIC in cooperation with NICT, that is the only public research institute specialized in ICT, is working on R&D in the field of ICT to generate seeds for the future development of Japan, and promoting efforts to create innovations through commercialization of research results.

2. Enhancing Research and Development to Realize Cutting-edge ICT in All Parts of Society

(1) R&D on the next-generation Artificial Intelligence Technologies

MIC, through NICT, has been working on AI core technologies including natural language processing and brain information communication for many years. Specifically, NICT's Universal Communications Research Institute is mainly working on research and development of technologies to analyze big data and multilingual voice based translation technologies. NICT's Center for Information and Neural Networks (CiNet) is working to elucidate brain mechanisms and conducting research and development of network control technologies that make use of these mechanisms and also of technologies to measure brain functions.

In April 2016 theStrategic Council for AI Technology was set up as the AI headquarters of the government. The council led studies and compiled the "Artificial Intelligence Technology Strategy" and "AI Targets of Research and Development and Industrialization Roadmap" in March 2017. The strategy and roadmap stipulate that the three AI centers (the National Institute of Information and Communications Technology (NICT), Institute of Physical and Chemical Research (RIKEN) and the National Institute of Advanced Industrial Science and Technology (AIST)) shall work on R&D and commercialization of AI core technologies in close coordination and with cooperation of related ministries and agencies.

As described above, "Next Generation AI Commercialization Strategy" and "Next Generation AI × ICT Datability Strategy" are compiled integrally in the "Approach of New Information Communication Technology Strategy" as the third interim report.

"Next Generation AI × ICT Datability Strategy" recommends that, for Japanese companies to ensure competitiveness in services using AI, it is appropriate to promote data collection in various fields through the "IoT/

BD/AI Information Communication Platform" commercialization promotion project to construct a platform based on Japanese natural language processing technology using research results of NICT, while sophisticating the platform.

As traffic will increase more than 1,000 times by 2020, there will be a wide variety of requirements including different transmission speeds for each service, transmission delay and the number of concurrent connections. To address this challenge the "Next Generation Artificial Intelligence Commercialization Strategy" calls for detailed understanding of the diverse services and construction of an innovative network integration platform by developing automation technologies for dynamic resource (bandwidth, throughput, etc.) allocation according to the network condition.

Based on the strategies, MIC will work on "R&D and Demonstration of Advanced Dialogue Agent" that enables considerate dialogues reflecting Japanese view of personal relations as represented by the "omotenashi" recognized worldwide.

(2) Establishment and Demonstration of Common IoT Platform Technologies

Since FY2016 MIC has been conducting research and development on common platform technologies, such as technologies to quickly and efficiently connect massive numbers of IoT devices and technologies to consolidate IoT devices and services with different wireless standards and connect and accommodate them in networks efficiently and securely. The ministry is also promoting international standardization in cooperation with the Smart IoT Acceleration Forum that is an industry-academia-government promotion system.

(3) Promoting Research and Development into Next-generation Optical Network Technologies

NICT is researching and developing the base technologies to make possible fast, high-capacity, low-power networks (all-optical networks) with all signal transmissions and conversions done optically. An achievement in FY2017 is the world's first successful optical transmission exceeding 10 petabit per second using multiple optical propagation modes with multicore fiber in industry-academia-government collaboration.

(4) Promoting Research and Development and Pilot Programs of Multilingual Voice-based Translation Technology

Under a five-year plan that began in FY2015, MIC is working to implement multilingual voice-based translation systems. This project necessitates other initiatives, such as research and development into noise-reduction technologies so that conversations can be recognized correctly in noisy environments. The performance of such technologies must be evaluated in real-world settings such as hospitals, commercial establishments, trains, and taxis.

(5) Construction and Application of Testbeds to Accelerate the Public Implementation of Research Findings

NICT constructed the Japan Gigabit Network (JGN), an R&D testbed network, in FY1999. The testbed has been made available to a wide range of domestic and overseas research institutes and has helped advance research and development into cutting-edge network technologies and testing of many applications.

In FY2017 MIC constructed the "Cutting-edge AI Data Testbed" that makes available nationwide the language information data and brain information models that NICT has accumulated through its past research and will accelerate R&D and demonstration, in an effort to further integrate the integrated testbed.

3. Assistance for Creating Innovation Using Competitive Funding

(1) Strategic Information and Communications R&D Promotion Programme (SCOPE)

MIC seeks novel R&D themes in the ICT field broadly from universities, national R&D agencies, private companies, local government research institutes, etc., selects highly potential ones through assessment by external intellectuals, and offers competitive funds to R&D activities on those selected themes. Since FY2002, MIC has offered financial support for over 600 R&D themes.

(2) ICT Innovation Creation Challenge Program

The ICT Innovation Creation Challenge Program (I-Challenge!) was launched to stimulate made-in-Japan innovation in the ICT field. I-Challenge! encourages universities and venture businesses to commercialize technologies and assists them in taking on the challenge of new business domains. The Program pushes for unification of research and development support and venture incubation support, making use of the private sector's commercialization expertise and know-how.

(3) *Inno*-vation Program

MIC runs the *Inno*-vation Program to support attempts to solve technological problems that can become seeds of disruptive innovations in the ICT field. The aim of this program is to provide assistance to risky challenges with great potential in order to produce breakthrough global-scale values in the ICT field. The Program encourages challenges with ambitious targets using revolutionary approaches.

4. Contributions to More Resilient Public Infrastructure

(1) Strengthening the Disaster Resilience of Communications and Broadcast Infrastructure

Since FY2014, MIC and NICT have engaged in R&D on the strengthening of resilient disaster prevention and mitigation functions (sharing and utilization of real-time disaster information), which is one of the research themes of the Cross-ministerial Strategic Innovation Promotion Program (SIP). MIC has endeavored to develop technologies to forecast heavy rains and tornados and technologies to deliver disaster information using the outcomes of this research and development.

(2) Study Group on Future Network Infrastructure

MIC set up the Study Group on Future Network Infrastructure in January 2017. The purpose of this Study Group is to discuss technical problems and promotion policies for creating network infrastructure that can properly meet rapidly growing needs for ICT and support a society where ICT is fully utilized, envisaging the near future from 2020 to around 2030. A report was compiled and published in July 2017.

5. Other Research and Development Programs

(1) Space Communications Technologies

Forum on Future Vision of Space Use was set up in February 2018. The purpose of the forum is to study the direction of space use that Japan should aspire and short- and long-term measures to be taken toward promotion of ICT utilization through broad and informal discussions on a new future vision that will be brought about by innovations in space use.

(2) Future ICT Base Technologies

MIC and NICT are researching and developing base technologies for achieving a new ultrafast wireless com-

munication system and sensing system. NICT is researching and developing quantum communications technology based on quantum cryptography and quantum signal processing as well as nano ICT technology and electromagnetic sensing base technology.

Section 8　Promoting International Strategies for ICT

1. Prioritized Promotion Themes for International Policy

a. Promoting Overseas Deployment of Japanese ICT

Based on the government's policy including the Growth Strategy, MIC focuses on overseas deployment in the ICT field as an important policy issue. For this purpose the ministry is energetically working for: adoption of the Japanese standard for terrestrial digital TV and further dissemination of this standard; expansion of cooperative relationships built up in the field of terrestrial digital broadcasting to the entirety of the ICT field, and: support for Japanese companies involved in overseas deployment of ICT infrastructure including communication/broadcasting/postal systems, disaster prevention- and medical care-related ICT, security and wireless systems and broadcast content. MIC is collaborating with the Fund Corporation for the Overseas Development of Japan's ICT and Postal Services (JICT) and relevant organizations to propose ICT infrastructure packages taking advantage of the features and strengths of Japan's ICT according to the needs of the target county, and promoting total sales including human resource development, maintenance and finance.

Based on the "Infrastructure System Export Strategy (FY2017 Revised Edition)" setting the government's target for Japanese companies to receive infrastructure system orders of about 30 trillion yen in 2020, MIC together with METI formulated an overseas deployment strategy in the information communication field in October 2017. In light of the market trend in the information communication field at home and abroad, Japan's strengths, trends of competitors, and other factors, the strategy sorted priority fields where Japan should focus and showed the direction of future efforts for overseas deployment.

b. Overseas expansion of Japanese-type digital terrestrial television broadcasting

In the terrestrial digital broadcasting field, MIC is working to spread ISDB-T that has the strength in its unique functions to (i) broadcast emergency warnings to protect people's lives, (ii) enable reception of TV broadcast with mobile terminals (One Seg service), and (iii) provide diverse services through data broadcasting. The number of countries adopting the ISDB-T standard has increased to 19 in total as of March 2018.

2. Initiatives in International Frameworks

MIC is involved in multilateral policy consultations including G7/G20, APEC, APT, ASEAN, ITU, United Nations, IGF, WTO and OECD and actively leading global collaboration efforts concerning the ICT field. The efforts include promotion of free distribution of information, creation of safe and secure cyberspace, development of high-quality ICT infrastructure and contribution to the UN Sustainable Development Goals (SDGs).

a. Promotion of international policy in multilateral framework

With cross-border information distribution, businesses and services progressing due to globalization and digitization of socioeconomic activities, there have been vigorous discussions also at G7 and G20. The discussions started with the G7 ICT Ministers' Meeting in Takamatsu, Kagawa chaired by Japan in April 2016. Its results were carried on into the discussions of the G7 ICT Ministers' Meeting (Italy) in 2017 and G7 Innovation Ministers' Meeting (Canada) in 2018. The discussions further deepened to study G7's common principles concerning AI and other matters.

In light of the achievements of G7 and G20, Japan is working on overseas deployment of high-quality ICT infrastructure, study of international guidelines on AI development, global cooperation for promotion of IoT through public-private consortium and global cooperation for sharing of cyber attack information, for example. Japan will for the first time act as the chair of G20 in 2019. Taking this opportunity, MIC will actively work to further deepen the discussions toward development of the global digital economy and lead related initiatives.

Section 9　Promoting Public Administration and Disaster Prevention through ICT

1. Promoting e-Government

(1) Promoting the Widespread Adoption of Regional Information Platforms

Regional information platforms are the set of operational and technical rules (standard specifications) that enable information sharing among various systems (for the exchange of digital information, etc.) owned by local governments. The Association for Promotion of Public Local Information and Communication (APPLIC) publishes and operates the Regional Information Platform Standard Specifications that cover various systems of lo-

cal governments (26 types of basic local government businesses, and education, disaster prevention, GIS and other fields)

(2) Promoting the Local Government Cloud

The Local Government Cloud is an initiative that enables local governments to make use of system hardware, software, and data, via networks, that are managed and operated at an external data center. This also enables consolidation and sharing of information systems from multiple local governments among them. The Local Government Cloud saves local governments from having to manage and operate system hardware, software, and data at their own offices., MIC explored and analyzed the cases of 56 groups that introduced the Local Government Cloud across the country (as of January 2016) and broke them down into patterns. The ministry compiled the result in the "Present Data Analysis of the Local Government Cloud and Procedures and Points of its Introduction" and provided advice to all local governments.

(3) Enhancing Infrastructure to Achieve Citizen-centered e-Government and More Efficient Administrative Procedures

The Basic Resident Registration Network System (Juki-Net) is a local government system that networks basic resident registries. The system enables the provision of personal identification records (name, address, date of birth, gender, Individual Number, resident register code, and updated information of these records) to government institutions and the administrative processing of basic resident registers between municipal boundaries. The Basic Resident Registration Network System has operated stably for over 14 years since it went into operation in August 2002, and it has assumed a pivotal role in improving convenience for residents and as infrastructure for e-government and e-local government and as the basis for the Individual Number System since October 2015.

Municipalities have issued individual number cards since January 2016, and citizens can now obtain various forms of ID and certificates at convenience stores using their individual number cards.

2. Promotion of Informatization in Disaster Prevention Field

(1) Development of Resilient Fire and Disaster Prevention Communication Networks

As major fire and disaster prevention communication networks connecting the central government, the Fire and Disaster Management Agency, local governments, residents and others, there are (i) the central disaster prevention wireless network for information collection and transmission within the national government, (ii) the fire and disaster prevention radio system linking the Fire and Disaster Management Agency and prefectures, (iii) the prefectural disaster prevention radio system linking prefectures and municipalities, (iv) the municipal disaster prevention radio system linking municipalities and residents, and (v) the satellite communication network linking the national government and local governments or linking local governments together.

(2) Ensuring Emergency Communication Means at the Time of a Disaster

In preparation for such cases as where telecom services via public communication networks are suspended upon a disaster, MIC has developed a system to lend out originally developed ICT units (in an attaché case form) to local governments' disaster prevention organizations as requested to help them secure necessary communication means. ICT units have been deployed to Regional

Bureaus of Telecommunications and others in order since FY2016.

(3) Stable Operation of the Nationwide Instantaneous Alarm System ("J-Alert")

MIC Fire and Disaster Management Agency has developed the National Instantaneous Alarm System "J-Alert" to instantaneously transmit ballistic missile information, earthquake early warning, tsunami warning and other information on events that require urgent response to the state and residents through early warning e-mails distributed to mobile phones, disaster management radio communications of municipalities and other means.

(4) Promoting Disaster Prevention through ICT

MIC has promoted the use of geospatial information (G-space information) using ICT and conducted demonstration projects such as the "G-space City Construction Project." Through these efforts, MIC has established an advanced disaster prevention system. The ministry is also promoting dissemination and utilization of a common platform (L-Alert) to transmit disaster-related information including evacuation advisories sent by local governments to diverse media including a large number of broadcast stations and internet businesses.

Section 10　Developments in Postal Service Administration

1. Promoting Postal Service Administration in the International Field

As emerging and developing countries tackle modernization and advancement of their postal operations, MIC is working to deploy Japanese-style postal infrastructure systems to these countries as part of the "In-

frastructure System Export Strategy" of the government and has provided them with Japan's superb knowledge and technology in the area of postal operations. In this initiative, MIC aims to not only offer technical guidance

or other cooperation but also encourage Japanese companies with relevant knowledge to smoothly enter into these business fields by making proposals on various

business services utilizing post offices and other postal services.

2. Promoting the correspondence delivery business

Correspondence delivery falls into two categories: general correspondence delivery businesses, which can deliver all correspondences on the condition that they provide general correspondence services nationwide, and specified correspondence delivery businesses,

which offer only limited correspondence delivery services that do not undermine the provision of universal postal mail services. As of March 31, 2018, 510 operators had entered the specified correspondence delivery business.