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CAMBRIDGE SOCIETY FOR THE APPLICATION OF RESEARCH

'Ultra-wideband Wireless Technology'

Jack LANG
CEO, Artimi Limited, Cambridge

Monday, 24 May 2004 ***7.30 p.m. - 9.00 p.m.***
The Wolfson Lecture Theatre, Churchill College, Cambridge

Chair and Vote of Thanks: Professors Antony Kelly and Laurie Hall will introduce the speaker Jack Lang, and then propose the vote to thank him!

About the Lecture: **Jack Lang writes:**

Ultrawideband (UWB) radio has been hailed as the next generation of personal and local wireless networks. It promises low cost, and high bandwidth. It may take short-haul and low power communications to another level. Promoters of the technology promise many advantages.

Ultra wideband, or baseband radio is not new - some trace it back to Marconi's original spark gap radio, and certainly to military and radar work close to 50 years ago Since it is undetectable by conventional radio techniques, it was used for stealth radio and stealth radar applications.

What has given it recent momentum is the ruling by the US Federal Communication Commission (FCC) in February 2002 to allow its use without additional license in the US, subject to certain power limits. As they stated in the report "UWB technology holds great promise for a vast array of new applications that we believe will provide significant benefits for public safety, businesses and consumers."

UWB works by transmitting a very low level of power over a broad range of frequencies The energy is smeared out instead of concentrated at a single frequency. This is in contrast to the way most conventional radios work which is by transmitting at higher power on a narrow band of frequencies. To a conventional receiver, looking at just a narrow part of the spectrum, the UWB signal just looks like noise. The amount of energy in the narrow band is below that of natural interference, the "noise floor". This noise is the radio background that is always

present from natural emissions, or from non-deliberate transmissions, such as stray radiation from your laptop or hairdryer, or from thermal noise in the aerial. Since it is undetectable by a conventional receiver, UWB signals can co-exist with and share the same spectrum space as conventional receivers.

The FCC ruling was ground-breaking. The FCC, for the first time, was persuaded to co-allocate spectrum that had already been assigned to (and in some cases paid for by) other users, on the grounds that UWB signals would not interfere significantly with existing uses, since the signal strength was below the noise floor. This frequency allocation meant there was 7Ghz of new bandwidth (strictly 3.1Ghz-10.6Ghz) for the taking, and over 100 companies have set out to exploit this new seam. Canny investors have pumped hundreds of millions of dollars into new start-up companies that do UWB research and development in the bet that the technology will be successful.

Artimi Ltd, a Cambridge based start-up is one such company, and I will outline Artimi's single chip solution architecture. I will also discuss some of the history and operating principles of UWB, and progress on regulation and standardisation, and some of the expected applications.

About the speaker:

Jack Lang was originally a Demonstrator in the Computer Laboratory, University of Cambridge, before starting a number of high-tech companies and a restaurant. He has also been Chief Technologist for ntl.

He holds a number of patents on TV systems and UWB technology, and is a member of standards committees and other professional advisory bodies. He still teaches and examines courses in Business Studies and E-commerce for the University of Cambridge Computer Science Tripos and the Judge Institute.

He is the author of "The High Tech Entrepreneurs Handbook" or "How to start and run a High-Tech business" (ISBN 0273656159), and a by-fellow of Emmanuel College. He is acting CEO of Artimi Ltd.

The Organising Secretary adds:

We still have some places left on the **Bletchley Park** visit, on 2nd June; Roll Up, Roll Up! Join the bus to Bletchley!

Best

Richard Freeman
CSAR Organising Secretary