



Synthetic Aperture Radar Workshop

7th December 2011

*Allens Arthur Robinson Theatre (G23)
Law Building
The University of New South Wales*



UNSW
THE UNIVERSITY OF NEW SOUTH WALES



BAE SYSTEMS

Time	Topic	Speaker
8:00 am	Arrival & registration	
8:30 am	Welcome <i>Overview of Project Garada and workshop objectives</i>	Andrew Dempster UNSW
8:45 am	SAR Techniques <i>Fundamental principles, phenomenology, sensitivity and system design</i>	David Hall Astrium
10:10 am	SAR Technologies <i>Antenna types, power amplification, instrument control and pulse waveform generation</i>	Martin Cohen Astrium
10:30 am	Morning Tea (hosted by BAE Systems)	
10:45 am	SAR Data Processing and Product Generation (Monostatic) <i>Image formation, image rectification, radiometric calibration, polarimetric calibration and exploitation</i>	Nick Stacy DSTO
11:25 am	Benefits of SAR Formation-Flying Satellites	Steven Tsitas UNSW
11:40 am	Evolution from Monostatic to Bistatic SAR and	Robert Middleton UNSW
12 noon	Buffet Lunch (hosted by BAE Systems)	
12:45 pm	Group photograph	
1:00 pm	Application of SAR for Emergency Response during the 2011 Queensland Floods	Norman Mueller Geoscience Australia
1:45 pm	Land Cover Classification using Interferometric SAR	Syed Ali DIGO
2:30 pm	Garada SAR Formation-Flying System Architecture	Steven Tsitas UNSW
3:00 pm	Afternoon Tea (hosted by BAE Systems)	
3:15 pm	Guided discussion session: <i>SAR Satellite Trends</i> <i>Garada Cost Drivers</i> <i>Garada SAR Technology Drivers</i> <i>Garada Satellite Platform Design</i>	Panel Members - Andrew Dempster - Martin Cohen - Nick Stacy - Steven Tsitas Facilitator David Hall
5:30 pm	Workshop Close	

Speakers



Andrew Dempster is Director of the Australian Centre for Space Engineering Research (ACSER) at the University of New South Wales (UNSW). Andrew is leading the Garada project, which supports the development of Australia's capability in the rapidly expanding field of satellite earth observation. Garada will also focus on the important national and transferable benefits for environmental monitoring and disaster mitigation.



David Hall is employed by EADS Astrium where he has worked for the last 29 years. Having started in the ultra-high vacuum field working with mass spectrometers, he moved to work with thermal imaging systems and thence to Marconi, now Astrium, where his field encompasses radar, synthetic and real aperture, very low to very high frequencies as well as microwave and optical radiometers.



Martin Cohen is a Synthetic Aperture Radar design expert who has spent over 20 years at Astrium in the UK working on the concept development, design, build and test of a range of SAR instruments. He worked on the ASAR instrument for the European Space Agencies ENVISAT spacecraft, and subsequently was involved in a range of studies looking at next generation SAR systems. He is also the Engineering Manager and technical lead for the SAR payload on NovaSAR-S, a new low-cost SAR satellite to be developed in the UK.



Nick Stacy joined the Australian Defence Science and Technology Organisation (DSTO) in 1993. He has worked in the field of imaging radar systems, phenomenology, image formation and analysis primarily using the Ingara airborne polarimetric SAR system. He currently leads a program of research that includes the end-to-end sensor to decision maker application of electro-optic, hyperspectral and imaging radar technology to ISR.



Robert Middleton is a Senior Research Associate at the University of New South Wales and has previously worked on radar signal processing techniques for FMCW radar. He has also worked on a variety of topics within Synthetic Aperture Radar, including high-frequency implementation at 94 GHz, and on autofocus techniques. Currently Robert is researching low-cost SAR systems for earth observation from space for the Garada Project at the University of New South Wales.



Steven Tsitas completed his PhD in Planetary Science with a Minor in Astronomy from the California Institute of Technology. He completed a MSc in Astronautics and Space Engineering at Cranfield University. His most recent papers detail the system design and commercial applications for an 8 kg, 6U CubeSat that can carry out the Earth Observation mission of a 150 kg micro-satellite. Steven is a Senior Research Associate at ACSER, UNSW where he works on the Garada project.



Norman Mueller is a Remote Sensing Applications Scientist and the Emergency Response Coordinator of the National Earth Observation group at Geoscience Australia. Norman has a background in physics and IT and entered the remote sensing and GIS field in 2002. Since 2007 he has specialised in the detection and feature extraction of water in the landscape from optical satellite imagery and more recently radar imagery.



Syed Ali is the Senior Imagery Scientist at the Defence Imagery and Geospatial Organisation (DIGO) with the Department of Defence. DIGO is the lead geospatial and imagery intelligence organisation in the Department of Defence. DIGO's purpose is to provide geospatial intelligence, from imagery and other sources, in support of Australia's defence and national interests.



Garada

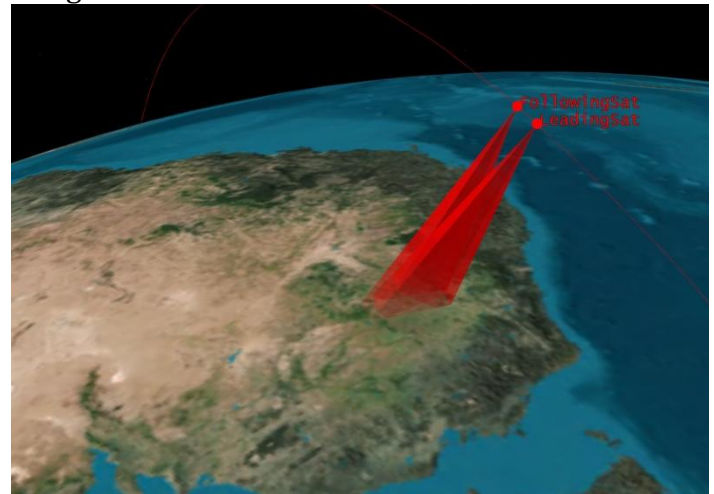
About the Garada Project

Funded by the Australian Space Research Program (ASRP), Garada is a collaborative space engineering research project at the Australian Centre for Space Engineering Research (ACSER).

- Garada is investigating the design of a low cost L-Band Formation Flying SAR satellite for monitoring regional deforestation and forest degradation.

- Industry studies have identified urgent shortfalls in Australia's access to medium resolution optical and L-Band SAR data. There are currently no L-Band satellites and only two are planned by other countries in the years ahead.

- The Garada project aims not only to help fill the gap with a low cost design that uses high technology to achieve significant cost reduction but to build some of the essential supporting satellite navigation hardware.



- The Garada project includes a study of the orbits and ground station design for Antarctic Groundstation (AG), a proposal for a ground station at an Australian Antarctic base to downlink data from polar orbiting satellites including Garada. AG relies on Antarctic Broadband (AB) to relay the data back to the Australian mainland. AG will double the downlink capacity of all existing and planned polar orbiting satellites that rely on the Norwegian ground station at Svalbard.

- In collaboration with prominent industry partners, the UNSW-led project will also identify preliminary industrialisation options, both Australian and international, for the development of the low cost L-Band SAR and AG.

- Garada project will boost Australia's space capabilities in the niche of small satellites and help develop the case for an Antarctic polar ground station that will improve the data return from all polar orbiting satellites

- The Garada SAR Formation Flying project will investigate a formation of separate transmit and receive SAR spacecraft to perform these functions.

For more information please visit the Garada Website:

www.garada.unsw.edu.au