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High-throughput satellite (HTS) with radio and optical frequencies for the next generation satellite communications

Ka-band broadband satellite communications services called high-throughput satellite (HTS) are now emerging all over the world. The National Institute of Information and Communications Technology (NICT) in Japan has established a user consortium to identify the future needs of communication-satellite users, has studied satellite-communication system concepts covering those needs, and has settled on technical issues for increasing communication speeds. The NICT has also come up with a conceptual design of a next-generation large-capacity satellite communication system. A feasibility study has been conducted into a prototype system, and development has begun. Our goal is to realize 100-Mbps-per-user, high-speed, large-capacity mobile communication using the Ka-band, and to implement flexible (variable-frequency bands and steerable beam) relay technology that can handle traffic fluctuations. According to projected increases in traffic and users, the feeder-link capacity in terms of frequency bands between satellites and terrestrial gateway stations will become exhausted soon. In addition, the radio regulations tend to make it difficult for RF bands to be allocated. To solve these issues, the feeder links could be achieved optically instead. The NICT has initiated the high-speed communication with advanced laser instrument (HICALI) project, for which NICT will develop an onboard ultra-high-speed laser communication system. The objective is to realize 10-Gbps-class optical feeder-link technology for a geostationary Earth orbit. The next step is to verify this technology on orbit, which would contribute to the next-generation hybrid (RF and optical frequencies) HTS. Here, the hybrid HTS communication system is introduced.

Biography

Morio Toyoshima received a PhD in Electronic Engineering from the University of Tokyo, Tokyo, Japan in 2003. He joined the Communications Research Laboratory (CRL, Ministry of Posts and Telecommunications) in 1994. He had worked in Japan Aerospace Exploration Agency (JAXA) from 1999 to 2003. In December 2003, he became a Senior Researcher in NICT. Starting in October 2004, he spent one year as a Guest Scientist at Vienna University of Technology, Austria. In April 2006, he returned to NICT and he is now the Director of the Space Communications Laboratory, the Wireless Networks Research Center in NICT, since 2011.

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