Open Up Bright Future

2024
Winter

Xross B5G

English Edition

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

Dialogue with Stakeholders

Report on Exhibition at CEATEC 2024
Participation in "Ideathon + Sendai 2024"
Event Briefs

NICT
Beyond 5G R&D Promotion Unit

Contents

XrossB5G 2024 Winter

Feature

Dialogue with Stakeholders

Report

Report on Exhibition at CEATEC 2024

- An integrated exhibition of life, technology, and services in the Beyond 5G era -

CEATEC (Combined Exhibition of Advanced Technologies) is one of the largest technology exhibitions in Japan. It is held every year at Makuhari Messe in Chiba Prefecture. CEATEC brings together the latest IT and electronics technologies and products with the aim of realizing a **"Society 5.0"** that achieves both economic growth and the resolution of social issues. This year, it was held from Tuesday, October 15 to Friday, October 18. Many companies and institutions from Japan and overseas exhibited, and the number of participants exceeded 110,000.

NICT participated in this international technology exhibition again this year. Since last year, NICT has been making preparations at a rapid pace to present the latest results of its R&D on the four strategic areas (Beyond 5G / AI / ICT / Cyber security), which is indispensable for the realization of a Society 5.0 that will bring cyberspace and physical space together at a high level.

The CEATEC 2024 venue and NICT's Beyond 5G exhibition

At the Beyond 5G exhibition booth, under the theme **"Beyond 5G with AI"** the concept of Cyber Physical Systems (CPSs), the image of services utilizing CPS, and fundamental technologies such as terahertz wave wireless communication were introduced through touch panels and demonstrations of actual equipment. The exhibition contents are as follows.

~ Exhibition Contents ~

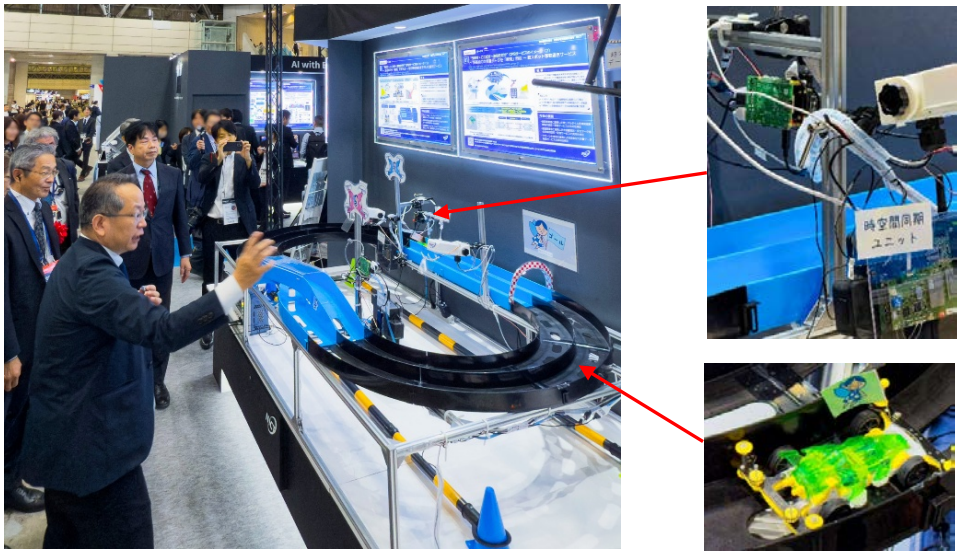
(1) Concept: Touch panel for explaining the outline of the CPS utilization system

A touch panel was exhibited to allow anyone to intuitively understand how to use CPS, which are assumed to be one of the components of Beyond 5G, and its concept. The touch panel introduced specific examples of the CPS in a story format, in which the roles and needs of orchestrator were presented, and many people experienced how Beyond 5G will bring new value to future society through the new services realized there.

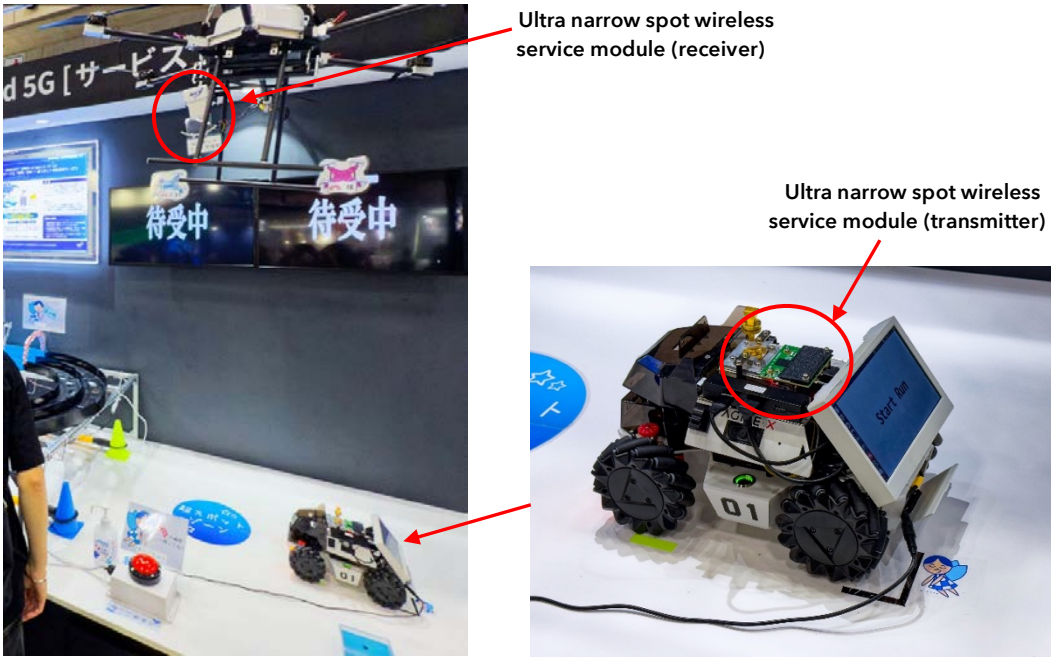
[Concept] Introducing specific examples of new services utilizing Cyber Physical System (CPS) on a touch panel

(2) Service: Demonstration of ultra narrow spot wireless service

A demonstration was held where participants could experience the actual operation of ultra narrow spot wireless service, which is anticipated to be a crucial technology supporting CPS. This exhibition combined space-time synchronization technology and terahertz wave communication technology. Space-time synchronization technology synchronized the time of cameras, while terahertz wave wireless communication technology transferred images from cameras to vehicles and from vehicles to drones. Video data received by drones was displayed on monitors, allowing visitors to intuitively understand the process.



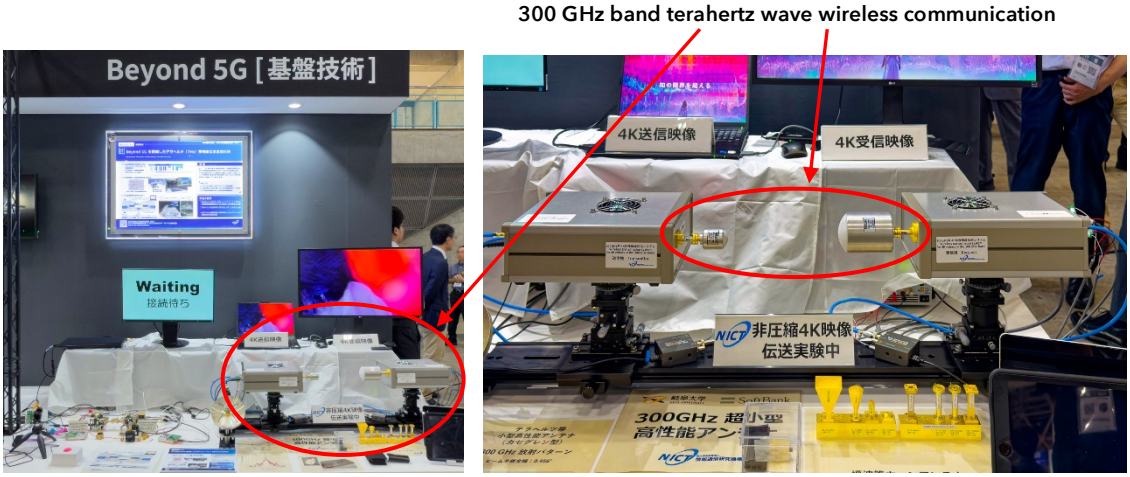
[Service] A demonstration where a model car driving at a high speed is shot with two cameras with space-time synchronization and the video is played back without deviation



[Service] Demonstration of ultra fast & large capacity wireless communication in the millimeter-wave band assuming a terahertz wave wireless communication when vehicles enter the ultra narrow spot zone directly below the drone

(3) Fundamental technology: Terahertz wave wireless communication

The R&D results on terahertz wave wireless communication technology, which forms the basis of CPS, were exhibited. In the demonstration of the uncompressed 4K video transmission system using the 300 GHz band terahertz wave, high-definition video was shown on two monitors without delay.



[fundamental technology] Demonstration of uncompressed 4K video transmission system using 300 GHz-band terahertz waves

In addition to skeptical comments such as "Isn't it too early to look at Beyond 5G when 5G is not yet widespread enough?", "Isn't it going to require a huge amount of computation?", and "Isn't it necessary to install more base stations to realize the future as presented by this touch panel?", many visitors responded positively to the potential of Beyond 5G, saying things like "I clearly saw how next-generation technology will help society" and "I have high hopes for the possibility of orchestrator creating new industries and services. Through many discussions with various stakeholders including such opinions, we recognized the importance of agile R&D.

At CEATEC 2024, the **"Concept", "Service"** and **"Fundamental technology"** which are the results of NICT's R&D for the realization of Beyond 5G, were exhibited in a harmonized manner. We felt that visitors could intuitively understand the connection between each technology and service. We aim to continue working as a team to realize the next-generation communication infrastructure through concept construction with service in mind and R&D that further advances the maturation of fundamental technology.

Report

Participation in "Ideathon + Sendai 2024"

- Surviving disasters! Regional disaster mitigation and prevention through ICT -

On Saturday, November 9, 2024, SHINKAWA Masayuki, innovation producer of the Beyond 5G R&D Promotion Unit, participated as a mentor in "Ideathon + Sendai 2024," sponsored by Tohoku University and NICT. An exhibition on Beyond 5G (Beyond 5G architecture video and touch panel " The Future with Beyond 5G") was also held. This event, now in its seventh year, saw participation from 21 individuals, including university students and working adults, at Tohoku University.

Given the recent series of major earthquakes and the significant damage caused by heavy rain disasters such as linear precipitation bands, the theme of this year's event was **"Surviving disasters! Regional disaster mitigation and prevention through ICT."** There was a heated discussion about new disaster mitigation and prevention mechanisms and services.

First, at the Input Seminar, MATSUDA Mie, a researcher at the Cybersecurity Research Institute, gave a lecture on disaster mitigation and prevention cases and analysis methods. Following this, we divided into four teams to discuss services that could lead to disaster mitigation and prevention. Each team engaged in lively discussions, resulting in many original ideas, such as a new disaster prevention radio, a disaster prevention app to maintain disaster awareness, and the identification of damaged areas using vending machines.

Additionally, to stimulate discussion, an exhibition of Beyond 5G using a touch panel video* was held alongside the Ideathon. I was pleased that even those unfamiliar with Beyond 5G found it "very easy to understand" and said, "This is a great future" when I explained it. The touch panel also included a scenario related to disaster prevention, which aligned with this event's theme, and I thought it provided useful insights for considering services.

*The video of the touch panel can be viewed from the following site.
Video of "The Future with Beyond 5G"
https://beyond5g.nict.go.jp/media/tpmov.html

【Mentor responder SHINKAWA's impressions】

My team was made up of people from various backgrounds, from undergraduates to graduate students and working adults, and everyone was actively sharing their opinions. It was wonderful to see ideas being brushed up one after another as the discussion progressed. Even while serving as a mentor, I gained a lot of learning and discovery. It was very exciting to think that new ideas and creative ideas like those of the people who participated this time would lead to the reduction of disaster damage and the creation of a more livable city.

Thank you to everyone who participated.

Report

Event Briefs

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

September 30, 2024(Mon)

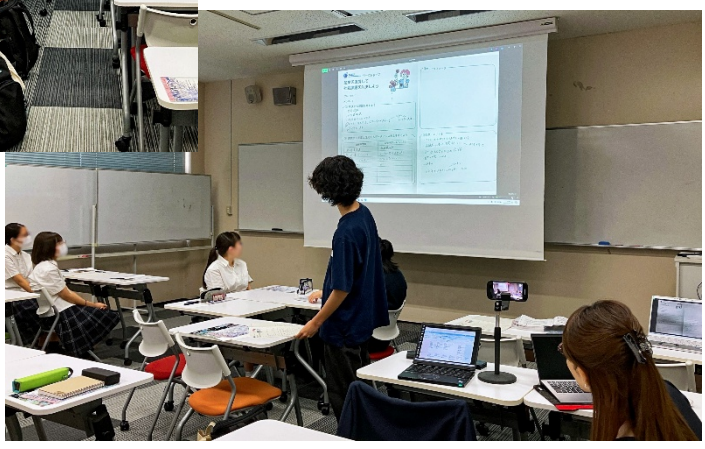
We gave a visiting lecture at the National Institute of Technology, Sasebo College.

The National Institute of Technology (KOSEN), Sasebo College is a technical college with five engineering departments (General Education, Department of Mechanical Engineering, Department of Electrical and Electronic Engineering, Department of Control Engineering, Department of Chemical and Biological Engineering), Advanced courses, and has about 840 students.

Despite being busy on the first day after the summer vacation, nine students attended. In the class, we gave an overview of Beyond 5G and held a touch panel demonstration on the theme of **"The Future with Beyond 5G"** and then as a workshop, we asked them to think about what problems can be solved in the cross-industry collaboration using Beyond 5G.

In the workshop, the students actively talked with each other and presented services that we had not thought of, and I could tell that the students' motivation was high and that they spent their student lives thinking about various things with interest.

We hope that all of you students will grow up as colleagues who build the future of Beyond 5G together.

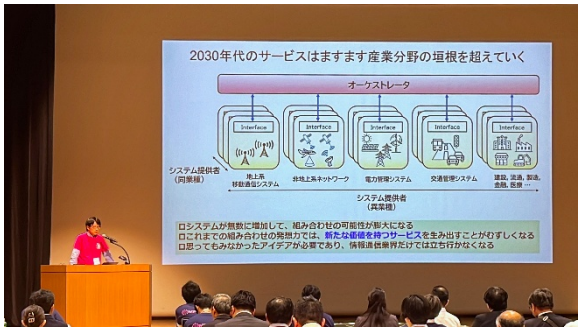


October 28 (Mon) - 30 (Wed), 2024

Beyond 5G R&D Promotion Unit exhibited at the MIKA 2024, and Director ISHIZU of Beyond 5G Design Initiative served as a moderator.

We exhibited the **Multiple Innovative Kenkyu-kai Association for Wireless Communications (MIKA)** of IEICE Communications Society. NICT once again participated in the exhibition and introduced R&D on Beyond 5G. Through exchanges with participants from participating companies and universities, we were able to deepen our understanding of research trends in wireless communication technology, and it was a good action to promote future research.

In addition, Dr. ISHIZU Kentaro, Director of Beyond 5G Design Initiative, an expert committee member, oversaw a planning session on the theme of **"Making Space Accessible: Toward Full Utilization of Cross-Industry Collaboration Technologies"** and served as a moderator of this session. Many people in many industries noticed the fun and difficulty of space activities, and that the content was interesting to students.



October 29, 2024 (Tue)

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

National Institute of technology (KOSEN), Kure College is located near **Aga** station in JR Kure line in Hiroshima prefecture. It is a very lively and wonderful school with about 840 students. The main courses are Mechanical Engineering, Electrical Engineering and Computer Science, Environmental and Urban Engineering, and Architecture, followed by an Advanced course of Project Design Engineering.

A total of 11 students participated in the lecture, including Prof. KUROKI Futoshi of the **Department of Electrical Engineering and Computer Science**, 8 from the regular course, and 3 from the advanced course. The lecture included an overview of Beyond 5G, a touch panel demonstration on the theme of "**The Future with Beyond 5G"** and a workshop. The theme this time was **"New services leading to problem solving by cross-industry collaboration."** Each group consists of 3-4 people, divided into 3 groups, and we discuss current social issues first. While many opinions utilizing our expertise were exchanged, we finally compiled **"New services possible by cross-industry collaboration".** Through the exchange with the students who will lead the world in the future, we also received a lot of stimulation.

Students at college, we hope you will continue to learn a lot and gain various experiences to grow as colleagues who build the future of Beyond 5G together. We look forward to seeing you again!

November 7, 2024 (Tue)

Director ISHIZU of Beyond 5G Design Initiative delivered a lecture at the FOKUS FUSECO Forum.

The **"FOKUS FUSECO Forum*,"** sponsored by Fraunhofer FOKUS, Germany, is held annually in Germany. The 2024 event took place in Berlin from November 7 to 8. Dr. ISHIZU Kentaro, Director of Beyond 5G Design Initiative, delivered a lecture on Beyond 5G R&D at NICT.

This event was attended by R&D leaders from Europe and other countries around the world. It was a good opportunity to meet them again and exchange opinions on the latest situation and future activities.

*Fraunhofer FOKUS 12th FOKUS FUSECO Forum

https://www.fokus.fraunhofer.de/ngni/events/fuseco-forum_2024

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Published: March 2025

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ISSN 2759-5269 ONLINE
ISSN 2759-5277 PRINT

EVENT EXHIBITION SCHEDULE

Please come and visit our exhibition!

EXPO 2025
OSAKA, KANSAI, JAPAN
Beyond 5G Ready Showcase
20250526→0603
@EXPO Messe "WASSE" (North), Yumeshima, Osaka

MWC Barcelona 2025　2025.5.26-6.3　EXPO Messe "WASSE" (North)
https://theme-weeks.expo2025.or.jp/program/detail/66f2925c03d52.html

EXPO 2025 Theme Weeks

9772759529002

ISSN 2759-5285 ONLINE
ISSN 2759-5293 PRINT

Xross B5G
English Edition
2024 Winter Volume 4

Published: March, 2025
Quarterly publication, 4 times a year

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