

# Space Communications Seminar/Workshop

10am – 2 pm February 19, 2008

Massey University Wellington, Block 5, Level C, Room 12 (5C12) - Entrance A, Wallace St

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## **Terahertz Technology for Space & Earth Applications**

The terahertz (THz) part of the electromagnetic spectrum falls between the lower frequency millimetre wave region and, at higher frequencies, the far-infrared region. The frequency range extends from 0.1 THz to 10 THz, where both these limits are rather loose. As the THz region separates the more established domains of microwaves and optics, a typical THz technique will incorporate aspects of both realms, and may even draw on the best of both. The two bounding parts of the spectrum also yield distinct sets of methods of generating and detecting THz waves. These approaches can thus be categorised as having either microwave or optical/photonic origins. As a result of breakthroughs in technology, the THz region is finally finding applications outside its traditional heartlands of remote sensing and radio astronomy. Extensive research has identified many attractive uses and has paved the technological path towards flexible and accessible THz systems. Examples of novel applications include medical and dental imaging, gene therapy, communications and detecting the DNA sequence of virus and bacteria. The presentation will discuss the range of THz applications and will present the components and systems that are utilised for the frequency region

### **Presenter: Dr. Peter de Maagt**

Peter de Maagt was born in Pauluspolder, The Netherlands, in 1964. He received the M.Sc. and Ph.D. degrees from Eindhoven University of Technology, Eindhoven, The Netherlands, in 1988 and 1992, respectively, both in electrical engineering. In the period 1992/1993 he was station manager and scientist for an INTELSAT propagation project in Surabaya, Indonesia. He is currently with the European Space Research and Technology Centre (ESTEC), European Space Agency, Noordwijk, The Netherlands. His research interests are in the area of millimetre and sub-millimetre-wave reflector and planar integrated antennas, quasioptics, electromagnetic bandgap antennas, and millimetre- and sub-millimetre-wave components. Dr. de Maagt was co-recipient of the H.A. Wheeler Award of the IEEE Antennas and Propagation Society for the best applications paper of 2001. He was granted a European Space Agency Award for innovation in 2002. He was co-recipient of the LAPC 2006 best paper award. Dr. de Maagt serves as an Associate Editor for the IEEE Transaction on Antennas and Propagation. Dr. Peter de Maagt is IEEE MTT Society Distinguished Lecturer.

## **International Satellite Technology Educational Programs: SSETI\* and GENSO\*\***

The presentation will provide update on the latest developments and changes in the SSETI programme and its relationship with the European Space Agency (ESA). It will present also the background to the SSETI ESEO mission including the development and launch of SSETI Express and the lessons learnt. After that the general description of SSETI ESEO, its present status and a more detailed review of the two communications systems and the other two planned ground stations will be discussed. Finally, a general description and the latest update on GENSO - the Global Educational Network for Satellite Operations will be provided.

**Presenter: Mr. Graham Shirville**

Graham Shirville has been a radio amateur for many years. His interest in space can be traced back to the launch of the Sputnik. He is a member of the UK AMSAT (The Radio Amateur Satellite Corporation) committee of in the. This group has contributed more than 300,000 USD towards development and launch of many OSCAR (Orbital Satellite Carrying Amateur Radio) satellites. Graham was part of the launch integration team for SSETI Express in Plesetsk, Russia in 2005 and is presently contributing to the ESA sponsored ESEO satellite. He is also supporting the amateur radio programme on Columbus module on the International Space Station.

**Massey University SSETI ESEO Ground Station**

Aiming to contribute to the success of the SSETI program, Massey University is working towards developing and setting up a ground station to enable control, data downlink from and uplink to ESEO satellite (as well as to other relevant satellites in the future). The New Zealand Ground Station will be able to track the ESEO satellite and communicate with its onboard transceiver at any of the bit rates available at the satellite side. It will also exchange telemetry and telecommand data with the Mission Control Centre via secure links over the Internet. The Wellington Campus has been selected to host the fully fledged SSETI ESEO New Zealand Ground Station that should be in full-scale operation at the time of the ESEO satellite launching. At the same time teams at other campuses will be involved in development of various subsystems of the ground station as well as in its integration and operation.

The presentation will provide update on the results in developing the Massey University SSETI ESEO Ground Station as well as outline the plans for the 2008 and 2009.

**Presenters: Dr. Xiang Gui & Dr. Frans Weehuizen**

Dr. Xiang Gui is a Senior Lecturer with the School of Engineering and Advanced Technology at Massey University Palmerston North campus. He teaches fundamental and advanced papers in the area of electronics, computer, and communication engineering. His research interests include wireless and mobile communications and applications, multicarrier and spread spectrum systems, and communication networks. Since 2007 he has been actively involved in the development of a fully operational SSETI Ground Station in New Zealand that will provide additional telecommunication facilities for the ESEO satellite and other SSETI missions from the Pacific region. Dr. Xiang is a Senior Member of IEEE.

Dr. Frans Weehuizen is a Senior Lecturer with the School of Engineering and Advanced Technology at Massey University Wellington campus. He is also an Academic Director of the BEngTech engineering program. His teaching and research interests are wide. They cover electronics, computer, communication engineering and applications. In 2007 he supervised several final year student projects related to the development of SSETI ESEO Ground Station at Massey University Wellington.

**For enquiries regarding the event please contact**

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