

External Awards

Young Engineer Award

Winner: Hiroyuki Takahashi, NTT Microsystem Integration Laboratories

Date: November 29, 2012

Organization: IEEE Microwave Theory and Techniques Society Japan Chapter

For “10-Gbit/s BPSK Modulator and Demodulator for a 120-GHz-Band Wireless Link”.

This paper presents 10-Gbit/s binary phase-shift keying modulator and demodulator modules for a 120-GHz-band millimeter-wave wireless link. To reduce system complexity, we selected differentially coherent detection for the demodulator and designed the modulator and demodulator without IF circuits. The direct-conversion modulator consists of a 180° hybrid coupler, gain-control amplifiers, and a Wilkinson combiner. The demodulator has a 100-ps delay line made with coplanar waveguides and a variable phase shifter. The modulator and demodulator were fabricated with 0.1- μm -gate HEMTs (high-electron-mobility transistors) lattice-matched to an InP (indium phosphide) substrate. A test element of the modulator exhibited a static vector error magnitude of 5%. We also mounted the modulator and demodulator in WR-8 waveguide modules and evaluated the characteristics of 10-Gbit/s data transmission. The bit-error rate for 10-Gbit/s pseudorandom binary sequence 27-1 data is 10⁻¹² at a received power of -39 dBm.

Published as: H. Takahashi, T. Kosugi, A. Hirata, K. Murata, and N. Kukutsu, “10-Gbit/s BPSK Modulator and Demodulator for a 120-GHz-Band Wireless Link,” *IEEE Trans. on Microwave Theory and Techniques*, Vol. 59, No. 5, pp. 1361–1368, 2011.

APMC 2012 Prize

Winners: Jun Takeuchi, Akihiko Hirata, Hiroyuki Takahashi, and Naoya Kukutsu, NTT Microsystem Integration Laboratories

Date: December 6, 2012

Organization: Asia-Pacific Microwave Conference

For “20-Gbit/s Unidirectional Wireless System Using Polarization Multiplexing for 12-ch HDTV Signal Transmission”.

This paper presents a 20-Gbit/s unidirectional wireless data transmission system with a 120-GHz-band wireless link using orthomode transducers (OMTs). The OMTs are used for polarization multiplexing unidirectional transmission of 120-GHz-band wireless link. We designed and fabricated a new finline OMT whose group delay is improved by adjusting the waveguide length. The measured group delay is 43 ps. Using the finline OMT, we developed new unidirectional wireless equipment that can transmit two channels of 10-Gbit/s data using cross polarization multiplexing. With this wireless equipment, we succeeded in transmitting 20-Gbit/s wireless data and 12-ch high definition television (HDTV) signals.

Published as: J. Takeuchi, A. Hirata, H. Takahashi, and N. Kukutsu, “20-Gbit/s Unidirectional Wireless System Using Polarization Multiplexing for 12-ch HDTV Signal Transmission,” *Proc. of 2012 Asia-Pacific Microwave Conference (APMC)*, pp. 142–144, Kaohsiung, Taiwan, 2012.

Best Presentation Award

Winners: Yusuke Ichikawa^{†1}, Yasunari Kishimoto^{†2}, and Toru Kobayashi^{†1}

^{†1} NTT Service Evolution Laboratories

^{†2} NTT Software Innovation Center

Date: January 17, 2012

Organization: SIG-CDS, Information Processing Society of Japan

For “A Proposal of Extracting Innovative Users with Web Access Log of an E-Commerce Site”.

We studied a way of extracting user groups having specific psychographic profiles. In particular, we define innovative users as the segment interested in buying new items. Identifying such users will allow more firms to develop and market new products more efficiently. This paper assumes that innovative users are interested in specific information found on particular web pages on an e-commerce website. Once those web pages have been identified, new users can be categorized as innovative based on the pages they access. We propose a method of analyzing web access logs to classify users as innovative or not and report its effectiveness.

Published as: Y. Ichikawa, Y. Kishimoto, and T. Kobayashi, “A Proposal of Extracting Innovative Users with Web Access Log of an E-Commerce Site,” *SIG Technical Reports*, Vol. 2013-GN-86, No. 28, pp. 1–8 (in Japanese).

Best Presentation Award

Winners: Shunichi Seko, Ryosuke Aoki, and Masayuki Ihara, NTT Service Evolution Laboratories

Date: January 17, 2013.

Organization: SIG-CDS, Information Processing Society of Japan

For “InfoSkin: User Interface for Information Selection”.

In this paper, we propose “InfoSkin”, a user interface that allows users to simply and easily collect information on the web. To achieve such information retrieval, we focused on the behavior in a shoe store. We designed and implemented the user interface for information selection based on the metaphor of the shoe store and then validated its effectiveness. Evaluations showed that our proposed interface allows users to take a broad view of information and improves their willingness to view and input operations.

Published as: S. Seko, R. Aoki, M. Ihara, and T. Kobayashi, “InfoSkin: User Interface for Information Selection,” *SIG Technical Reports*, Vol. 2013-GN-86, No. 15, pp. 1–8 (in Japanese).

Best Presentation Award

Winners: Misa Hirao, Yoko Ishii, and Yasuhiko Miyazaki, NTT Service Evolution Laboratories

Date: January 17, 2013.

Organization: SIG-CDS, Information Processing Society of Japan

For “Proposal of TV Communication Support System for the Hearing Impaired and their Families”.

The TV watching style has been diversified thanks to the innovation of video viewing services such as integrated services digital broadcasting and IPTV (Internet protocol television). On the other hand, the TV accessibility of hearing-impaired people still has problems. We aim to construct a communication support system for families with hearing-impaired members for use when watching TV. Hearing-impaired people have some unique limitations when watch-

ing TV because they rely mostly on visual information. Therefore, we propose a “TV interface which combines TV programs and watching people’s faces”. This new interface allows us to watch a TV program and to see people’s sign language or expression simultaneously. We show the results of an experiment when users watched TV when using our proposed interface prototype system. The results indicate that the communication frequency increased compared to the case when the prototype system was not being used.

Published as: M. Hirao, Y. Ishii, Y. Miyazaki, N. Matsushima, and T. Kobayashi, “Proposal of TV Communication Support System for the Hearing Impaired and their Families,” SIG Technical Reports, Vol. 2013-GN-86, No. 14, pp. 1–7 (in Japanese).