

Open Up Bright Future

2024
Autumn

Xross B5G

English Edition

Beyond 5G R&D Promotion Unit
National Institute of Information and Communications Technology

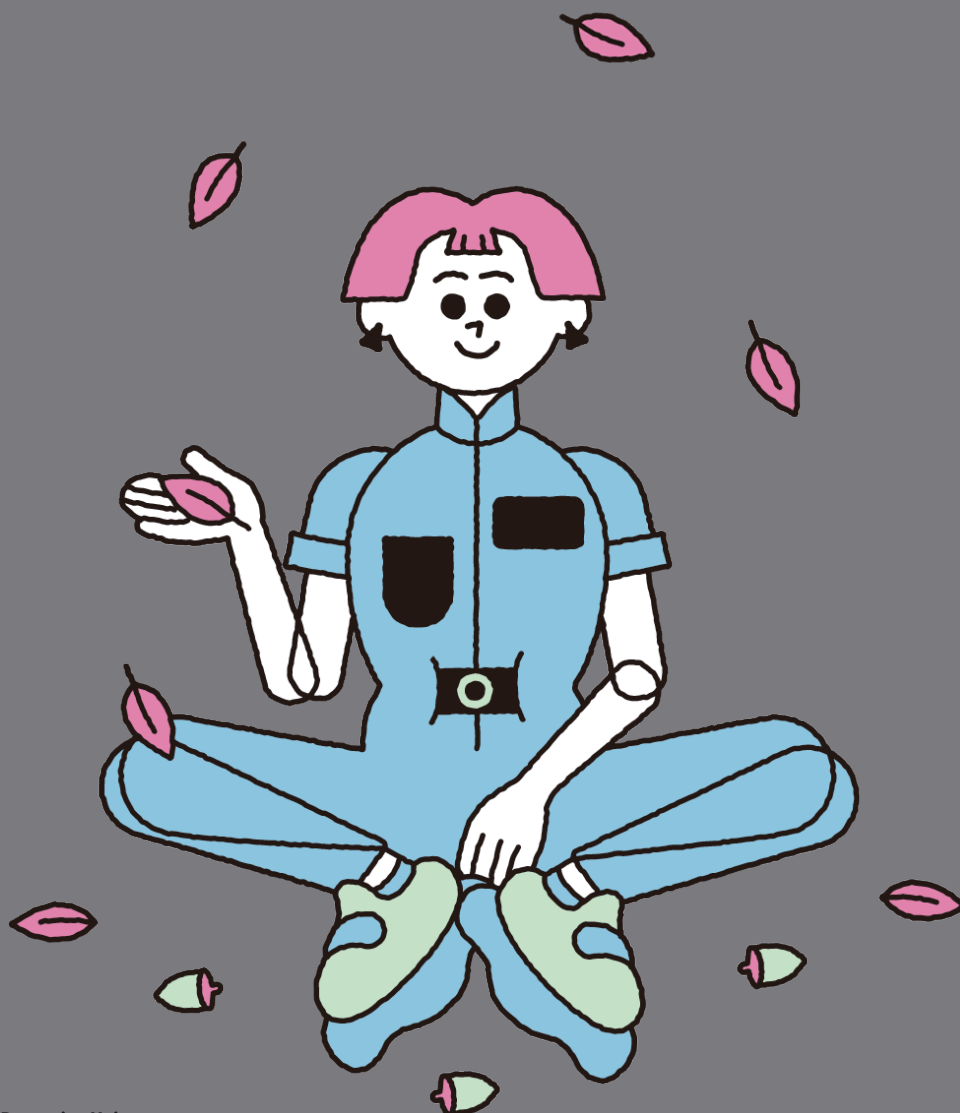
A Forum for Discussion

Germany-Japan Beyond 5G/6G Research Workshop (in Berlin 6G Conference 2024)

Exhibition at NICT Open House 2024

Notes on the development of a demonstration system making it together as a forum for discussion (#1)

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Update

Germany-Japan Beyond 5G/6G Research Workshop (in Berlin 6G Conference 2024)

This article reports on the "4th Germany-Japan Beyond 5G/6G Research Workshop" (hereinafter referred to as the "Germany-Japan Workshop"). This workshop was planned as a session of "Berlin 6G Conference 2024".

Berlin 6G Conference 2024

The Berlin 6G Conference 2024 is the largest event in the 6G field in Germany, and is held by inviting industry, academia, government and related parties in Germany as well as countries with close ties in the field. The number of participants reached about 1,000, and more than 20 people from NICT participated.



Dr. TOKUDA Hideyuki President of NICT giving a keynote

From NICT, President TOKUDA Hideyuki gave a keynote speech, introducing the roles of NICT and Beyond 5G/6G-related activities, as well as the history of Germany-Japan workshops and R&D projects selected for the Beyond 5G collaboration fund within NICT. There were also demonstrations from several research hubs and related companies. NICT also held six posters and one demonstration.

Germany-Japan Workshop

The first Germany-Japan Workshop was held in April 2023 (Headquarter, NICT), the second in June 2023 (Berlin, Germany), and the third in February 2024 (Nihonbashi Innovation Center, NICT) with the aim of promoting exchanges between researchers in the Beyond 5G/6G field in Japan and Germany and activating collaboration.

This fourth session was planned as a session at the Berlin 6G Conference, and we expected many people to participate. We aimed to disseminate information on Germany-Japan collaboration in Beyond 5G/6G R&D and involve more stakeholders. As a result, about 100 people attended the meeting, which was nearly full, and lively discussions were held.

The meeting began with a speech by Professor Hans D. Schotten on behalf of 6G Platform. Engelbert Beyer, Head of the German Federal Ministry of Education and Research (BMBF), introduced the 6G initiatives of the German government, and Professor NAKAO Akihiro of the University of Tokyo introduced an overview of XG Mobile Promotion Forum (XGMF) in Japan. In addition, as an example of a Germany-Japan collaboration project, Dr. SHOJI Yozo, Director of the Social-ICT System Laboratory, gave a progress report on a Germany-Japan collaboration project with the Aachen University of Technology, and 12 ongoing projects also made lightning presentations. At the end of the meeting, Dr. ISHIZU Kentaro, Director of Beyond 5G Design Initiative, expressed his expectation that many projects born from this community will bring about further progress.

The fifth conference is scheduled to be held in January 2025 at Sendai Japan. Through this workshop, Germany-Japan collaboration projects have been proposed, and the research community between Japan and Germany is also growing. We will continue to make efforts to create research results.



Participants in the Germany-Japan Workshop



Dr. ISHIZU Kentaro giving an address



Venue of the Germany-Japan Workshop

Exhibition at NICT Open House 2024

- The shape of a new society realized by Beyond 5G -

"NICT Open House 2024" was held again this year from June 28 (Fri) to 29 (Sat) at the headquarters of National Institute of Information and Communications Technology in Koganei City, Tokyo Prefecture.

On the first day and 28th, as for business, NICT held a keynote speech by President TOKUDA Hideyuki and a special lecture entitled "Exploration of the land to develop digital nature" inviting Dr. OCHIAI Yoichi, Head of R&D Center for Digital Nature at the University of Tsukuba, as a special guest. Despite the unfortunate rain, it was crowded with many people.

On the second day and 29th, as for students and the general public, a wide variety of programs were prepared, such as a NICT exploration tour, a talk session in which NICT staff members talked about their true feelings, and the antarctic postal service, antarctic corner, and quiz rally, which were very popular among small children, and the venue was filled with families, students, and the general public. Under such circumstances, the NICT, which has nearly 700 staff members engaged in research-related work, was divided into several buildings and held "Technical Exhibitions" (95 titles this year!) to exhibit the contents of each research for two days.



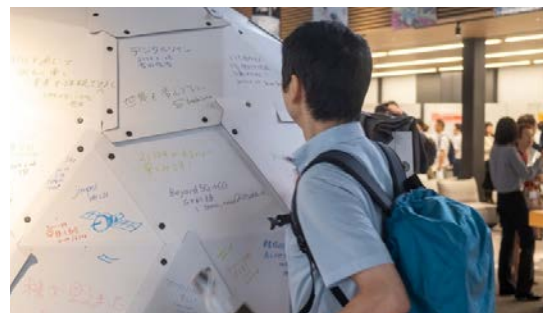
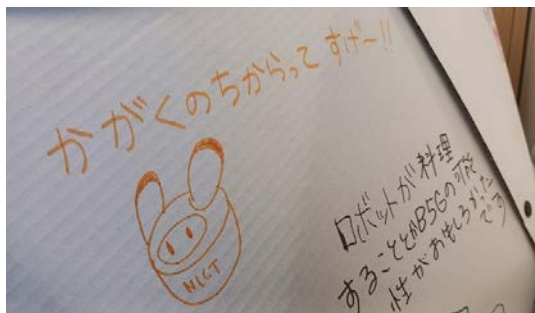
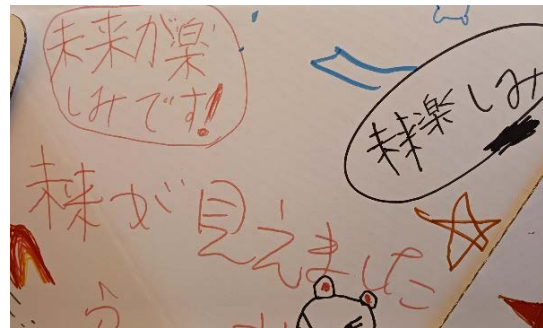
At the Technology Exhibition of the Beyond 5G Research and Development Promotion Unit, under the title of "The Shape of a New Society Realized by Beyond 5G," we exhibited a Dome Theater where you can experience the mechanism of Beyond 5G and touch panel content where you can experience how Beyond 5G solves social problems. From small children to students, companies, and local governments, each of us has a different understanding of the research content of NICT toward the Beyond 5G era, but

it was an opportunity to feel again that there are great expectations for our future society that we will visit in the future. We would like to continue to tell you how exciting the future of people living in Japan and the world will be with advances in information and communications, and how NICT's new technologies and ideas will be shaped.



We received a lot of comments from everyone at the Dome Theater.

Thank you.



Update

Notes on the development of a demonstration system making it together as a forum for discussion (#1)

- Development of Demonstration System for Service Proof-of-Concept by Beyond 5G -

In order to realize Beyond 5G, NICT is conducting R&D on leading-edge elemental technologies and Beyond 5G architecture as a mechanism for utilization across industrial boundaries. Through this architecture, Beyond 5G is expected to become a place for the creation of new services beyond its mere function of providing communications. Currently, NICT is conducting collaborative research with several research institutes on the issues and effectiveness of building services using "digital twin collaboration" and "orchestrator", which are components of Beyond 5G and function to determine and collaborate appropriate combinations of systems across industrial fields. As part of this research, we are developing a demonstration system for the proof-of-concept (PoC) of services using Beyond 5G. This paper introduces this demonstration system several times from this time, including the progress of development.

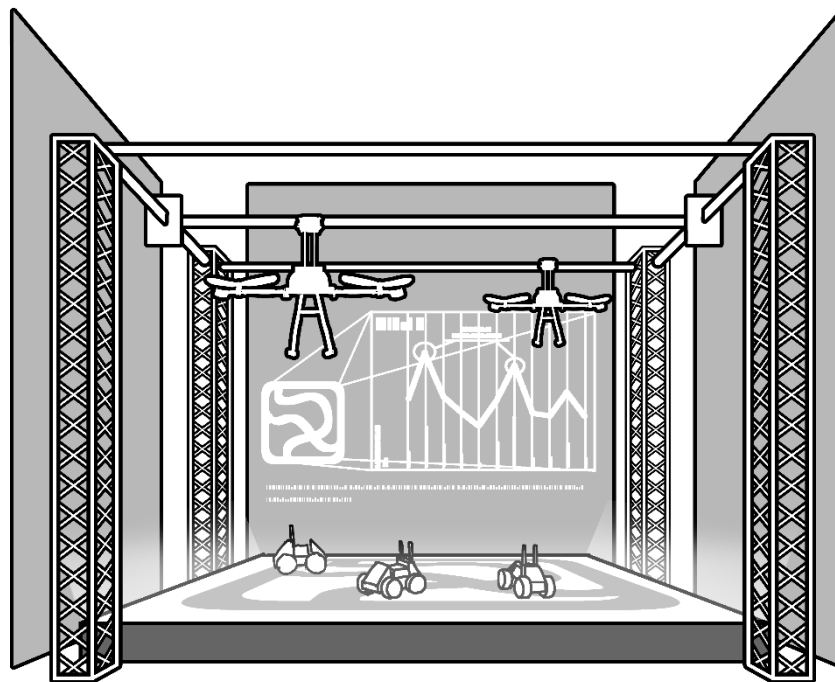


Fig. 1 Image of Assumed Demonstration System

Fig. 1 shows an example of the demonstration system. On the left side, the right side, and the front side are large screens displayed by projectors. On the floor of the stage are LED panels that project roads and the city. A model vehicle running on an LED panel and a drone suspended from a gantry move through the stage, assuming a vehicle running in the city and a drone flying in the sky. There are digital twins between the vehicle or drone and cyberspace, and they manage the current position, movement commands, and future path prediction. In addition, the vehicle and drone are equipped with device for ultra narrow spot

communication in the millimeter-wave band, which is assumed to be Terahertz band wireless communication, and can communicate at ultra fast speed when the drone and vehicle are facing each other.

In addition to digital twins for vehicles and drones, there are digital twins such as road/traffic digital twins and people's flow, and information can be exchanged between each digital twin according to instructions from the orchestrator. In the demonstration, we assume several service scenarios, and using the future prediction of each digital twin, vehicles and drones that are moving at every moment cooperate to travel and navigate a rational path. In this case, when an event that assumes a crowded people's flow or a physical obstacle on the road occurs, if we know whether each digital twin can act rationally according to the optimizing policies instructed by the orchestrator, we can verify the effectiveness of the service using the functions of the Beyond 5G.

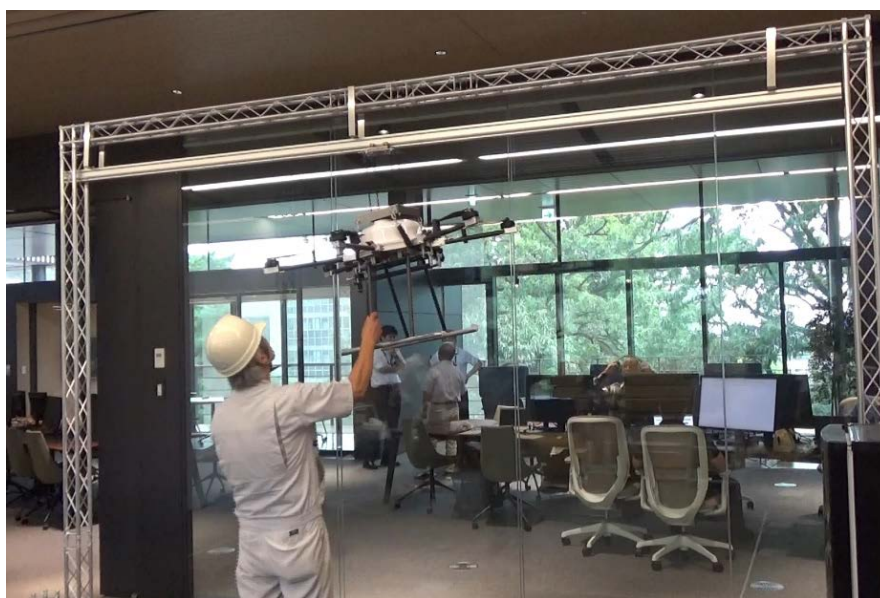


Fig. 2 Drone suspended from the gantry loader

Fig. 2 shows a gantry loader and a drone model which are parts of this system. In the future, we plan to proceed with examinations of the specific configuration of the system and the materialization of scenarios, etc. This system is positioned as a place for implementing technologies within NICT, and we are proceeding with the development of this system with a strong awareness of its character as a place for demonstration in cooperation with collaborative research partners. We also hope that this system will be used as a forum for people from various industries to see the system and discuss how to germinate and grow bud of new services. Therefore, we would like to proceed with the construction while discussing with as many people as possible in an environment where it is easier for people to cooperate, such as by disclosing the progress of making from the state before completion. Why don't we all discuss it together?

Event Briefs

- A summary of lectures and other events held at various locations -

July 12, 2024 (Fri)

We gave a visiting lecture at National Institute of technology, Toyama College.

"National Institute of technology, Toyama College" is a college of technology consisting of a total of six departments: four engineering departments (Department of Mechanical Engineering, Department of Electrical and Control Systems Engineering, Department of Applied Chemistry and Chemical Engineering, and Department of Electronics and Computer Engineering), one humanities and social sciences department (Department of International Business), and one maritime engineering department (Department of Maritime Technology). The total number of students at the Hongo campus and the Imizu campus is about 1,400. This time, we visited the Imizu campus.

Two visiting lectures were held in the morning and afternoon for about 20 students.

In the morning, a lecture was given by Dr. ISHIZU Kentaro, Director of Beyond 5G Design Initiative, and a touch panel demonstration was held under the theme of "The City of the Future created by Beyond 5G." In the afternoon, we participated in a seminar and exchanged opinions on use cases of Beyond 5G under the theme of local events. We received a lot of questions from students, and we could tell that they are studying while being interested in various things on a daily basis.

In the future, we hope that they will grow as colleagues who will build the future of Beyond 5G together.



July 24 (Wed) - 26 (Fri), 2024

The Beyond 5G Research and Development Promotion Unit and others exhibited at the TECHNO-FRONTIER 2024, and Director ISHIZU of Beyond 5G Design Initiative gave a speech.

"TECHNO-FRONTIER 2024," sponsored by the Japan Management Association, was held at Tokyo Big Sight. It was a comprehensive exhibition supporting the creation of Japanese manufacturing and new industries, and this year attracted more than 36,000 visitors and more than 900 exhibitors. For the first time, the Beyond 5G Research and Development Promotion Unit and the Social-ICT System Laboratory of the ICT Testbed Research and Development Promotion Center exhibited at a manufacturing exhibition.

The atmosphere of the venue was different from that of other information and communications exhibitions. Many modern technologies such as industrial machinery, robots, electrical and electronic equipment, and motors were on display, attracting many visitors. The Beyond 5G Research and Development Promotion Unit exhibited touch panel content simulating Beyond 5G technology and orchestrator functions, and the Social-ICT System Laboratory exhibited ultra narrow spot wireless communication technology assuming the use of Terahertz band.



At the seminar venue, Dr. ISHIZU Kentaro, Director of Beyond 5G Design Initiative, gave a lecture on NICT's R&D for the Beyond 5G Era under the title of "How Systems in the Beyond 5G Era Will Change! ~ Cross-Industry Collaboration through Open Architecture."



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EVENT EXHIBITION SCHEDULE

Please come and visit our exhibition!

The 5th Germany-Japan Beyond 5G/6G Research Workshop 20250121 → 22 @Sendai, Katahira Sakura hall

The 5th Germany-Japan Beyond 5G/6G Research Workshop
2025.1.21-22 Tohoku University Katahira Sakura Hall
<https://beyond5g.nict.go.jp/en/event/20250121Germany-Japan-Workshop.html>



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