National Institute of
Information and Communications Technology

# NICT NEWS

No.457 APR 2016


## The Fourth Medium to Long-term Plan has started

We are sorry to inform you that this April 2016 issue will be the final one to be distributed in printed materials.
It would be appreciated if you will access to the electronic version of NICT NEWS at http://www.nict.go.jp/en/data/nict-news/index.html.

Fourth Medium to Long-Term Plan

# New Research Organization

NICT

## AI/Brain Networks and Communications Research Cluster

### Create

- Universal Communication Research Institute
  - Data-driven Intelligent System Research Center
- Center for Information and Neural Networks
- Advanced Speech Translation Research and Development Promotion Center

## Cybersecurity Research Cluster

### Defend

- Cybersecurity Research Institute

## Applied Electromagnetic Research Cluster

### Observe

- Applied Electromagnetic Research Institute

## Open Innovation Promotion Headquarters

### Social Innovation Unit

- Strategic Program Produce Office
  - Preparation Office for Integrated Promotion of Artificial Intelligence Research
- Big Data Integration Research Center
- Resilient ICT Research Center
- Terahertz Technology Research Center
- Cybersecurity Human Resource Development Research Center
- ICT Testbed Research and Development Promotion Center

## Network Research Cluster

### Connect

- Network System Research Institute
- Wireless Networks Research Center

## Advanced ICT Research Cluster

### Pioneer

- Advanced ICT Research Institute

# Upon the Start of the Fourth Medium to Long-term Plan

**Dr. Masao SAKAUCHI**
President
National Institute of Information and Communications Technology

As of this April, the National Institute of Information and Communications Technology (NICT) started the five-year period of its fourth medium to long-term plan.

Recently in the field of information and communications, with the emergence of IoT and advancements in artificial intelligence, it has become possible to create new (intellectual) value in society, such as predicting the future, by analyzing big data gathered from countless sensors and other sources. This has enabled ICT to develop from being a means of "connecting people with people and with information" to a means of "connecting people, things, and knowledge" by linking the real world with cyberspace. As we move toward a super-aging society and as international competition intensifies, we expect these ICT technologies to play an important role in creating new value in various fields and industries, and in revolutionizing economic and social systems.

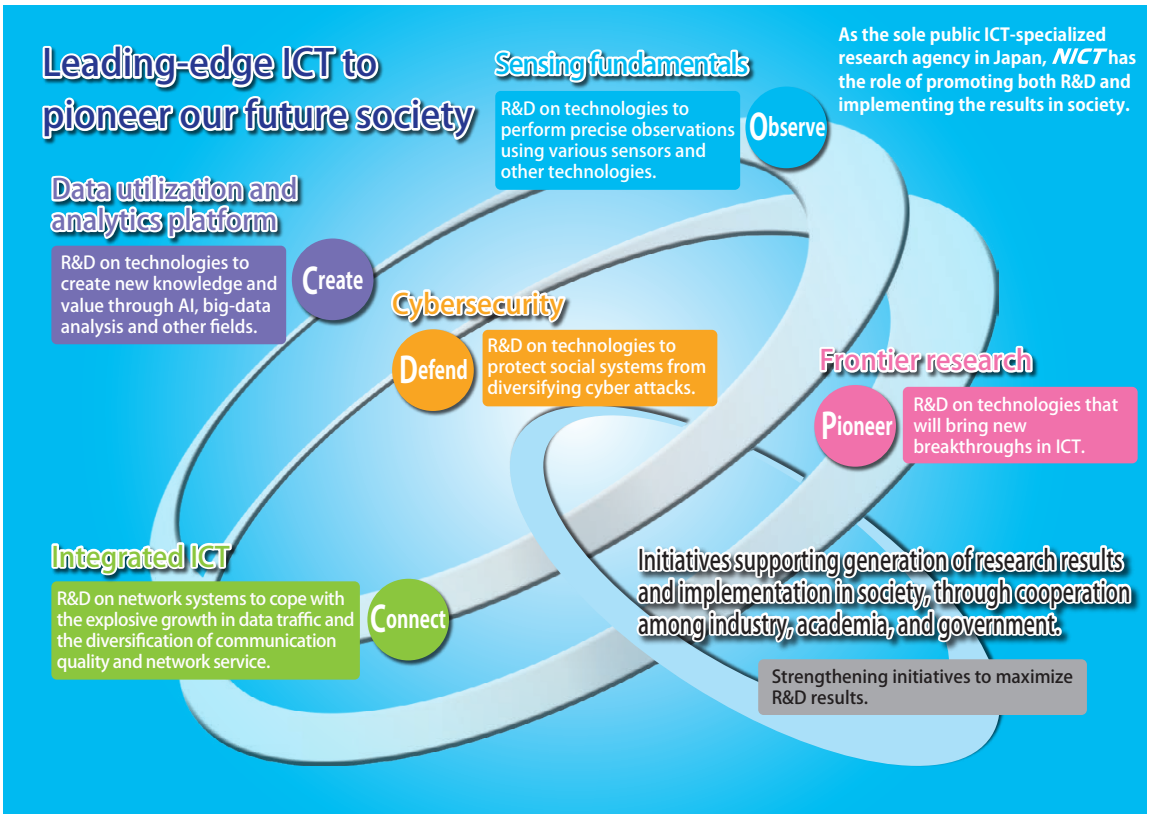
Considering these societal circumstances, the first goal of our fourth medium to long-term plan is to create leading-edge ICT focusing on five strategic R&D regions: "Observing society," "Connecting society," "Creating value," "Defending society," and "Pioneering the future," connecting people, things, events, and then knowledge, and creating strong links between real society and cyberspace. In this way, we aim to find solutions to societal issues, and also to make social systems more efficient and create new value through optimization in a wide range of fields such as health, medicine, transportation, logistics, and public services.

The second goal is to engage in wide ranging collaboration inside and outside NICT (with universities, enterprises, and regional governments), creating open innovation while continually focusing on spreading and implementing results in society, to maximize the effects of R&D results. We will actively pursue collaborative initiatives, particularly in fields such as big data, artificial intelligence, and IoT. We will also work to implement R&D results in society and to promote open innovation through activities such as building demonstration testbeds (for technological and societal verification), applying R&D results for disaster response, creating intellectual assets and standards, and international development.

NICT is determined to put every effort into developing information and communications, which are a base for social and economic activities. We ask for your continued support and cooperation in these efforts.

# The Fourth Medium to Long-term Plan has started

**Main initiatives in basic and infrastructure R&D, and implementing research results in society**




## Strategic priority R&D areas

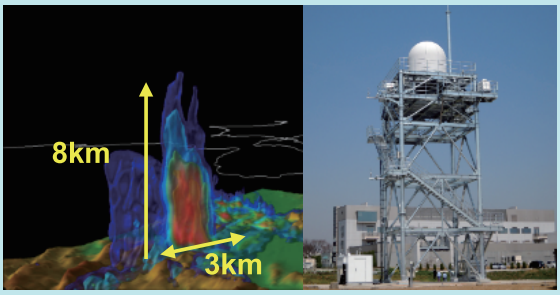
Observing society
Observe

## Sensing fundamentals

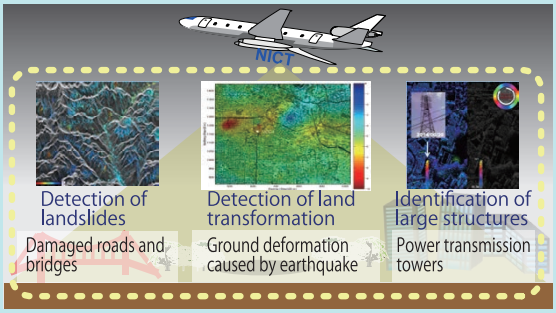
We not only use accurate electromagnetic measuring technologies, but also conduct research on using electromagnetic waves to measure various phenomena in our environment and to collect information that cannot be obtained by other means. The research activities are based on precise characterization of the electromagnetic waves themselves.

Phased array weather radar is a good example of equipment that was developed from our advanced remote sensing technology. It enables localized extremely heavy rainfall events and tornados to be detected much earlier than conventional precipitation radars can. Advanced analytical techniques can be used to extract from airborne synthetic aperture radar (SAR) images geographical information associated with natural incidents such as volcanic eruptions and earthquakes.

We also provide services to society that include testing and calibration of radio equipment, generation and delivery of Japan Standard Time, and space weather forecasts.




3-Dimensional rainfall distribution measured by the phased array weather radar



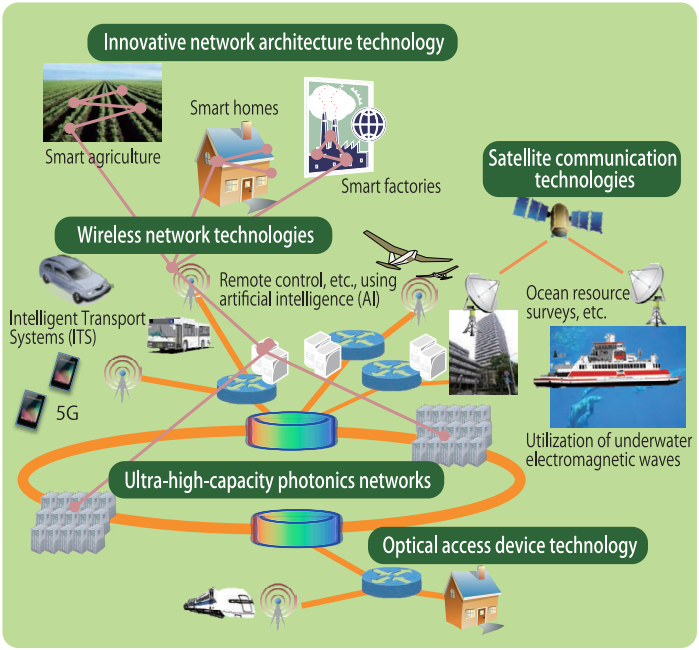

Advanced analytical techniques on airborne SAR images

Connecting society
Connect

# Integrated ICT

We will conduct R&D on integrated ICT to realize scale-free and seamless networks that can connect any locations in accordance with users' demands and that can cope with explosive increase in traffic by integrating wired and wireless ICT.

These technologies will enable the ultra-high-capacity network systems needed in the IoT era, the wireless network control and management needed to integrate heterogeneous networks, and high-speed, high-capacity global optical satellite communication networks.

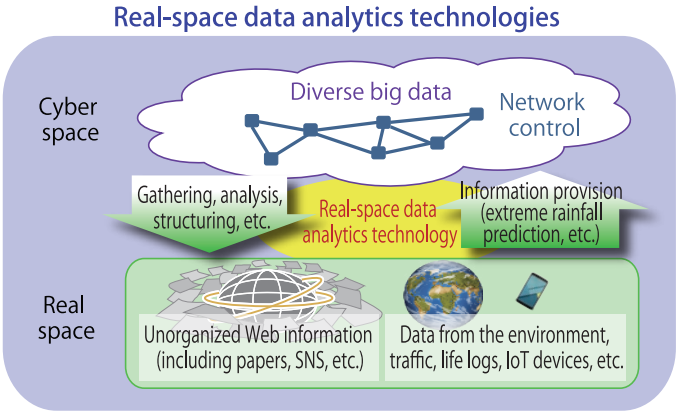


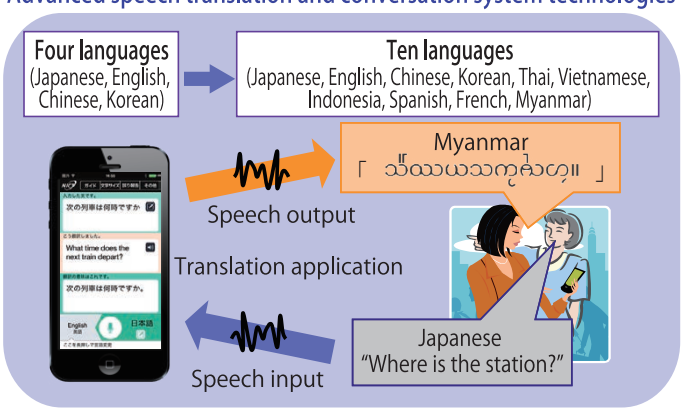

Creating value
Create

# Data utilization and analytics platform

We will conduct R&D on data-utilization platform technologies, to better understand the diverse information overflowing from the world and the human neurological functions that process it from an ICT perspective, and then to use it in a variety of activities in the real world, in order to create new knowledge and value using big data and next-generation artificial intelligence.

These technologies will help us to overcome language barriers, to automate intellectual work such as by recognizing and formulating questions regarding societal issues, and to gather and analyze real-space data on important occurrences such as extreme weather events and environmental changes.



Defending society

Defend

# Cybersecurity

We will conduct R&D on cyber-security technologies to secure information and communications at various levels by quickly detecting, analyzing, and defending against increasingly clever and complex cyber-attacks and also by quickly thwarting intrusions to prevent leaks of sensitive information.

These technologies also contribute to making automated countermeasures against cyber-attacks, to protecting privacy for secure personal data utilization, and to building and using a verification platform specialized for security.

## Cyber-security technologies


Building the largest cyber-attack monitoring network in the world


Cyber-attack analysis/ prevention platform technology

Cyber security universal repository technology, which automatizes cyber-attack countermeasures by gathering and analyzing large amounts of diversified cyber-attack information

Pioneer the future

Pioneer

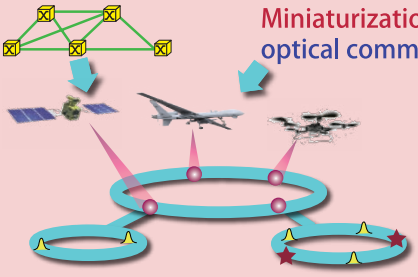
# Frontier research

We will conduct R&D on leading edge technologies to create innovation, by sharing knowledge and technology across wide ranging research fields and by collaborating on and cultivating new approaches and methods that are different from existing ICT technologies, in order to bring new breakthroughs in ICT.

Here, we aim to realize technologies that will have great impact on future society, such as novel quantum cryptography and communication technologies that provide levels of security and capacity beyond what is possible with conventional ICT, gallium oxide power devices, and deep ultraviolet LEDs for disinfection.

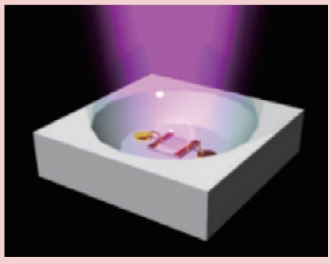
## Integration of quantum key distribution networks

## Miniaturization of free space optical communication systems



Quantum optical networks for implementing quantum-safe communication

Deep ultraviolet devices that will bring innovation in fields from ICT to the environment and medicine



# Promotion of R&D and social implementation of research results

### 1. Building testbeds enabling technical verification and demonstration in society

Amid fierce international competition, it is essential that Japan's ICT industries remain competitive and that the whole process from the beginning of R&D to the final implementation in society be accelerated. To this end, we are building testbeds to demonstrate the results of our R&D even as it is ongoing. Also, to encourage new value creation in various social and economic fields, we are promoting the use of these testbeds by NICT itself and other organizations and encouraging a wide range of open innovation. Furthermore, we will merge NICT's testbeds consisting of R&D testbed networks, wireless testbed, large-scale emulation platform and compound service hosting platform, and operate them as a single testbed for demonstrating IoT technologies to those engaged in technological endeavors and to society in general.

### 2. Reinforcing initiatives to enable open innovation

We are establishing a new organizational structure to enable continuous promotion of R&D toward open innovation with an eye to meeting potential needs of society and a clear vision of the final results. It is our first priority to create an integrated strategic plan from the initial stage of R&D through to implementation in society. The "Open Innovation Promotion Headquarters" has been established inside NICT with the goals of developing such integrated research plans and promoting projects essential for open innovation. In particular, to promote open innovation, we will utilize R&D testbeds and collaborate with organizations in a wide variety of fields. It is also important for us to strengthen our collaborations with universities, and researchers in remote sites of NICT are expected to act as hubs for such engagements. Moreover, we will actively contribute to academic societies, consortia, alliances, research conferences, and community forums. Emerging fields such as big data, artificial intelligence, IoT, robotics, and ITS will play important roles in society in the future, and we will focus on these areas in our effort to promote collaboration among industry, academia, and government toward creating open innovation.

### 3. Promoting initiatives to realize disaster resilient ICT

We will create new value and reform social systems through technology that protects people's lives and property from disasters such as earthquakes, flooding, volcanoes, tsunami, and typhoons. To further strengthen initiatives for basic research functions and implementation in society, we will also consolidate cooperative systems working on basic and applied research related to disaster resilient ICT and on societal implementations of research results. In addition to steady promotion of R&D and strengthening of basic research functions in disaster-resilient ICT, we will actively contribute to collaborative activities among industry, academia, and government, including forming a broad network that includes regional public organizations, to gather, collect and exchange knowledge and examples related to disaster resilient ICT.

### 4. Promoting strategic standardization activities

There is a growing diversity in the forums for discussing ICT-related issues, and standardization activities and open-source initiatives are becoming diverse and complex. In response to these developments, we will gather information and share it with related parties, and we will promote strategic standardization activities in collaboration with the Ministry of Internal Affairs and Communications and others in industry, academia, and government. We will also actively make contributions to domestic and international standardization organizations, such as the ITU, and especially promote these activities by taking into consideration strategic handling of intellectual property.

### 5. Strengthening international development of R&D results

We will promote international development by spreading the results of our R&D globally and by integrating them into international businesses. We will strengthen our international research network and promote international collaborative research by encouraging exchanges of researchers and staff. NICT will work to spread its R&D results globally through international contributions, including applying results to solve issues in developing countries.

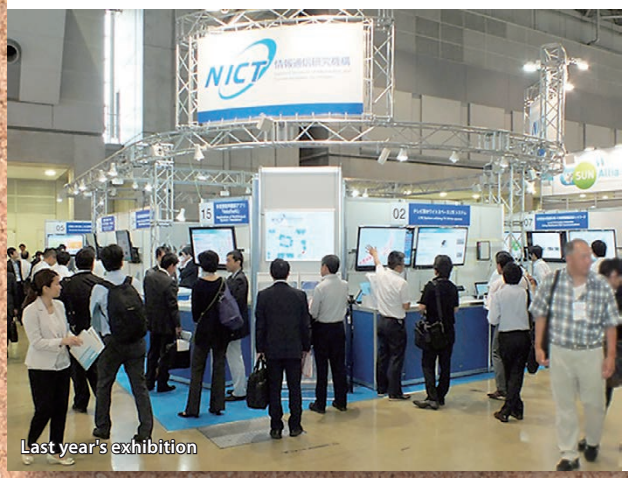
# WTP2016

## Wireless Technology Park 2016

## May 25–27, 2016 (Wed.-Fri.) at Tokyo Big Sight

**Held concurrently with: Wireless Japan 2016, Transport Systems Expo, and IDE TOKYO Drone Solution and Technology Expo**

**Sponsors: National Institute of Information and Communications Technology, YRP R&D Promotion Committee, YRP Academia Collaboration Network**



Last year's exhibition

Wireless Technology Park (WTP) is a special event focused on wireless communication technology research and development. It promotes collaboration among industry, academia, and government as well as globalization through exhibitions, seminars, and academia sessions and fosters advanced technologies and activities inside and outside of Japan.

The main theme this year is "World leading wireless technologies toward 2020" and it incorporates various plans to explain ICT and wireless communication trends that are attracting attention around the globe, such as 5G mobile communication systems, IoT, M2M, and Wi-SUN.

NICT will introduce its latest achievements in wireless network technology through exhibits and presentations.

We hope that many of you will participate in the event.

# Interop Tokyo 2016

## Free admission with pre-registration!

**Date: June 8-10 (Wed.-Fri.)**

**Venue: Makuhari Messe (International Exhibition and Conference Hall)**

Details: http://www.interop.jp/2016/en/

**Held concurrently with: Connected Media Tokyo, Digital Signage Japan, Location Business Japan, and APPS Japan**

**Sponsor: Interop Tokyo Executive Committee**

Interop Tokyo 2016 is a trade show dealing with the Internet, cloud technology, data centers, virtualization, security, wireless, and other technologies. NICT will present dynamic exhibits on networking and other technologies. Details will be given as available through Twitter (@NICT_Publicity).

We hope many of you will visit the NICT booth (Hall 6, 6N32).

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4-2-1 Nukui-Kitamachi, Koganei, Tokyo
184-8795, Japan
TEL: +81-42-327-5392 FAX: +81-42-327-7587
E-mail: publicity@nict.go.jp
URL: http://www.nict.go.jp/en/
Twitter: @NICT_Publicity

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