



Fundamentals of Airborne Radar

25-27 May 2009

Presenter: Mr Robert T. Hill

Parkview Hotel
562 St Kilda Rd, Melbourne VIC

Teaching Arrangements:

The courses 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\$1980 (including GST)

Early bird rates: AU\$1683 (incl. GST) register before 15th Feb 2009

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 this Course

Why is airborne radar so distinctly different from surface-based radar? Why is Doppler processing so important to airborne radar? Why are “medium prf waveforms” used so much, when they are so obviously ambiguous in the usual radar measurements? How does radar imaging work from airborne and space-borne radars? Questions like these are quite common among radar persons, even those with some considerable experience in other areas of radar. In this **3-day** course, these questions are answered, albeit rather qualitatively, in the very first session, and then developed more carefully in the lectures to follow. By the conclusion of the course, the student will fully understand the fundamentals of all radar, the practical impact of putting such equipment into aircraft and spacecraft in the first place, and then both the demands (for clutter rejection, for example) and the opportunities (for imaging, say) inherent in simply flying over the earth.

Assumed Knowledge: Elementary algebra and some trigonometry are helpful, as is some understanding of statistics and statistical inference.

Course Outline

- Day 1**
- Introduction to radar generally and the challenges and opportunities of airborne radar specifically; the major types of airborne radar (AEW, AI, others); electromagnetic waves and how we represent them; radar composition, block diagrams; quantifying radar performance and the statistical nature of detection.
 - Scattering and propagation; the nature of clutter, statistical models, dependencies; introduction to signal processing, coherent and non-coherent processes; pulse compression; Doppler processing basics.
- Day 2**
- Airborne radar signal processing; quantifying the Doppler effects, understanding the pulse-repetition-frequency (prf) choices; handling ambiguities in both range and Doppler dimensions; the Woodward ambiguity function.
 - Class exercise: an example airborne radar and our design of an appropriate waveform for it.
- Day 3**
- Advances in airborne radar: the achievement of high resolution in several dimensions; how imaging works, SAR; ISAR; image problems (e.g., ground moving targets); image enhancement; polarimetry briefly; dimensions associated with space-borne radar, a notional SBR.
 - Advances in waveforms, in high resolution detection processes; phased arrays and active apertures; some example developments underway.

About the Presenter



Mr. Robert T. Hill received the BS (Iowa State University) and the MS (University of Maryland), both in EE, in 1957 and 1967. In 1960, after working in industry and as an Air Force officer, he began government civilian service, retiring in 1988, in the development of naval radar.

Mr. Hill is a distinguished lecturer for the IEEE, being also a member of its Radar Systems Panel and, formerly, of its Aerospace and Electronic Systems Society Board of Governors for many years. He has published numerous conference papers, magazine articles and chapters of books, and is the author of the radar, monopulse radar, airborne radar and synthetic aperture radar articles in the McGraw-Hill Encyclopedia of Science and Technology and of the radar entries in their technical dictionary. He is a Fellow of the IEEE.

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 Fundamentals of Airborne Radar on 25-27 May 2009.

PLEASE PRINT

Date: _____

Title: _____ First Name: _____ Surname: _____

Position: _____ Organisation/Division: _____

Postal Address: _____

Telephone No: _____ Facsimile No: _____ Email: _____

Dietary preference: _____

Course Fees: Early bird fees: AU\$1683 (incl. GST)
(Please register by **Feb 15th**.)

Full fees: AU\$1980 (incl. GST)
(Please register by **May 11th**.)

Method of Payment (please tick below):

Cheque (payable to National ICT Australia Ltd)

Please forward the cheque and a copy of THIS registration form to:

Anne-Marie Eliseo, Industry Education Manager, NICTA, Innovation House, First Avenue, 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

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