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Title

Advanced Wireless Communications for Bridging Societies and Individuals

Abstract

This presentation highlights advanced wireless communication technologies that bridge societies and individuals toward a more inclusive and diverse future. First, for connecting remote areas and communities, multi-layer networking approaches that combine terrestrial and non-terrestrial networks (TN-NTN), along with autonomous multiple-drone flight for advanced air mobility, are introduced. In particular, demonstration experiments conducted under various use cases and environments are presented, focusing on drone communications such as autonomous swarm flight and wireless-based collision avoidance, which are key to real-world deployment. Next, research and development efforts toward the realization of “cybernetic avatar (CA) life,” promoted under Moonshot Goal 1 in Japan, are introduced. A CA is a comprehensive concept that includes not only surrogate robots and 3D avatars, but also ICT and robotics technologies designed to expand human physical, cognitive, and perceptual capabilities. Its goal is to free people from the constraints of body, brain, place, and time, enabling anyone to participate in society regardless of distance or physical limitations. To support this vision, highly reliable end-to-end communication is indispensable, and technological efforts to ensure the reliability and usability of teleoperation for diverse CA applications are introduced.

Photo



Biography

Takeshi Matsumura received the M.S. degree in Electronic Engineering in 1998 and the Ph.D. degree in Nano-Mechanics Engineering in 2010, both from Tohoku University. From 1998 to 2007, he was engaged in research and development of wireless communication devices in private companies. In

April 2007, he joined the National Institute of Information and Communications Technology (NICT) as a researcher in the Smart Wireless Laboratory, working on white-space communication systems and fifth-generation mobile communication systems. Since April 2016, he has also served as an Associate Professor at the Graduate School of Informatics, Kyoto University. In April 2019, he returned to NICT, and since April 2021, he has been Director of the Wireless Systems Laboratory. His research interests include beyond 5G mobile communication systems, enhancement of 5G / Local 5G systems, wireless emulation technologies, non-terrestrial networks (NTN), and highly reliable end-to-end communication for cybernetic avatars. Dr. Matsumura is a member of IEICE and IEEE.