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International Conference on

Natural Hazards and Disaster Management

June 01-03, 2017   Osaka, Japan

Wireless Dependable IoT/M2M for Disaster Rescue and Healthcare - Reliable Machine Centric Sensing and Controlling

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Wireless body area network (BAN) has been researched and developed for ubiquitous and remote medicine and its international standard IEEE802.15.6 was established in February, 2012. In order to find missing victims and sense their vital sign at disaster spots, highly reliable and secure, i.e. dependable BAN can be applicable to a body of robots, cars, UAVs (Unmanned Aerial Vehicle) like drones as well as a human body for dependable machine to machine (M2M) sensing and controlling. Such a M2M network can be called as "BAN of Things" like Internet of Things (IoT). Around disaster areas unexpected obstacles and complicated radio propagation tend to prevent accurate ranging and positioning, and reliable vital data sensing. To perform precise localization and robust data communications by BAN, dependable radio technologies such as ultra wide band (UWB) radio, array antenna and error-controlling codes in physical layer must be jointly optimized with MAC, Network, and application layers. Even after BAN has been developed and standardized in global, regulatory science must be keen to guarantee safety, reliability and security to be compliant for regulation.   This talk will introduce research and development, standard and regulatory compliance of dependable wireless BAN for disaster rescue and medical healthcare using UWB ranging and communication. The joint Japan and New Zealand project on remote sensing and controlling multiple UAVs to locate casualties in natural disasters such as earthquakes will be also introduced. The research has two objectives, one being to use UAVs to locate people under rubble, the other to collect information that is constrained in the BANs those people are wearing. IEEE802.15 international new standard group of dependable wireless networks IEEE802.15 IG-Dependability has been chaired by the speaker.

Biography

Ryuji Kohno received the Ph.D. degree from the University of Tokyo in 1984. Since 1998 he has been a Professor and the Director of Centre on Medical Information and Communication Technology, in Yokohama National University in Japan. In his currier he was a director of Advanced Telecommunications Laboratory of SONY CSL during 1998-2002, directors of UWB Technology and medical ICT institutes of NICT during 2002-2012. Since 2012 he is CEO of University of Oulu Research Institute Japan – CWC-Nippon Co. Since 2007 he has been a Distinguished Professor in University of Oulu and since 2014 a director of Kanagawa Medical Device Regulatory Science Centre. He was a member of the Board of Governors of IEEE Information Theory Society in 2000-2009, and editors of IEEE Transactions on Communications, Information Theory, and ITS. He was Vice-president of Engineering Sciences Society of IEICE during 2004-2005, Editor-in chief of the IEICE Trans. Fundamentals during 2003-2005.

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Geoinfor Geostat: An Overview
ISSN: 2327-4581 GIGS, an open access journal

Natural Hazards Congress 2017
June 01-03, 2017

Volume 5, Issue 2 (Suppl)

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