

# NTT DOCOMO Holds “5G Evolution & 6G Summit”

To promote the Research and Development (R&D) of fifth-generation mobile communications system (5G), its enhancements (5G Evolution), and the sixth-generation mobile communications system (6G), “5G Evolution & 6G Summit” was held on July 29 and 30, 2020 (Part 1) and August 27 and 28, 2020 (Part 2) on the web. This summit came to be viewed by many companies, universities, and individuals.

Launched as a commercial service in Japan in

March 2020, 5G is expected to drive the creation of new services and help find solutions to social problems in a variety of fields. Here, to respond in a flexible manner to a wide range of requirements that differ from field to field, further enhancements to 5G will be needed. At the same time, discussions on 6G have already begun in Japan and other countries aiming to launch commercial services around 2030. To this end, studies are being conducted on



Figure 1 Part 1 website information

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Photo 1 Part 1 back office (presentation side)

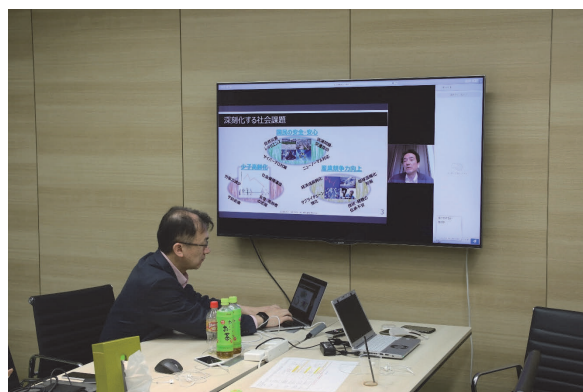


Photo 2 Part 1 back office (secretariat side)

Table 1 Panel discussions

Theme	Speakers
Human-augmentation/VR	Takeshi Ando Panasonic Corporation Masahiko Inami The University of Tokyo Hironao Kunimitsu gumi Inc. Tetsuya Mizuguchi Enhance Experience Inc.
Brain technologies	Kenichiro Iwasaki H2L, Inc. Takeshi Ogawa Advanced Telecommunications Research Institute International (ATR) Ryohei Hasegawa National Institute of Advanced Industrial Science and Technology (AIST) Ryosei Wakabayashi neumo, Inc.
Regional revitalization	Naoki Ota New Stories Ltd. Yuya Nishimura MIRATUKU Incorporated NPO Shoukei Matsumoto Buddhist Monk, Founder of "Mirai no Jushoku-Juku" project (temple management school)
Radio/network technologies	Tadashi Ogami NEC Corporation Takeshi Onizawa Nippon Telegraph and Telephone Corporation Takashi Dateki Fujitsu Ltd.
Space	Hiroyuki Iwamoto Japan Aerospace Exploration Agency (JAXA) Hidetaka Aoki SPACETIDE Shinichi Nakazato SKY Perfect JSAT Group Yuya Nakamura Axelspace Corporation

achieving even higher transmission speeds and capacities, extending coverage, lowering power consumption and costs, lowering latency, improving reliability, achieving massive-connectivity and sensing capabilities, and creating new use cases fitting 6G.

With the aim of promoting worldwide R&D in 5G enhancements and 6G, this summit presented exhibitions on NTT DOCOMO studies and invited outside experts in radio technologies and future 5G/6G use cases to participate in panel discussions.

During the two days of Part 1, the summit held

five talks and five panel discussions. The talks on the first day covered the topics of "Directions in 5G Evolution & 6G," "Requirements and Use Cases of 5G Evolution & 6G," and "Technology Developments and Study Areas in 5G Evolution & 6G." These talks included 6G whitepaper updates released on July 17, 2020 just prior to this summit.

On the second day, NTT DOCOMO Executive Vice President Naoki Tani gave a talk on "NTT DOCOMO R&D toward 5G Enhancements and 6G." This was followed by panel discussions on use cases envisioned for the 6G era under the themes of human

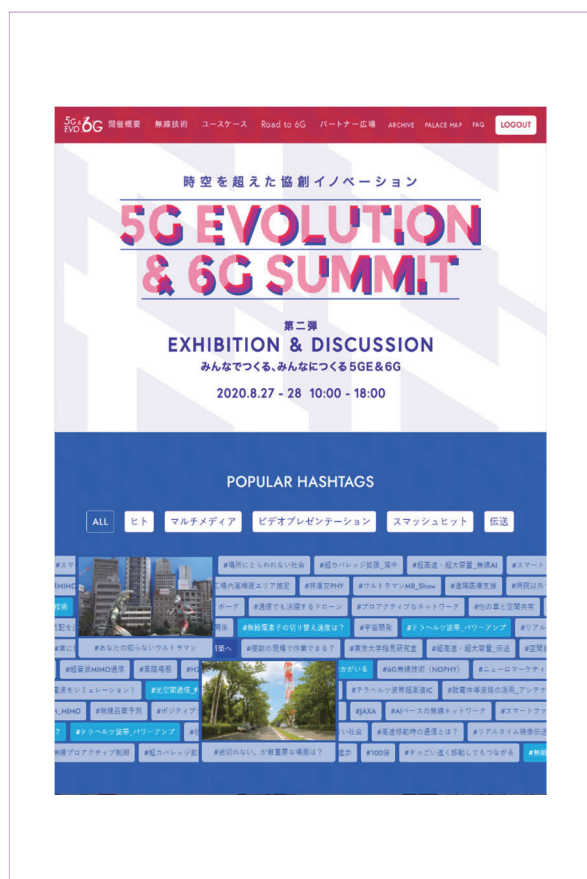


Figure 2 Part 2 website information

augmentation and Virtual Reality (VR), brain technologies, regional revitalization, radio/network technologies, and space. Passionate discussions ensued on each of these themes and on expectations for 6G. In addition, many viewers were able to watch these panel discussions online and ask questions and give comments using a chat system, which made for



Figure 3 Part 2 screenshots of text chat system

Table 2 Part 2 exhibitions

Network technologies		Use cases
5G Evolution & 6G Overall Image	Coverage Extension: Reflective Plate	Mobile SCOT Remote Medicine Experience
HAPS	Coverage Extension: Repeater	Remote Control of Construction Equipment
94 GHz Band Transmission Power Amplifier	Undersea Ultrasonic High-speed Wireless Transmission Technology	Transmission of High-presence Sensations Using 8K Video
150 GHz Transmission System	Use of Satellite Communications for Extreme Coverage Extension	Variable-rate Video Transmission
National R&D Project on Millimeter-wave High-speed Mobility	Analog RoF-Mobile Front Haul for Extreme Distributed Antennas	In-vehicle Infotainment Experience
Bended Dielectric Waveguide as Leaky-wave Antennas	Extreme-high-speed IC Technology for 300 GHz Band Radio Transmission	Sense-of-presence Communication Experience
AI for RAN (AI-based radio network)	OAM-MIMO Radio Multiplexing Transmission Technology	Introduction to Activities and Conversations with Experts in Human Augmentation (3 videos)
NOPHY (Non orthogonal PHY)	Multi-radio Proactive Control Technology: Cradio	Introduction to Activities and Conversations with Experts in Brain Technologies (2 videos)
Smart Factory: Social Implementation	Virtual Massive MIMO (VM-MIMO) Technology	
Smart Factory: High-accuracy Simulations	Introduction to Activities and Conversations with Experts in the Space Industry (2 videos)	
Smart Factory: Enhanced Transmission Technologies		





Photo 3 Part 2 back office (answering questions from inside/outside NTT DOCOMO)



Photo 4 Part 2 back office (secretariat side)

very lively discussions.

Part 2 of the summit featured the presentation of about 40 exhibitions and demonstrations on network technologies and use-case development in relation to 5G Evolution & 6G as promoted by NTT DOCOMO and partner companies. Being an online summit, viewers were able to make use of explanatory videos, a text chat system for exchanging messages and engaging in Q&A sessions, and a voice-chat system for interacting with presenters similar to an offline exhibition. These videos and chat systems helped viewers to obtain a deep understanding of the technologies presented. Additionally, through web content controllable by mouse operations, many online visitors were able to gain an intuitive understanding of use cases as well as to view video archives of

the talks, panel discussions and interviews with the experts on the themes taken up in Part 1, etc.

Today, in the era of the COVID-19 pandemic, it is far from easy to hold real exhibitions. At NTT DOCOMO, we are nevertheless committed to collaborating with diverse partners and engaging in energetic discussions through summits such as this one and other future activities. We will continue to promote R&D toward the evolution of mobile communications.

#### ✿ REFERENCE

- [1] NTT DOCOMO News Release: "NTT DOCOMO Holds '5G Evolution & 6G Summit—Enhanced 5G and Future 6G Technologies Released on the Web,'" Jul. 2020 (in Japanese).