



IEEE Vehicular Technology Chapter Presentation

UWB for sensor networks: the 15.4a standard and beyond

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Abstract: Ultra-wideband (UWB) communications is an extremely promising technology for sensor networks with low (≤ 1 MBit/s) data rate. UWB offers high robustness to fading, low energy consumption, and the possibility for very precise geolocation. Recognizing these advantages, the IEEE has established a task group 802.15.4a that during the past 2 years developed a standard for such low-rate UWB devices. This standard, which covers both the PHY and the MAC layer, will be the main topic of this talk. It contains a number of scientific innovations that specifically exploit the sensor network applications. The physical layer is based on impulse radio, using bursts of impulses that allow coherent as well as noncoherent detection. Good spectral properties are obtained by polarization scrambling. Further options allow the use of chaotic waveforms or chirping. On the MAC side, pure ALOHA, or a special form of CSMA are used, and provisions are made for ranging that is resistant to spoofing or interception. The talk will wrap up with a description of possible applications and networking considerations.

Andreas F. Molisch (Fellow, IEEE) is a senior researcher with Mitsubishi Electric Research Labs (Cambridge, MA), and a professor for radio systems at Lund University, Sweden. Previously, he had worked at AT&T Bell Labs (NJ) and the Technical University of Vienna, Austria. His current research interests are wireless propagation channels, MIMO systems, and ultra-wideband (UWB) systems. He has authored, co-authored, or edited four books, 11 book chapters, some 85 journal papers, and numerous conference contributions. He is inventor of more than 40 patents, has been chairman of various standardization and industrial groups in the area of MIMO and UWB, and received several awards.

DATE: Thursday, February 2, 2006
TIME: 11:00 am – 12:00 noon
LOCATION: DC 1302, University of Waterloo

Invited By Professor Xuemin (Sherman) Shen