FEATURE
Promoting the Social Implementation of ICT

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Presentations at Kigyouka Koshien: Kigyouka Koshien is a competition where talented young students, who will lead the next generation, from technical colleges, universities, graduate schools, or similar institutions present business plans about original product and service ideas that they have developed. The event took place in Marunouchi Hall (Marunouchi, Tokyo) on Wednesday, March 7, 2018, with nine teams of students who had participated in student competitions held throughout Japan and won the NICT award (the right to compete at the Kigyouka Koshien).

FEATURE
Promoting the social implementation of ICT

INTERVIEW

Supporting the Startup of New ICT Businesses
Aiming to be a team that discovers local talent and creates new industries

Mitsuhiro HISHIDA

Executive Director, ICT Deployment and Industry Promotion Department

Entered the Ministry of Posts and Telecommunications (now the Ministry of Internal Affairs and Communications in 1994). After working as an Assistant Division Chief at the Ministry of Economy, Trade and Industry's Trade and Investment Facilitation Division, he worked as a First Secretary at the Embassy in South Korea. For 6 years starting in 2011, He was in charge of international conferences with groups such as the WTO, ITU, OECD, and APEC at the Ministry of Internal Affairs and Communications' Global ICT Strategy Bureau.
He also worked as a Deputy Director-General for Trade Policy in the field of telecommunications with groups such as the TPP, the Japanese EUEPA, RCEP, and TiSA. He has worked in his current role since July 2017. He is currently focusing his efforts on his current role supervising the NICT Nationwide Accelerator Program, which supports community-based startups.

As a national research and development institute, NICT is focusing its efforts on basic research and applied research in the field of ICT, but it also has one other important role. This role involves discovering new talent, incorporating it into society, and contributing to society by introducing useful technologies through its ICT Deployment and Industry Promotion Department. We spoke to Mitsuhiro Hishida, the Executive Director of the department, about its role.

■ The "Kigyouka Koshien*" and "Kigyouka Expo"

—The English word "deployment" isn't commonly used in Japan. What do you use it to refer to in this case?

Hishida: In this case, deployment refers to positioning and rolling-out technology. We aim to broadly industrialize information and communications, which includes positioning and rolling-out the ICT technologies that the NICT possesses.

—Specifically, what kinds of initiatives are you performing?

Hishida: The representative examples are our "Kigyouka Koshien" and "Kigyouka Expo" events.

These events allow young people who aim to become entrepreneurs to present their ideas and technologies. We hold them both once a year.

The Koshien event is aimed at students, and the Expo is aimed at working adults. Holding these elimination-style events nationwide at a regional level provides us with the opportunity to discover talented students and early-stage ventures from outlying areas, with the aim of supporting their growth.

As well as at the main events, we also check for talent at the regional elimination events. Whenever we find individuals with outstanding talent, regardless of the stage at which we find them, we have "mentors" provide them with advice. These mentors have specialized knowledge, and have entered into contracts with our institute. The advice they provide helps entrepreneurs to found their own companies and turn their startups into businesses.

—What kinds of people are these "mentors"?

* Koshien refers to a yearly high school base-ball tournament where selected baseball teams from each region in Japan compete against each other.

Offices and their Missions Within the ICT Deployment and Industry Promotion Department

Deployment Promotion and International Exchange Planning Office	Supports research institutes and others to invite overseas researchers and hold international research gatherings. Helps promote the deployment of research results by supporting established ventures based around NICT's research and development results.
Entrepreneur Promotion Office	Promotes business matching and commercialization support for entrepreneurial ventures in the field of information and communications, and individuals who aim to start businesses in this field through holding events and seminars.
Business and Technology Research Promotion Office	Provides financial and fiscal support for information and communication ventures, etc. Also, provides ICT infrastructure maintenance support and performs work related to managing research development for high-risk technological themes that have been consigned to the private sector.
Information Barrier-free Office	Supports projects based around providing barrier-free information for those with disabilities, and aids the promotion of television program production that includes subtitling or sign language, etc. Also, operates a website that provides information for barrier-free information, and collects and provides information that may be beneficial for those with disabilities.

Hishida: Individuals who already have experience with starting ventures, or individuals involved with venture capital (VC). They have a wealth of knowledge about founding companies.

In order to have an idea be recognized by society and bring about results, it's necessary to be able to identify whether a project will succeed before it even becomes a business.

These mentors are involved in this identification process, and provide advice about starting a business.

—I see, so, basically, what you mean is that if you can successfully find good ideas, you can help form them into technologies that can contribute greatly to society. Specifically, what kind of examples have you found?

Hishida: As an example, the "Kigyouka Koshien" event held in March 2018, a device called the "G-SENSE (6-pole GVS) On-board Headphone" received the Minister for Internal Affairs and Communications' Award.

This device was developed by a graduate student at Osaka University. It uses imperceptible electronic stimulation of the three semicircular canals in the ear to create an artificial sense of acceleration.

It could be used to increase the immersion of VR games, or used to decrease the sense of acceleration, reducing motion sickness.

If this device is installed in autonomous vehicles, which are expected to become increasingly commonplace, it will allow for passengers to relax and read books or documents while traveling, without worrying about feeling ill.

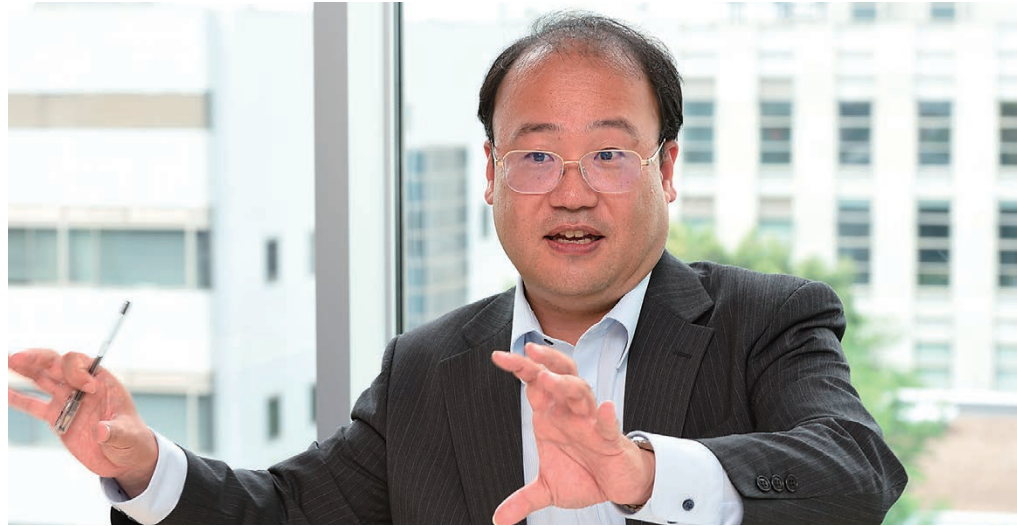**—What kinds of examples have you found at the "Kigyouka Expo"?**

Hishida: A company working in the field of artificial intelligence (AI) won the Minister for Internal Affairs and Communications' Award at this year's event. The company, called AISing Co. Ltd., originated from a group from Iwate University. It began with the concept of using AI-based learning to control the rolling movements of ships, and it is now developing a technology that can be widely used for a variety of purposes.

There was also another company originating from Hokkaido University that used cameras mounted on cars to photograph areas surrounding roads, creating 3D maps that could be used for road maintenance and other purposes.

There are a large number of these startup businesses that could help create growth in their respective regions. Discovering these businesses together with our mentors and helping them to grow is one of the rewarding parts of this job.

■ Barrier-free Information and Business Promotion

—You're also involved in initiatives called barrier-free information. What does this involve?

Hishida: It involves providing support and grants to ensure that those with physical disabilities can enjoy using communication and broadcasting services.

For example, some TV programs are available with subtitles for those with hearing disabilities, but not all of them. The NICT contributes part of the cost involved in creating these subtitles to TV stations after first performing a screening process.

—What about your business and technology research promotion initiatives?

Hishida: We inherited some initiatives from the former Telecommunications Advancement Organization such as guaranteeing debts and interest subsidiaries related to communication and broadcasting, but lately we're also providing support for IoT testbeds and regional data centers.

IoT testbeds perform proving tests to ensure that services that collect and analyze large amounts of information actually work according to specification before they're put into use. We provide partial funding support for that.

We also provide partial funding support for regional data centers. In the event of a disaster, it would not be ideal for all of Japan's data centers to be concentrated in Tokyo, so we provide this funding for any that are built in areas outside of the capital.

In addition, we previously consigned research for fundamental technologies to private businesses. We now provide advice related to the deployment of these research results.

■ Promotion of International Exchange

—Another NICT role is promoting international research exchange.

Hishida: Yes, we have an international exchange program where we provide partial funding assistance to have researchers come from overseas to participate in research gatherings. When universities and research institutes invite foreign researchers, NICT covers the costs involved in this.

I think it's extremely important to have talented researchers visit Japan from around the world.

This process allows for the creation of diverse ideas.

■ Always wanting to stay as "NICT" - the New Industry Creation Team

—What are the future goals of the ICT Deployment and Industry Promotion Department?

Hishida: The ICT Deployment and Industry Promotion Department always wants to remain focused on its role as a New Industry Creation Team. In other words, our team wants to ensure it can always continue to create new industries.

For this reason, we will further expand our network with local government authorities and groups nationwide that support startup companies, and ensure that the NICT can continue to back up entrepreneurs.
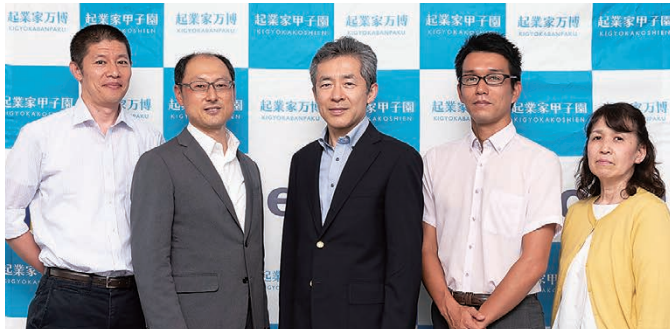
—What are your hopes for young people in Japan who will one day become scientists or engineers?

Hishida: There are untold talents lurking amongst young people in Japan today. I've been around the country and spoken to high school and technical college students who are around 17 years old, and graduate school students who are around 25 years old. I was surprised at how level-headed their thoughts are.

Through our projects at the ICT Deployment and Industry Promotion Department, we hope to provide total support to develop these talented individuals up until the point at which they enter society.

Creation of an ICT Startup Starting a Movement in the World

Entrepreneur Promotion Office

Entrepreneur Promotion Office Staff

ICT startups with the seeds of original technologies hold a great deal of hidden potential to realize richer and more varied information communication services for the next generation. To stimulate our national economy and society through the creation of regional ICT startups, the Entrepreneur Promotion Office aims to support the construction of an "ecosystem" to create ICT startups across the country, and the creation of ICT startups that will grow considerably from regional to global organizations.

■Aiming for an ICT startup "ecosystem"

To create ICT startups that will grow considerably from within Japan, it is essential to have a broadening base of young people across the country who are aiming to start their own businesses. To help this, we offer background support for the activities of organizations and bodies who are involved in initiatives to train promising students and support young entrepreneurs across the country ("Regional Entrepreneur Supporters"). We carry out many different initiatives to create a virtuous cycle (an "ecosystem" to create ICT startups around the country), where young entrepreneurs and promising students appear in great numbers, one after another, from all around Japan.

■Holding the "Kigyouka Koshien" and the "Kigyouka Expo"

Each year, the "MIC/NICT Entrepreneurs' Challenge 2 Days" is held jointly with the Ministry of Internal Affairs and Communications (MIC). It is made up of the "Kigyouka Koshien" ("Entrepreneur Koshien"), where students who are enthusiastic about creating their own ICT startups compete with their business plans, and the "Kigyouka Expo" ("Entrepreneur Expo"), where promising regional ICT startups introduce their business plans, and promote business matching, including fundraising and expanding their sales channels.

In terms of participants, in order to gather a broad range of talented people from around the country, supporters of entrepreneurs (as men-

tioned above) cooperate with events held across Japan, including business plan presentation competitions for students and startups. These events are considered the regional events of the "Kigyouka Koshien" and the "Kigyouka Expo," and the participants of those two are chosen from among the people involved in the events held by the supporters of entrepreneurs. In fiscal year 2017, the 2 Days were held on March 7 and 8, 2018, and nine teams of students selected from events for universities and technical colleges around the country gave presentations at

the "Kigyouka Koshien." The "Kigyouka Expo" saw presentations from eight NICT-originated venture companies and ICT venture companies recommended by Regional Entrepreneur Supporters, and at the exhibition booths inside the venue the companies got involved in business matching and PR for their products and services. At the contests, excellent teams and companies were awarded the Minister of Internal Affairs and Communications' Award, or a special award from the committee (Figure 1). The FY2018 event is scheduled to be held in

Figure 1   Kigyouka Koshien

Marunouchi Hall (Marunouchi, Tokyo) over two days, on March 11 and 12, 2019.

■ Displays at exhibitions in Japan and overseas

The finalist companies at the "Kigyouka Expo" are given the opportunity to exhibit at CEATEC (held in October each year). Each company carries out PR for their products and services at their exhibition booths, and attempts to business match with visitors.

The finalists of the "Kigyouka Expo" are also given the chance to exhibit overseas at TechCrunch DISRUPTSF, held in San Francisco, and to business match with visitors there (Figure 2).

■ Discovering and promoting regional ICT startups

In order to discover and cultivate the seeds of promising local ICT startups and entrepreneurs, we hold kick-off seminars and brush-up seminars in cooperation with Regional Entrepreneur Supporters, to enhance local collaborative events.

In addition, to give those who will be participating in the "Kigyouka Koshien" a chance to gain a global mindset, we run a "Silicon Valley Entrepreneur Training Program" on the West Coast of the U.S. (so called Silicon Valley), which includes networking with local ICT ventures, and lectures given by venture entrepreneurs active in the area.

■ Information available on the Internet

At the ICT Startup Promotion Center (URL: http://www.nict.go.jp/venture/), accessible via the NICT homepage, we give details of local collaborative events held around the country to provide complete, beneficial information for ICT ventures. We also have a video library of the "Kigyouka Koshien" and "Kigyouka Expo," and are aiming to enrich the information content even more, plus we give constant information updates on Facebook.

**Figure 2   The Silicon Valley Entrepreneur Training Program**

Participants of "Kigyouka Koshien" Visit Minister of Internal Affairs and Communications

On June 29 this year, seven students who participated in the Kigyouka Koshien of the previous fiscal year (FY2017) visited the Ministry of Internal Affairs and Communications to call upon Minister Noda and explain each of their business plans. "Everyone's plans conveyed a sense of 'I want to be of use to someone,' which made me feel very happy. I hope that in the future you are all able to do jobs where you can satisfy yourselves, and use your intelligence. And I hope that you make lots of people happy" were Minister Noda's words of encouragement.

On the following day (June 30), five of the seven students who visited Minister Noda participated in a poster session at the "NICT Open House 2018" (Koganei City, Tokyo) and enthusiastically explained their business plans to many of the visitors. In terms of awards, the five students won a prize for the best poster, the President's award, a prize for excellent research, the Idea award, and an encouragement award, respectively.

The students who visited Minister of Internal Affairs and Communications Noda
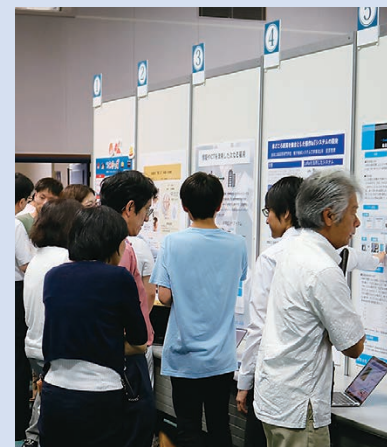
The poster session at the "NICT Open House 2018"

Message about the Creation of Regional ICT Startups

CEO of Sansan, Inc

Chikahiro TERADA ✕ **Hideyuki TOKUDA**

President, NICT

Mr. Chikahiro TERADA, CEO of Sansan, Inc., joined Mitsui & Co., Ltd. after graduating from university. After being assigned to the Information Industry Department, he was transferred to Silicon Valley branch office and became responsible for a cutting-edge American venture company. Following his return to Japan, he started up an internal corporate venture that imported and sold database software, and was later seconded to an affiliated company where he was in charge of business management and administration. He left Mitsui & Co. in May 2007 and founded Sansan, Inc. with four of his fellows. It has now grown so much that it is familiar to us from TV commercials.

The company participated in the predecessor to the Kigyouka Expo, the Information Communication Venture Business Plan Presentation Contest held in fiscal year 2009, and afterwards they offered their cooperation as a supporting company of the Kigyouka Expo; we have arranged a special discussion between Mr. TERADA and our President Dr. TOKUDA.

In this discussion, Mr. TERADA spoke to Dr. TOKUDA about the particulars of how he started his company, his expectations for the current Kigyouka Koshien and Kigyouka Expo, and advice for people aiming to start their own businesses.

TOKUDA: Thank you for taking time out of your busy schedule to talk to me. Mr. TERADA, you graduated from the same university and campus as myself (Keio University Shonan Fujisawa Campus), and you've been incredibly successful in starting up a business – the trigger for that success was your participation in the Information Communication Venture Business Plan Presentation Contest, the predecessor to the current Kigyouka Expo held by the NICT with support from the Ministry of Internal Affairs and Communication. I've been looking forward to meeting you and being able to talk to you. First, looking back, what was it that made you take the plunge when you started up your company?

TERADA: I'd really wanted to start my own business since I was in university. It wasn't so much that I steeled myself and left the company to start my own, but rather that I intended to create a business in the future, and chose which company to join when I was job hunting. Based on that assumption, I thought, "Now is the time," when the timing was right, and went for it.

TOKUDA: You started your business in June 2007. At that time, the NICT had inspired many different people with an entrepreneurial spirit, and wanted to foster numerous startups in Japan, so the Information Communication Venture Business Plan Presentation Contest was held. Mr. TERADA, you participated in FY2009. What memories do you have of that time?

TERADA: At the time, it was extremely important for us to receive an award to promote our company. And so, we went for every possible award. To have participated in and won the most formal of those, the NICT competition, meant that we were able to accelerate our business. I remember that it was really lively.

TOKUDA: Around that time, you also participated in an event hosted by the U.S. Embassy and won a prize, is that right?

TERADA: We heard that the American Embassy was giving awards to encourage entrepreneurship in Japan, so we applied for it. As a result, we received the U.S. Embassy's award and mentoring directly from the American Ambassador.

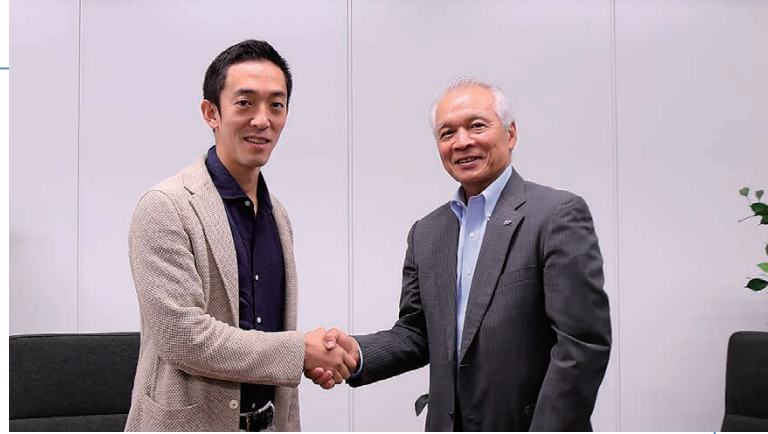## You should accelerate growth while confirming the market environment

TOKUDA: I understand that you received various awards and became noticed, and that your capital gradually increased, but looking back, what did you feel at each turning point?

TERADA: Speaking from a financial perspective, it really is difficult for a venture company to grow without properly keeping up with the flow of society. We've felt a great flow in these last 10 years. From around 2010, venture capital funds grew incomparably. I think that the most important element of a venture is to use external resources well and somehow accelerate your growth while confirming the market environment.

Creating academically recognized branding

TOKUDA: The structure of the current Kigyouka Expo and Kigyouka Koshien is such that those involved don't just win prizes in the contest, support companies and investors are also taking part, and to some extent it functions as a device linking people to the next step. Could you give us any suggestions you might have from your perspective relating to areas that are lacking and could be changed in this function?

TERADA: Compared to when I participated, contests for venture companies have increased a lot. The Kigyouka Expo and Kigyouka Koshien are NICT initiatives closely linked to research institutions, so I think it might be good if you could have more branding (visibility) that is recognized by academic bodies and researchers. In other words, it would be great if you could become a place to be recognized academically in the sense of, "Appearing there and winning a prize in NICT contests is the gateway to success for startups," and linked to the later recruitment of researchers. If you do that, I think that there would be even more incentive to aim for the NICT contests.

Starting a business improves careers

TOKUDA: At the moment there are a lot of very young people aiming for the Kigyouka Koshien, the youngest being students in technical colleges. In America, because they think starting their own company is more important to them than graduating from school, there are many students who drop out of school; do you have any messages you would like to pass on to young people?

TERADA: Even in today's world, there are notions in people's mind that starting up a business is high-risk and scary is still present. I think that it is just an impression of parent-generation age of participant's of Kigyoka-Koshien, However I honestly think there are absolutely no risks. Nowadays, we don't get huge debts through joint and several guarantees. Even if you do fail, you may have lost around three years' worth of your time, but that should give you accumulated experience. If someone who has failed in starting up a venture comes for an interview in my company, we understand that he/she has an incredibly strong career. In that sense, I think that starting a business improves your career. I think they lost only small thing lose by starting a business.

TOKUDA: I think that your message of "Even if you fail, it will help your career" is a very important one. When you started your company, you wanted to change the world. It's now 10 years since you started your company – how do you think you want to change the world now?

TERADA: Saying "I want to change the world" gives the impression that I'm trying to create something revolutionary, but my mission is to slightly change the commonplace in business encounters, and create encounters that will change the world. I'm continuing to face that challenge, and would like to achieve something early on.

TOKUDA: I'm sure that you will come up with new innovations for the next stage and bring Japan forward. Thank you very much for your time today.

Supporting Research and Development in Universities and the Industrial-Academic Sphere and Returning the Results of NICT Research to Society

Deployment Promotion and International Exchange Planning Office
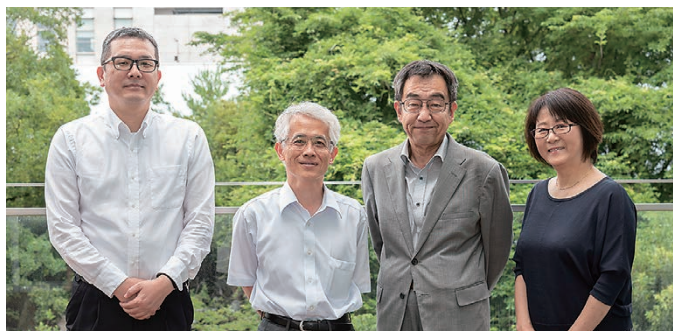
Deployment Promotion and International Exchange Planning Office staff

International exchanges for people of talent, and international cooperative research in the industrial-academic sphere and universities are important for enhancing information and communications technology and promoting research and development in Japan. The Deployment Promotion and International Exchange Planning Office's NICT International Exchange Program offers two types of assistance: inviting excellent researchers from overseas to come to research institutions in Japan, and supporting international research conventions to be hosted in Japan. Through this program, we ensure exchanges of people of talent from overseas research institutions. Furthermore, by supporting ventures based on the results of NICT research and development, we return the results of NICT research to society.

■ The NICT International Exchange Program with two types of assistance, and the Japan Trust International Research Cooperation Program

The NICT International Exchange Program offers two types of assistance through the Foreign Researcher Invitation Program (Figure 1) and the International Conference Support Program (Figure 2). Both programs are linked to research and development in the field of information communication, and aim to contribute to the sharing of the latest technologies and research information, improving the level of technology and fostering human resources by facilitating international researcher exchanges, as well as aiding the promotion of research and development and international cooperation.

The Foreign Researcher Invitation Program accepts researchers from overseas and supports Japanese institutions who wish to carry out research, technological development, and academic and educational activities in the field of information and communications technology. The program covers costs, such as the necessary lodging and travel expenses when inviting a researcher to Japan.

On the other hand, the Japan Trust International Research Cooperation Program, which is limited to private companies, supports travel and lodging expenses for researchers invited to Japan from funds gathered from private volunteers (a charitable trust). Through the Foreign Researcher Invitation Program, the universities and corporations who accept researchers actively create collaborative papers and research publications, and this is linked to the production of research results.

The International Conference Support Program offers support to invite foreign researchers to Japan and host international and academic research conferences relating to research and development in the field of information and communications technology. The NICT conducts this program with entrusting part of the work involved in holding an international research conference in a research institution to a university holding a conference or an institution affiliated with the party responsible for holding the conference.

In recent years, applications for suggestions for either program for the following fiscal year and the year after that have been open from around August to October each year. Details will be announced on the NICT International Exchange Program page* on the NICT website when applications first open.

■ Support for ventures based on NICT research and development results

Having the intellectual property rights NICT owns enforced by the researcher that created them, the NICT supports projects created at the time of establishment or after the establishment of the venture, with the aim of giving our research results to society via technology transfer, and promoting their practical use.

So far, around 10 ventures have been established, and with the aim of making it easy to share research with NICT researchers, we offer support such as loans of NICT facilities with more advantageous conditions than is customary; more than half of the ventures have moved into NICT facilities. From now on, more ventures based on NICT research and development results will be established, and our challenge will be creating a better environment to promote these projects.

Figure 1　Structure of the Foreign Researcher Invitation Program (Only private companies are eligible to apply for the Japan Trust International Research Cooperation Program)
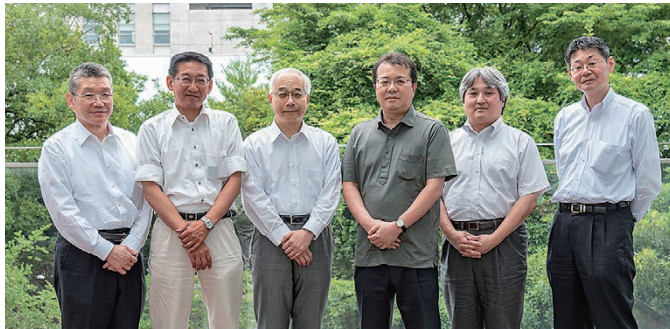

Figure 2　Structure of the International Conference Support Program

＊NICT International Exchange Program URL: http://www.nict.go.jp/deploy-support/int_prog.html (Japanese only)

Support for starting up information communication venture businesses, and the promotion of research in foundation technologies

Business and Technology Research Promotion Office

Business and Technology Research Promotion Office staff

When a project is started up, it is necessary to raise funds and prepare facilities for the project in order to commercialize it. Furthermore, with the progress of the project, new fundraising, technological developments, and more capital investment can be expedited, and its scale expanded. However, a considerable risk may be involved in the commercialization of the next-generation information services and infrastructure development. The Business and Technology Research Promotion Office (hereafter called the Office) offers various kinds of monetary and financial support, and fosters the contract projects in this risky business scene.

■Our three main duties

There are three main duties of the Office. They are (1) supporting information communication venture businesses, (2) developing information communication infrastructure, and (3) promoting fundamental technological research and development in private companies. These are our pillars, and details are given below.

(1) Supporting information communication venture businesses

In order to promote the creation of new businesses in the field of communication and broadcasting, the Office offers capital investment (6 companies, 1 union) and debt guarantees (4 companies) to venture companies that are at an early stage of foundation.

The current main work of the Office is to manage two companies in which the Office already made an investment and to guarantee the debt that the proprietors of the IoT testbeds and the local data centers are burdened with.

(2) Developing information communication infrastructure

Developing information communication infrastructure means giving monetary assistance such as interest subsidies for developing CATV facilities and terrestrial digital broadcasting facilities (a total of 661 carriers), and for developing telecommunication business lines such as optical fiber cables (a total of 258 carriers)(as of FY2017).

The facilities that receive this support are part of infrastructure maintaining the current Japanese communication and broadcasting businesses.

At the moment, the Office grants subsidies for the development of IoT testbeds (6 businesses) and local data centers (13 businesses) (as of the end of FY2017), and makes efforts to bring IoT into effect as soon as possible and

to disperse large amounts of data to the local areas other than the metropolitan area (Figure 1 and 2).

(3) Promoting fundamental technology research and development in private companies

The Office has promoted the research, development and commercialization* of original, advanced technologies in the field of information communication by openly advertising for technological ideas (fundamental technology) that are too difficult for the private sector alone to cope with and by entrusting the research and development of the technological ideas to the companies that came up with excellent proposals (59 cases).

The current work of the Office is to promote the collection of investments from the profits that the research and development of contract companies yielded by following up on how the contract researches are progressing.

■Future prospects

The Business and Technology Research Promotion Office is limited to only what is needed to accomplish the purpose of the policy of the state, based on the government's decision on "the Basic Policy for Reviewing the Office Work and Business of Independent Administrative Agencies." The current main duties of the Office are to manage and supervise the contract projects and to collect the funds needed to support the contract projects.

The Office inspects appropriately the social recognition of the results of our support up to date and provides easy-to-understand information concerning the social significance of our support program including its invisible effects to the public. The Office believes that one of the most important duties is to strive to gain public understanding.

Figure 1   **The vinyl greenhouse built for developing and verifying environment sensing technology (offered by Yanmar Co. Ltd.).**


Figure 2   **Data center which is equipped with servers provided by making use of subsidies (offered by Ryobi Systems Co. Ltd.).**

＊Examples of the research results and commercialization: http://kiban.nict.go.jp/seika/seihinka_jirei_201610.pdf (Japanese only)

Creating a Barrier-free Environment for Information

Grant for the Development and Provision of Communication and Broadcasting Services for People with Disabilities

Information Barrier-free Office
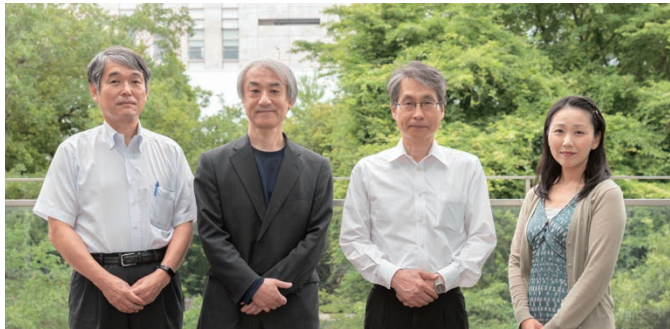
Staff at the Information Barrier-free Office

Barrier-free information refers to ensuring information communication that can be accessed by everyone, without barriers to access for senior citizens or those with disabilities.
For example, equipping webpages with a text-to-speech function so people with visual impairments can access written information, and having operators without disabilities as intermediaries who voice characters inputted by a disabled person and convert the speech of a person without a disability to text, in order to support telephone conversations between people with hearing-disabilities and people without disabilities in distant locations.

■ Barrier-free assistance services

To encourage creation of e an information barrier-free environment where everyone can use communication and broadcasting services equally, the Information Barrier-free Office is implementing several grant programs related to barrier-free information, based on the basic policy set out by the Minister of Internal Affairs and Communications.

The "Grant for the Development and Provision of Communication and Broadcasting Services for People with Disabilities" is one such grant. It offers assistance by partially funding the necessary expenses for private companies who develop and provide new equipment and services to carry out projects to ensure that people who have difficulty using communication or broadcasting services due to a physical disability can easily use applicable services (as in Figure 1 Support scheme and support details).

Applications for the grants are open from February to April each year, and the NICT will decide upon the recipients, based on the evaluation of an internally-established evaluation committee in NICT (made up of experts and people of knowledge and experience) that will take into account factors such as the benefits and influence of the project.

The "Grant for the Development and Provision of Communication and Broadcasting Services for People with Disabilities" was made available from fiscal year 2001. Recent grants include assistance for five projects in 2015 (around 35 million yen), four projects in 2016 (around 32 million yen), and five projects in 2017 (around 31 million yen). To the present day, a total of 129 projects have received assistance (total of grants: around 1 billion yen), and we have seen results including the start of new support services using images and voice.

From the next page, we introduce projects from ISCEC Japan and Beautiful Ones Co. Ltd. as examples of recipients of the grant. Examples of achievements to date are widely available in the information on our "site for the provision of information for barrier-free information" (http://barrierfree.nict.go.jp/ (Japanese only)). We also exhibit and present the results of those who received grants in the previous fiscal year at the International Home Care & Rehabilitation Exhibition, held each year in the fall (Figure 2). We will be exhibiting and presenting at this year's International Home Care & Rehabilitation Exhibition (H.C.R. 2018), to be held at Tokyo Big Sight October 10-12, where we hope that many of you will attend.
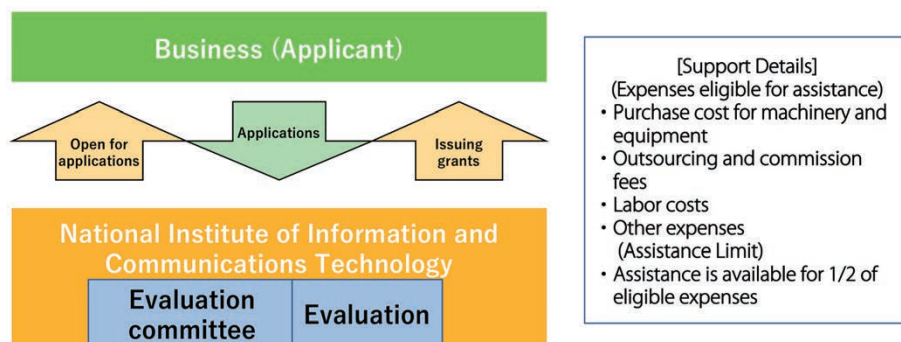

Figure 1　Support scheme and support details

Figure 2　Examples from the presentation of results at last year's International Home Care & Rehabilitation Exhibition

Supporting Learning among People with Hearing Disabilities

Iscec Japan Co., Ltd.

http://www.iscecj.co.jp/

"e-mimi" is an information accessibility service which delivers speech-to-text interpretation to people who have hearing difficulties, provided via a PC, smartphone, or tablet (iPad etc.); this service ensures that information can be accessed in an easy-to-use manner even in settings where this has proven difficult up to now.

President and CEO
Mr. Muneya ICHISE

■Special features of the project

The "Mobile Information Accessibility Service: e-mimi" featured in this project offers the following advantages over existing summary scribes.

- Information accessibility can be enabled from remote locations, so data inputters' seats do not need to be prepared at the venue.
- Provided that smartphones and a terminal allowing connection to the network environment are available at the venue, no other special equipment is required.
- The service aims to interpret all speech into text as far as possible, and quick reports of conference minutes can be delivered immediately after conferences are finished.
- The service is available 24 hours a day, 365 days a year (to be reserved before 1 week in advance of the event).

■Challenges and future prospects

When people think about providing communication support for people with hearing disabilities, "sign language" is usually what comes to mind. However, of the 360,000 people with hearing disabilities who are certified as disabled in Japan, only around 50,000-60,000 can understand sign language, with the majority relying on written text in order to access information. Furthermore, as society continues to age, there are now believed to be more than 10 million people who need text-based information accessibility.

Thanks to the progress made by artificial intelligence (AI) technology in recent years, speech recognition tools are now becoming easy to use. When AI is used in information support tools for ordinary conversations and dialogues with friends, these tools work very effectively because any small misunderstandings which may arise in such situations are unlikely to become major problems.

However, when a person is listening to an important class or lecture or taking part in an assembly or conference, such tools do not provide sufficient information accessibility. For this reason, the service Iscec Japan provides—a high-accuracy, high-speed system which incorporates human inputting—has won excellent reviews.

There is still a lack of awareness when it comes to information accessibility for people with hearing disabilities, and live subtitling is not available at all conferences and seminars, meaning that people with hearing disabilities are not always able to participate in such events as they like. Furthermore, the support provided at classes at senior high schools and universities remains far removed from what people with hearing disabilities would like to see.

As we look ahead to Tokyo 2020 Olympic and Paralympic Games, we are putting all possible efforts into improving the quality of information accessibility and boosting awareness surrounding this issue through this project, in order to enhance information accessibility for people with hearing disabilities.
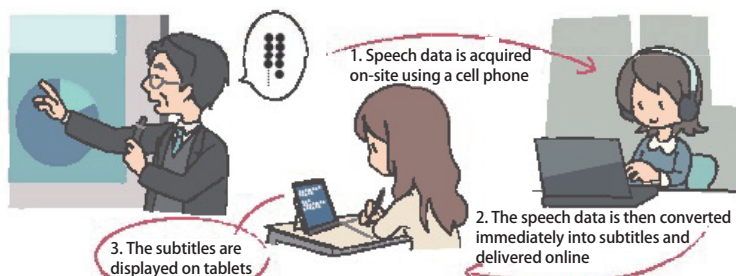
Outline of the promoted project	
Name	Mobile Information Accessibility Service (e-mimi)
Outline	This service delivers textual information from remote locations to senior high schools, universities, lectures and seminars by using computer-based speech-to-text interpretation, in order to support learning among people with hearing disabilities.
Track record of major activities	Established track record at assemblies in Takeo City in Saga Prefecture, Ota Ward in Tokyo, Nanjo City in Okinawa Prefecture, and the towns of Takahama and Wakasa in Fukui Prefecture. A track record has also been established at classes and lectures at senior high schools and universities.

No special equipment is required

The only equipment needed to use e-mimi is a cell phone capable of sending speech data to the center. The cell phone can be connected to the acoustic equipment at the venue, or held by the speaker; the event can then proceed as normal. If the users are enrolled in a no-charge call plan, they can even use the service without paying call charges.

Accurate, fast subtitling

Operators ensure that they learn specialized terminology and expressions particular to the region in question in advance of the event, enabling them to deliver virtually all speech in subtitle form. Moreover, as the subtitles are inputted by several people, speech can be captured at high speed.

1. Speech data is acquired on-site using a cell phone

2. The speech data is then converted immediately into subtitles and delivered online

3. The subtitles are displayed on tablets

Subtitles are delivered in text form after being finalized

At the same time as the speech contents are being delivered to the user in real time as subtitles, the same contents are also being stored in a log in the form of text data. Once the log is completed, it can then be used as lecture notes by anyone, including both users with hearing disabilities and those without.

Subtitles are delivered in real time

The subtitles can be viewed anywhere by simply opening up the URL where they are presented, using a PC or smartphone. Robust security is ensured, since a password must be entered in order to view the page.
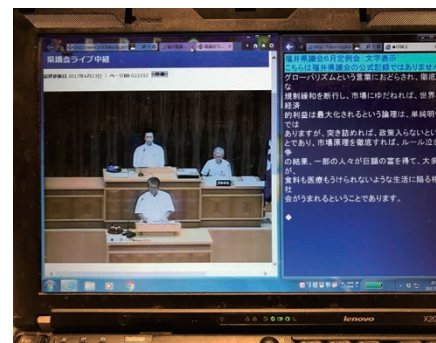
Example showing the screen delivered by the e-mimi service

Barrier-free Access for Cultural and Artistic Activities

Beautiful Ones Co., Ltd.

http://b-ones.co.jp/

A service for displaying explanatory information (subtitles, graphic illustrations, photographs etc.) for art galleries, museums, aquariums, and Noh theaters etc. on tablets. It allows foreign tourists and people with hearing disabilities as well as regular users to fully enjoy the value of art and culture, eliminating disparities in access.

President and CEO
Mr. Eiji SANO

■Special features of the project

This project features the concept known as "universal design" to cover the needs of the tourist service industry, allowing the development of a sustainable business model for providing services aimed at people with hearing disabilities, which represents a smaller market.

By broadening the range of beneficiaries to include people with hearing disabilities and foreign tourists as well as regular users, this service can help to expand the markets for cultural and tourist facilities such as Noh theaters, art galleries, and museums, and it is hoped that this will serve as an incentive for enhancing barrier-free functions at such facilities.

■Challenges and future prospects

Across Japan, there are a total of nearly 1,000 cultural and tourist facilities where this service could be introduced, including 84 Noh theaters, 859 art galleries, museums and aquariums and many other facilities, meaning that the potential impact of this project is immense.

The future vision for this service is to greatly expand the markets where it is used by making use of the "universal design" concept which is its special characteristic, incorporating the service into barrier-free functions (which aim to eliminate disparities in access) at cultural and tourist facilities. In particular, there are plans to introduce tablet-based guide terminals into art galleries, museums and aquariums and the like, which are more numerous than theaters and where audio guides are currently the norm, increasing the number of recreational facilities that are accessible for people with hearing disabilities and helping to make a barrier-free society a reality.

Tokyo 2020 Olympic and Paralympic Games are having an aspect of special festival of arts and culture, and the enhancement of cultural programs is also a point that is set out in the Olympic Charter. Tokyo will therefore need to have infrastructure that can eliminate disparities in access and ensure that foreign tourists and people with hearing disabilities as well as regular users can fully appreciate the value of culture and the arts. Information communication tools are sure to play a role in developing such infrastructure in the spaces where spectacles and objects of interest are to be found. In this project, we are working to create a service design that will expand the "framework" of services for the disabled to include the concept of "access to information."
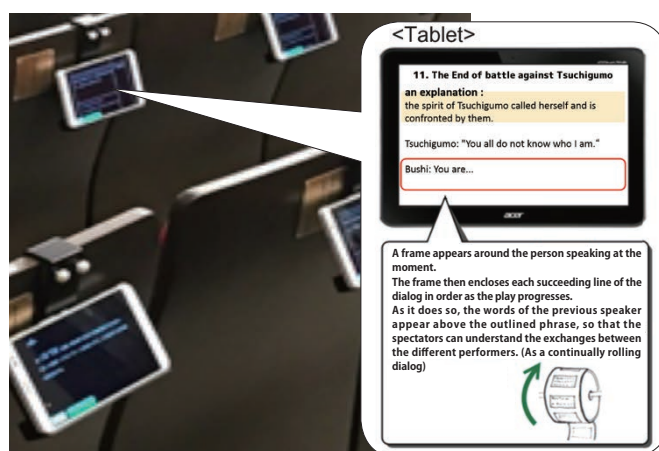
We hope that this tool will play a role in developing barrier-free access for the domain of culture and the arts, while also invigorating cultural and artistic activities.

Outline of the promoted project

Name	A service that helps to eliminate disparities in barrier-free access for theaters in regional areas through the remote operation of tablet loaning service operations for tablets on which subtitles are displayed
Outline	A universal design-based service in which tablets displaying explanatory information (subtitles, graphical illustrations, photographs etc.) at cultural and tourist facilities are lent to people with hearing disabilities, foreign tourists, and regular visitors.
Track record of major activities	Major users who have used this service so far: Yarai Noh Theater, Yokohama Noh Theater, Kyoto Kanze Noh Theater, Mori Butai or stage-Traditional Performing Arts Museum, Hosho Noh Theater, Kongoh Nohgakudou, Moriyama Citizen Hall, Kioi Hall, Hotel Okura Tokyo (banquet halls), others

We have developed this technology into a universal design-based multi-functional service which will enable people across a wide range of customer segments—including not only people with hearing disabilities but also first-time spectators and those with little experience of watching Noh theater, as well as foreign tourists—to appreciate this art form.

<Tablet>

11. The End of battle against Tsuchigumo
an explanation :
the spirit of Tsuchigumo called herself and is confronted by them.

Tsuchigumo: "You all do not know who I am."

Bushi: You are...

A frame appears around the person speaking at the moment.
The frame then encloses each succeeding line of the dialog in order as the play progresses.
As it does so, the words of the previous speaker appear above the outlined phrase, so that the spectators can understand the exchanges between the different performers. (As a continually rolling dialog)

To ensure that people with hearing disabilities holding the tablets find it easy to understand the nature of the techniques being exhibited on stage and the words spoken by the performers, the system features a function for displaying subtitle information on the tablet to accompany the dialog on stage. It is also fully equipped with a function that automatically switches the subtitle information page as the play progresses.

The Era of Pseudoscience

Motojiro YOSHIHARA
Chief Senior Researcher, Frontier Research Laboratory, Advanced ICT Research Institute
He received a Human Frontiers Science Program fellowship to do postdoctoral work at the City of Hope, California. After working as a visiting scientist at MIT, he joined the Department of Neurobiology at the University of Massachusetts Medical School as a faculty member in 2006. In 2013, he left University of Massachusetts Medical School to work as a visiting professor at MIT. In 2014, he moved back to Japan, and joined NICT. Ph.D. (Science).

When science is spoken about in logical words, it may be difficult to suspect the framework of thought that supports its basis in scientific research. Right now, biology has reached a critical situation, and the fact that it is not perceived as a risky situation is making the condition ever more serious.

What came into vogue, riding high on the echoes of successful experiences in molecular genetics in the 1990s, was a term that conjures up confusion, "necessary and sufficient." The phrase "necessary and sufficient" has a robust meaning, namely "equivalent." This powerful nuance has started to be used by certain biology researchers in a way that departs from the original meaning, probably for the purpose of advertising.

"Necessary" and "sufficient" are specialized terms in formal logic, but because these are the same words that are used in everyday speech, caution is required. As shown in A in the figure for example, one can say "if it is a square, then it is a rectangle"; in this case, the fact that "it is a square" is sufficient for the fact that "it is a rectangle," and the fact that "it is a rectangle" is necessary for the fact that "it is a square." However, by using false "logic," the results of experiments into loss of function using mutations" were made to be interpreted as "Protein X is necessary," while the results of experiments into "forced expression of proteins" were made to be interpreted as "Protein X is sufficient." Then, some people have put these together as a set and started to claim that "Protein X is necessary and sufficient." It appears likely that "necessary and sufficient" reverberates powerfully, and if that is the case, then it is because it tends to give an impression of being "logical." However, as shown in the upper half of B and C in the figure (see Reference 1 for details), these two terms, "necessary" and "sufficient," do not engage with each other. Thus, there is no base for making them a set.

■ False "necessary and sufficient" is an "indulgence" of pseudoscience

The pseudo-logic that came into vogue during the 1990s gradually permeated the world of biological research in the 20-plus years that followed, and has in recent years reached a point where it is used routinely in the titles of papers. Furthermore, when "optogenetics," the science of controlling the activity of nerve cells by illuminating laboratory animals with introduced genes (such as channels that influence nerve activity), started in 2005, the pseudo-logic was used in abundance, even in the field of neuroscience, through calling cell activation "sufficient" and inactivation (or elimination) "necessary" (lower half of B and C in the figure). There was a great number of people who recognized that this pseudo-logic was not a correct logic, but what exacerbated the situation was the fact that people left the matter with an open-minded attitude, assuming that "this is just the unique language of biology, and if it differs from the original meaning, then it is just a word problem." Even worse, as in the saying "if everyone runs a red light, then there's nothing to be afraid of," the number of people that use this pseudo-logic has increased at an accelerated rate, and the false "necessary and sufficient" started to present a respectable face, as if they were "technical terms," and have firmly established their arrival in the world.

However, this was far from simple semantics. The framework of thought has been undermined by these words, and while many people are blissfully unaware, we have descended into a situation where "pseudoscience" papers that are total nonsense as science are being published one after the other in the top journals with "necessary and sufficient" appearing as their signature phrase. This is because false "necessary and sufficient" appears true even when the part to manipulate and part in interest are separated. In neuroscience experiments, in particular, which are complicated and in which the structures are difficult to see, this separated state occurs frequently, so the trend is strikingly high. Nevertheless, the strong message conveyed by "necessary and sufficient" gives a mistaken impression as if the manipulated target were at the center of the problem, preventing people (including even researchers) from noticing the separation. Our critique that pointed out this problem[*1] was supported throughout the world for a short moment. Having looked at such large repercussions, *Nature* Office recognized the seriousness of the subject and introduced our critique in the Editorial to set alarm bells ringing further, by citing the words of George Orwell[*2]. There is absolutely no way that we can allow the current situation, where young people are lost within fields brimming with pseudoscience, to be left in its current state. I will straighten things up, even if I have to do it alone in the beginning.
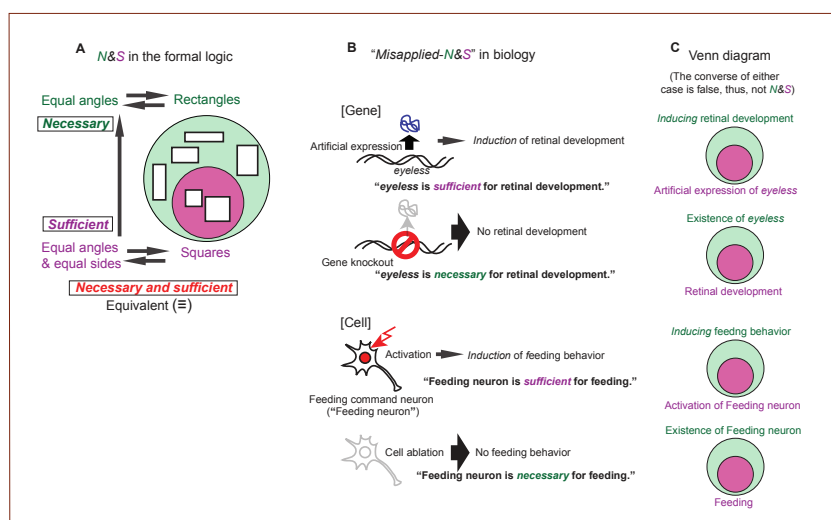

Figure: Necessary conditions and sufficient conditions. A: Correct necessary conditions and sufficient conditions in formal logic. B: False "necessary and sufficient" in biology. C: Venn diagram showing that necessary conditions and sufficient conditions do not engage with each other or have an "inverse" relationship with one another. Each Venn diagram corresponds respectively with each example in B. Cited from Reference 1. For details, see Reference 1.

References
*1. Yoshihara and Yoshihara (2018) Journal of Neurogenetics 32, 53-64
*2. Nature Editorial (2018) 558, 162 (https://www.nature.com/articles/d41586-018-05418-0)

TOPICS

"NIRVANA-Kai 2" with Added Vulnerability Management Platform Function
– From an NICT Press Release –

Cyberattacks often take advantage of "vulnerabilities" – exploitable bugs or weaknesses of computer programs that, when abused by an attacker, could cause organizational information security to be compromised. In order to mitigate cyberattacks, "vulnerability management" of the information systems within an organization is important. The number of vulnerabilities found and made public is increasing, thus the cost of managing vulnerabilities – collecting, assessing, and mitigating vulnerabilities – is increasing. Therefore, effective vulnerability management has been a challenge in the security community.

The NICT has been making advancements in the research and development of its comprehensive cyberattack analysis platform "NIRVANA-Kai" for the purpose of making cybersecurity operations more efficient.

Now, with its newly-developed "NIRVANA-Kai 2," the NICT has streamlined vulnerability management within organizations, and added functionality as a vulnerability management platform through implementing the capability to work with the open-source vulnerability scanner, "Vuls," developed by Future Corporation (Yasufumi Kanemaru, President, Chairman, and Group CEO) to visualize in real-time the results of vulnerability scans by Vuls on servers within an organization (Figure 1).

NIRVANA-Kai 2 allows visualization of an overall status of vulnerabilities detected in servers within an organization, and makes it easier to access detailed information of each vulnerability (Figure 2). If a major vulnerability is found which has the potential to impact a wide range of servers, the actual impact within an enterprise network could be visualized by initiating the actuation (automatic response) function of NIRVANA-Kai 2 to trigger an urgent full scan by Vuls (Figure 3).

The systematic cooperation between NIRVANA-Kai 2 and Vuls enables simpler and more cost effective vulnerability management within an organization.

At "Interop Tokyo 2018" held at Makuhari Messe on June 13–15, 2018, the NICT succeeded in the interconnected cooperation with a record number of security device types, specifically 38 (from 21 companies), and furthermore succeeded in verifying security operations using NIRVANA-Kai 2. Going forward, the NICT aims for NIRVANA-Kai 2 to extend its function as a common vulnerability management platform, and plans to collaborate with a variety of vulnerability scanners and other systems or services, as with Vuls.
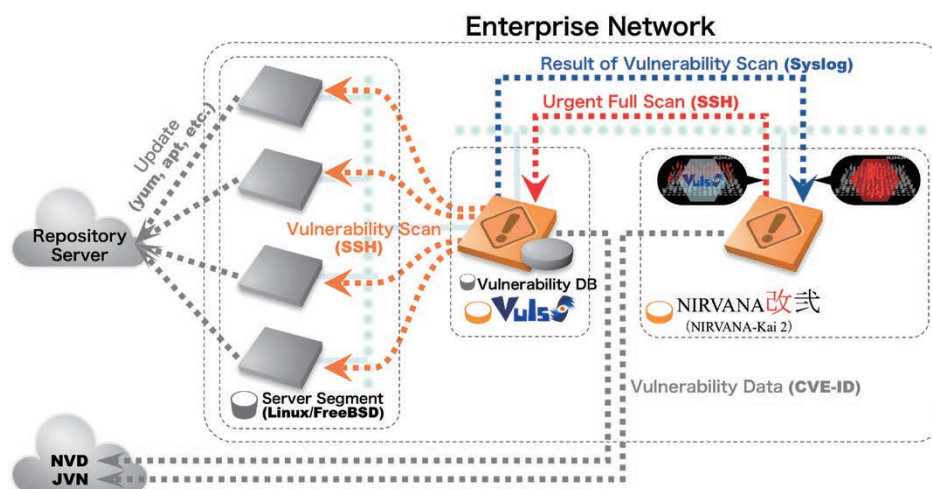

Figure 1   Cooperation between NIRVANA-Kai 2 and Vuls

Figure 2   NIRVANA-Kai 2 implemented an interface to trigger an urgent full scan by Vuls.

Figure 3   A server in which vulnerability is detected as a result of a vulnerability scan by Vuls

■**Related press release**
• **"Development of Vulnerability Management Platform "NIRVANA-Kai 2""** (June 11, 2018 http://www.nict.go.jp/press/2018/06/11-1.html (Japanese only))

The Interop Best of Show Award is an award decided at one of the largest general network computing exhibitions in Asia, Interop 2018 Tokyo (June 13–15, 2018 Makuhari Messe / organizer: Interop Tokyo Steering Committee), judged by a review committee comprised of heavyweights from the leading media companies and experts from the academic worlds to be "this year's dish." The "**Advanced Technology Award Fuji Sankei Business i Prize**" targets a broad range of fields, including electronics, information, bioscience, materials, construction, and chemistry; it is a prize awarded to commend young researchers and engineers in industries, academia, or government who have excelled in originality and creativity and achieved brilliant research results, with a view toward practical application in the near future.

Interop Tokyo Steering Committee
Interop Best of Show Award
Grand Prize in the Demonstration Category

National Institute of Information and Communications Technology＊

＊ Received as an organization

ICT Testbed Research, Development and Operations Laboratory, ICT Testbed Research and Development Promotion Center / Cybersecurity Research Institute, Cybersecurity Research Laboratory

Overview
●Description: **Construction of Interop's venue network "ShowNet"**

The winner constructed a system that enables the distribution and recording of Syslog and xFlow at speeds exceeding 10Gbps in order to meet the demands of Interop's venue network "ShowNet" that requires many more devices to be handled across a wider bandwidth than one would ordinarily consider, and exhibited the contents that were actually operated within ShowNet.

This study was made up of some of the results of joint research by the Japan Advanced Institute of Science and Technology and the NICT that applied the NICT's experimental facility StarBED.

●Date received: June 13, 2018

●Joint recipient: Japan Advanced Institute of Science and Technology

Comment from the Recipient
In addition to widening bandwidths in recent years, networks now have various middle boxes, such as security devices, connected. When networks are operated by organizations, it is important for safe system operation, security measures and preservation of evidence to distribute the huge volumes of log and flow information produced by these numerous devices to analysis systems without loss and to record this information.

In this study, problems like the above are resolved not by using dedicated hardware but in software by using general servers; the fact that a flexible user interface was created was also highly praised.

Comment / Toshiyuki Miyachi
Associate Director of ICT Testbed Research,
Development and Operations Laboratory,
ICT Testbed Research and Development Promotion Center
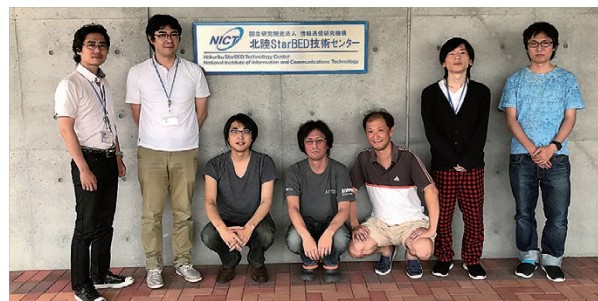
From left, Miyachi, Enomoto, Inoue, and Akashi (all four of them, Testbed), Uda (JAIST), Miura (Cybersecurity Research Laboratory), Yumura (ICT Testbed Research, Development and Operations Laboratory)

The 32ⁿᵈ Advanced Technology Award "Fuji Sankei Business i Prize"

Shin-ichiro Inoue
Director of DUV-ICT Device Advanced Development Center,
Advanced ICT Research Institute

Overview
●Title: **Research and development of 150mW high-power deep-ultraviolet LEDs based on nanophotonic structures and techniques**

The work was praised for overcoming the technological challenges in deep-ultraviolet light-emitting diodes (DUV-LEDs). One of the most challenging tasks for penetration of the potential applications in this field is to increase the optical output power of the DUV-LEDs. In this work, the world's highest power output DUV-LEDs (exceeding 150 mW) were successfully demonstrated, which greatly exceeds, for the first time, the level for practical application.

As a frontier of light technology, following the development of blue-LEDs, DUV-LEDs are expected to have a revolutionary contribution to a wide range of fields, from sterilization of viruses to the environment, lithographic microfabrication, medical diagnostics, and ICT. This technology is an epochal breakthrough in efforts toward the realization of its spread through society.

●Date received: July 11, 2018

Shin-ichiro Inoue having received the prize [photograph provided by Sankei Shimbun]

Comment from the Recipient
It is a true honor to receive this prize, which is incredibly prestigious. I would like to express my deepest thanks to everybody involved who has given me constant support and assistance. Going forward, I will further extend the research and development of this field to contribute to the creation of a safe, secure, and sustainable society.

Inoue (right) explaining the details of the achievement of the prize to Princess Hisako (left) who attended the prize ceremony (at Meiji Kinenkan)