

Introduction to Satellite Communications

29–30 June 2009

Presenter: A/Prof Sorin Adrian Barbulescu

Mantra on Queen, 570 Queen Street
Brisbane Qld

Teaching Arrangements:

The course will be conducted from 9.00am to 5.00pm. Morning tea will be available at approximately 10.00am to 10.30am, lunch from 12.30pm to 1.30pm and afternoon tea at approximately 3.00pm to 3.30pm.

Registration Fee:
AU\$ 1320 (incl. GST)

Group and PhD student discounts available. Please enquire.

How to Register

To register fill out the registration form (overleaf) and fax it to +61-8-8343-8711 or scan and email it to industryeducation@nicta.com.au.

Cancellation Policy

At least **4 weeks** notice is required for cancellation of a place in a short course for full reimbursement. If cancellation is later than 4 weeks then the place can either be given to another person or the registrant can be provided with a credit towards other NICTA training.

For details of further courses please see our web site: www.nicta.com.au/short_courses or contact the NICTA Industry Education Manager.

About Introduction to Satellite Communications

This **two-day** course gives an introduction to the Satellite Communications field. It introduces the basic orbital parameters, the space environment, followed by a detailed presentation of the link budget and various satellite access schemes. The ground station architecture and requirements are formulated. The building blocks of the satellite platform and the satellite payload are discussed together with the issues related to satellite installation in orbit. Bent-pipe versus on-board processing architectures are compared. Limitations and solutions for TCP/IP traffic over satellite are discussed, together with an example of a generic stream IP encapsulation protocol. Network dimensioning, satellite services including satellite Internet applications and specific issues for military applications are also introduced. A brief history of Australian contributions in this area with a focus on the latest developments in satellite communications equipment (e.g., the Satellite Network Access Point) concludes this course.

The course is a general introduction to satellite communications. It is intended for those engineers and technicians working in the field who would like to get an overall understanding of the issues. Managers who need a sound understanding of the implications of the latest technology in improving the system efficiency and cutting costs will also benefit. The course does not require a specific background although a basic knowledge of digital communications would be useful.

Brief Course Outline

Orbits: Kepler's and Newton's Laws; Orbital Parameters; Inclined Orbits; Geostationary Orbit;
Space environment: Mechanical Effects; Atmospheric Effects; Rain Attenuation; Polarisation & Propagation;
Link budgets: Equivalent Isotropic Radiated Power; Received Signal Power; Noise Power at the receiver input; The Uplink & Downlink; Station-to-station link; Example using spreadsheet;
Satellite Access: FDMA; TDMA; CDMA; Random access;
Earth Stations: Standards; Antennas; Radio Frequency Subsystem; Communication Subsystem; Turbo Coding;
Payload: Transparent Repeaters; Multibeam Satellite Repeater; Bent-pipe vs on-board processing; Antenna Characteristics;
Platform: Attitude Control; The Propulsion System; The Power Supply; Telemetry, Tracking and Command;
Satellite Installation: Installation in Orbit; Launch Vehicles; Reliability issues;
Satellite Services: Broadcasting Satellite Services (DBS, DVB-S); Fixed Satellite Services (INTELSAT, VSAT); Navigational Satellite Services (NAVSTAR GPS); Earth Resource Satellite Services (Radarsat, NOAA); Mobile Satellite Services
Satellite Internet: TCP/IP over satellite issues; Proposed Systems; Network Dimensioning;
Network Dimensioning: System requirements; Types of traffic; ON-OFF vs Poisson model;
MAC layer optimisation: Throughput control; Generic stream IP encapsulation;
Specific issues: Protect your satellite link; Privacy for each of us;
New Trends: Australian contribution: FedSat; Key trends: space segment; Key trends: ground segment
SNAP: Concept; Platform; Advantages;
Discussions.

About the Presenter: Associate Professor Sorin Adrian Barbulescu

The course presenter is Associate Professor Sorin Adrian Barbulescu with almost 20 years experience in the field. He received his PhD from the University of South Australia in 1996. Since then he has been working with the Institute for Telecommunications Research, University of South Australia, as a technical leader and project manager in projects applying the turbo coding technology in mobile and fixed satellite communications systems. He is currently the leader of the Engineering Projects Group. He is also the Managing Director of Iterative Connections Pty Ltd, a South Australian company specialised in turbo coding technology.

About NICTA and Short Course Program

National ICT Australia (NICTA) is Australia's ICT Centre of Excellence and was established to drive innovation through high quality research, research training and technology transfer. As a world-class research institute NICTA uniquely combines excellence in research, education, commercialisation and collaboration. We are working to ensure that Australia is well placed to benefit from the significant opportunities that ICT research delivers.

NICTA is funded by the Australian Government as represented by the Department of Communications, Information Technology and the Arts and the Australian Research Council through *Backing Australia's Ability* and the ICT Centre of Excellence program. NICTA members are the Australian Capital Territory Government, the New South Wales Government, the University of New South Wales and the Australian National University.

NICTA short courses offer scientists, engineers and managers technical training with a leading edge in areas such as telecommunications, transport, security, defence, logistics, e-government, mining, finance and biotechnology.

There will be ample opportunities for discussion and questions and answers. Morning and afternoon tea/coffee and a light lunch will be provided. Extensive workshop materials will be made available to participants.

How to register

Please complete the registration form below and

- Fax it to +61-8-8343-8711 or
- Scan and email it to industryeducation@nicta.com.au.

Send the form as soon as possible to secure your place.

For further information please contact
Anne-Marie Eliseo
Industry Education Manager
Telephone: +61-8-8343-8710
Email: anne-marie.eliseo@nicta.com.au

Registration Form and Tax Invoice* ABN 62 102 206 173

*Upon completion of this form, including the relevant payment, this form will become a Tax Invoice.

Please register me for Introduction to Satellite Communications on 29-30 June 2009.

PLEASE PRINT

Date: _____

Title: _____ First Name: _____ Surname: _____

Position: _____ Organisation/Division: _____

Postal Address: _____

Telephone No: _____ Facsimile No: _____ Email: _____

Dietary preference: _____

Course Fees: Full fee: AU\$1320 (incl. GST)
(Register before **Jun 15th, 2009.**)

Method of Payment (please tick below):

Cheque (payable to National ICT Australia Ltd)
Forward the cheque and a copy of THIS registration form to:
Anne-Marie Eliseo, Industry Education Manager, NICTA, Innovation House, First Ave, Mawson Lakes SA 5095, Australia.

Credit Card: Credit Card No.: _____ Expiry Date: _____

Visa Master Card Name on card: _____

Amount: AU\$ _____ Signature: _____ Tick if receipt required

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Electronic Funds Transfer
Please advise by email to Annette Van Bramer
annette.vanbramer@nicta.com.au
when payment is made

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- Send an email to comments@nicta.com.au or
- Phone NICTA's Industry Education Manager on +61 8 8343 8710.