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National Institute of
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OPEN INNOVATION
オープンイノベーション
推進本部

Cover Photo:
This photo represents the creations achieved by open innovation, including the research and development that the NICT is conducting with other organizations.

Upper left Logo:
The word "oi" stands for open innovation. The first letter 'o' in NICT blue with the top not closed indicates the NICT's openness to society. The second letter 'i' represents humans (similar to the Chinese character meaning a person). The dot at the top of the letter means creating unique ideas. The color of the letter 'i' is orange, which is the organization color of the Open Innovation Promotion Headquarters. The colors of 'o' and 'i' contrast with each other. The word "oi" thus means that the NICT, which has the most advanced ICT, forms tight bonds with people and society, complementing each other, to create new values.

Interview

Making Cutting-edge Technologies New Social Value through Open Innovation

Open Innovation Promotion Headquarters

Society 5.0, AI, IoT, and Beyond 5G / 6G … the world of information and communication technology (ICT) is developing rapidly. When creating new values from these cutting-edge technologies, collaborations play a key role.

We interviewed NAKAZAWA Junichi, Headquarters Chairman of the Open Innovation Promotion Headquarters, about the open innovation initiative being conducted by the NICT.

NAKAZAWA Junichi

Senior Executive Director / Headquarters Chairman of Open Innovation Promotion Headquarters

Entered Ministry of Posts and Telecommunications (currently MIC; Ministry of Internal Affairs and Communications) in 1990. Engaged in radio policy, information and communication policy, he became Director of Land Mobile Communications Division in MIC. In NICT, he served as Secretary General of Open Innovation Promotion Headquarters. Current position since July 2019.

—— What is the background of the open innovation initiative being promoted by the entire NICT?

NAKAZAWA ICT is evolving rapidly, so we need to create new values by not only using the outputs of our in-house research and development, but also collecting various technologies and ideas from outside. The NICT must improve technologies by working with other organizations in various fields and then deploy them in society, in other words, it must carry out innovation in an open manner. And this process must be done quickly due to international competition. Therefore, the goal of this open innovation initiative is to maximize the outputs from NICT R&D.

—— What is the policy of open innovation?

NAKAZAWA By effectively using our latest technologies, human resources, and research infrastructure such as testbeds, we are promoting industry-academia-government, international, and local collaborations. Through these collaborations, the process enters stages of social demonstration and social implementation, while properly recognizing social issues and user needs, while keeping an eye on the market and business, as well as developing seed technologies. In this process, it is crucial to establish an appropriate system and structure for collaborations. It is an important fact that the NICT has neutrality as a National Research and Development Agency, and this neutrality allows the public to tackle common issues through these collaborations.

This challenge is new for us, so it is very important to repeatedly practice and learn while receiving feedback.

Cultivating seed partnerships

—— How do you cultivate specific local and industry-academia-government partnerships?

NAKAZAWA We have many divisions doing various types of work. One of them is the Strategic Program Produce Office. They identify social and local issues and needs by regularly swapping information with people who understand local issues, holding ideathons with local universities and organizations, and introducing our seed technologies to let people know about the research results of the NICT. The people at the headquarters jointly develop and support collaborations with external organizations through research. And we have some bilateral co-funding R&D programs among Japanese universities.

Interview

Making Cutting-edge Technologies New Social Value through Open Innovation

—— There are plenty of testbeds. Are they frequently used by the private sector?

NAKAZAWA Testbeds play an important role in collaborating with external organizations. As for integrated testbeds, we have built environments for ultra-high-speed networks and large-scale simulations, and IoT service infrastructure. They are used by many companies, as well as universities and research institutes in various stages from development to commercialization. They are very useful for checking product specifications and service performance in a large-scale testing environment before release.

In addition, the AI Science R&D Promotion Center has organized an AI data testbed and provides data for developing AI technology. This is a new form of testbed for promoting data-driven open innovation.

—— What open innovation is being done at the Resilient ICT Research Center, Big Data Integration Research Center, and Terahertz Technology Research Center?

NAKAZAWA The Resilient ICT Research Center is conducting R&D and demonstrations for building a resilient society based on wired and wireless networks, and information exchanged through those networks. For example, they are performing open tests of the DISAANA and D-SUMM systems that can rapidly analyze huge numbers of posts on Twitter and summarize disaster information. These systems are currently being used by municipalities as well.

The role of the Terahertz Technology Research Center is to carry out R&D, and to standardize the terahertz band, which will be one of the fundamental technologies for Beyond 5G / 6G. They also operate a laboratory for prototyping advanced devices for a wide range of wavelengths including light, terahertz and millimeter wave, and the lab is used by external organizations too for promoting open innovation.

The Big Data Integration Research Center carries out research and development on human behavior modification through prediction using data linkage among environmental, traffic, health, and other sensing data and development of an analysis platform. The platform is now being demonstrated in Japan and overseas before being introduced into society.

——We heard there is a plan to create a system or structure for social implementation.

NAKAZAWA Social issues are diverse, ranging from everyday life including disaster prevention and medical, education, security and monitoring, to those in manufacturing, sightseeing, agriculture, etc. We have strengthened collaborations using the current commissioned research scheme of the NICT. As the next step and beyond, we are working to establish a system and structure for promoting collaborations.

For example, in the field of wireless communication, to ensure stable communication in a factory, we have established a body called FFPA[*1] with companies for standardizing and deploying the technology based on the results of an R&D project conducted by the NICT. This technology allows production lines to be changed flexibly and improves productivity. It can help solve common issues in manufacturing including the auto and machinery industries.

Regarding machine translation, we run the Translation Bank for accumulating translation data from all over the nation to help improve the accuracy of translation. This ecosystem receives bilingual data from companies and provides (licenses) machine translation technology with improved accuracy in return. It is used in the pharmaceutical, financial, and auto industries among others.

■ Promoting global standardization and international joint research

—— What is strategic standardization?

NAKAZAWA We are working hard to standardize the outputs of our R&D internationally. For example, we have succeeded in standardizing quantum key distribution technology, which is important for quantum cryptography, and have succeeded in securing the terahertz frequency band for wireless communication. Both of these are included in ITU[*2] recommendations (standard). These are important fields for Japan and this success came through collaborations with the related companies.

—— What international research partnerships do you have?

NAKAZAWA The NICT has been conducting open innovation through international partnerships. We have been working on several international projects with government organizations in the U.S. and Europe, and now are focusing on partnerships with Southeast Asian countries. We have built a research platform, ASEAN IVO[*3], with universities and research institutes in ten countries to help solve their respective issues as well as common issues in the region.

—— What are the main issues in ASEAN countries?

NAKAZAWA Since this region has high population densities and frequently suffers natural disasters, there are many projects dealing with food problems including agriculture and fishery, environmental protection and building resilient telecommunication networks. They are also working on a project for using the IoT to make society safer.

■ Using the knowledge and human resources of the NICT

—— Social implementation includes cybersecurity training and surveys.

NAKAZAWA The training is conducted under the program for developing human resources in the field of security. The NICT has gained much knowledge on cyber threats through its research on cybersecurity. Exploiting this knowledge, testbeds and other infrastructures, we are conducting an exercise called CYDER[*4] targeting the engineers who manage the information systems of gvovernmental and municipal organizations.

Regarding surveys, we have been testing IoT devices with improper password settings all over the nation. This survey is conducted in collaboration with the Ministry of Internal Affairs and Communications, internet service providers and so on.

—— Are there any initiatives for supporting young people to turn their ideas into reality?

NAKAZAWA Developing young human resources in ICT is also one of our important roles. Targeting entrepreneurial university and high school students, we hold contests called “Entrepreneur Koshien” and “Entrepreneur Exhibition” to support their activities.

As a hackathon in security, our SecHack365 program helps to develop excellent software engineers and researchers as well.

■ Next stage of open innovation

—— What is your plan for society after COVID-19?

NAKAZAWA ICT makes remote working and learning possible, and promotes a contactless lifestyle as the new normal. Concerning this role of ICT, we held a special online symposium, “Form of Society after COVID-19” on June 12 with panelists including NICT researchers, and specialists in medicine and economics (see pp.10-11). Our R&D outputs will underpin society during and after COVID-19, and open innovation will also play an important role.

—— What are the future prospects for open innovation at the NICT?

NAKAZAWA As a National Research and Development Agency, it is increasingly important to collaborate with other organizations in order to create cutting-edge technology and turn them into social values. We will continue promoting open innovation. During strategic efforts in the fields of Beyond 5G / 6G, quantum communication, data exploitation including AI, and cybersecurity, both a global perspective and business attitude will become more important.

I hope that the philosophy and know-how developed in the NICT will expand our collaborations and challenges and lead us to the next stages of co-creation.

＊1 FFPA: Flexible Factory Partner Alliance
＊2 ITU: International Telecommunication Union
＊3 ASEAN IVO: ICT Virtual Organization of ASEAN Institutes and NICT
＊4 CYDER: CYber Defense Exercise with Recurrence

This interview was held remotely.

Advanced ICT Device Lab
Open innovation platform

Terahertz Technology Research Center


A trainee from an external institute receiving operational training

The Advanced ICT Device Lab, which operates three facilities, the Photonic Device Lab and Millimeter-Wave Research Facility at Koganei (Headquarters), and the Clean Room at Kobe Branch, is a research facility serving as an open innovation hub for researchers both inside and outside the NICT, to contribute to collaboration among government, industry, and academia. As the demand for ICT is rapidly developing, these facilities have advanced technologies for hardware development, for designing, prototyping, implementing, and evaluating devices. The purpose is to create fundamental technologies for innovative information and communication devices by fusing technologies for various electromagnetic wavelength ranges including light waves, millimeter waves, and terahertz waves. These facilities are used not only by NICT researchers, but also external institutions including companies and universities. In fiscal 2019, with 162 researchers from 36 organizations (29 universities and 7 companies) registered to conduct joint research with the NICT, these facilities contributed to the development of advanced device technologies and education of young researchers and engineers. To encourage innovation in device technology and to provide a venue for joint innovation among industry, academia, and government, we hold an Advanced ICT Device Lab Workshop every year. At a workshop held in January 2020, there were 47 poster presentations and a total of 98 participants. In the poster presentations, there were lively discussions on technical areas ranging from basic to applied social implementation. The workshop served as an open innovation hub for promoting the exchange of information between users. In addition, we are preparing a new "Process library" which will standardize the device fabrication process in the laboratory. The library can also be used for a fee by those who are not participating in joint research with the NICT, and the number of users is expected to increase.

Use of Intellectual Property, Commissioned Research, and Personnel Exchanges to Maximize Research Results

Innovation Promotion Department


Sample Application of NICT Research Results
(Water sterilizer using a deep-ultraviolet light-emitting device)
A small, high-output light source was realized by significantly improving the light extraction efficiency of a deep-ultraviolet LED. It is expected to replace the mercury lamps used in sterilization systems.

To ensure that patent applications are made for inventions resulting from ICT research, this department offers advice to researchers. Submitted invention notifications will be examined and processed by a patent office, and a patent application will be filed. We also judge whether an overseas patent application is required, whether further review is required, and whether it is necessary to maintain the patent after acquisition, in order to ensure that patents are effectively used. Since the purpose of maintaining patents is to help research results be used in society, we introduce our patents to industry and license them.

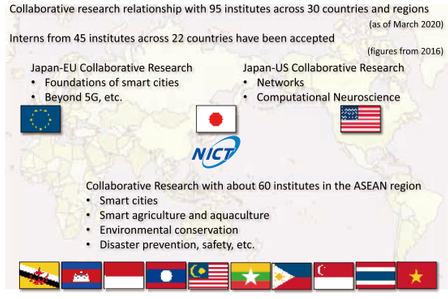
In addition, if integration with the research conducted by the NICT is more efficient, research is commissioned to other institutes such as universities and companies who have applied for specified research themes and contents. An NICT researcher controls the commissioned research as a project officer. For evaluating commissioned research, an evaluation committee consisting of external experts has been established to conduct the prior evaluation, evaluation of adoption, intermediate evaluation, final evaluation, and post evaluation.

Moreover, to develop open-minded and highly skilled specialists, we accept researchers from institute and graduate students from home and abroad, and they gain skills by participating in NICT R&D. We encourage exchanges between researchers, including inviting external researchers to educate and advise NICT staff. We are also carrying out the "Matching Research Support Project" to conduct feasibility studies on new research themes with universities.

In addition, we conduct R&D commissioned by government institutions, and then feedback the research results to society through international standardization. This maximizes the value of research results.

Innovation and Social Implementation through Global Cooperation

Global Alliance Department



In today's world, where national borders are no barrier to the movement of people and business development, people from across the globe now come together to solve the world's problems, leading to innovation and societal development. NICT works with nearly 100 institutions in 30 countries and has been actively promoting personnel exchanges, research partnerships and running international cooperation programs.

To stimulate innovation, we have teamed up with the NSF to solicit international research projects in a new networking technology supporting IoT, and in computational neuroscience, which is a new approach in brain research. A project of the former program has demonstrated a new communication protocol over Japan-US networks. The latter has led to a multinational program, including participants from Germany, France, Spain and Israel.

NICT are working with MIC and the EU in conducting programs for developing information and communications technology, and post-5G technology for smart cities. Cooperation between companies and universities in Japan and Europe has produced technology that has been proposed to an international standardization body.

For societal development, we have established a joint research organization with around 60 institutes in the 10 ASEAN countries, and carried out nearly 30 projects in the fields of agriculture and aquaculture, environmental protection, disaster prevention, and safety and security, which are common issues for all the participating countries. Multi-language translation data, in nine languages, was created based on NICT research. The development and demonstration of environmental monitoring technology and farming assistance systems is currently under way, which are also expected to contribute to UN SDGs.

Economic and Social Innovations with ICT: Supporting Startups

Deployment Promotion Department

ICT has been changing society and the economy, and video streaming and social networking services (SNS) through the Internet are now commonplace. Most of these services have been created by startup companies. The NICT supports ICT startups and the entrepreneurs behind them.

1. Entrepreneur Koshien/Exhibition

Every year, the NICT and the Ministry of Internal Affairs and Communications co-host the Entrepreneur Koshien/Exhibition, which is a national competition among teams of promising students and young entrepreneurs who have won business contests, etc. held throughout Japan. The participating teams present their business plans which they have created with guidance from mentors who have knowledge of ICT startups. In fiscal 2019, the Hokkaido student team and the Kansai entrepreneur team received the Minister for Internal Affairs and Communications Awards.

2. Training in Silicon Valley

Every year, students who participate in the Entrepreneur Koshien join training at Silicon Valley in the U.S., the center of startups.

3. Assisting Participation in Large-Scale Exhibitions

The teams participating in the Entrepreneur Exhibition are given a chance to participate in large-scale exhibitions in Japan and abroad. In fiscal 2019, the NICT assisted participation in CEATEC (Japan), Tech Crunch DISRUPT (U.S.), and Digital Thailand Big Bang (Thailand). To help create new services and products from its research results, the NICT also provides a dedicated space in its headquarters (Koganei) for startups that were formed in the NICT, thus facilitating new businesses.