



**The  
Institution  
of Engineers,  
Australia**

Electrical College

Chairman  
Clive Cooper

**ACI  
NEWSLETTER**

**National Committee on  
Automation, Control & Instrumentation**

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Issue 14  
June 1994

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Print Post Approved  
PP 255003/00217

## WELCOME TO THE ACI NEWSLETTER.

This issue continues our look at Cooperative Research Centres involved in ACI (Automation, Control and Instrumentation) endeavours, highlighting the Australian Photonics Cooperative Research Centre.

We announce details of the next big Australian control conference - CONTROL '95 - which will be held in Melbourne in October 1995. Those of you who were fortunate enough to attend CONTROL '92 in Perth will testify to the value of these conferences in facilitating the sharing of ideas and experiences amongst control engineers and academics.

We also do a roundup of AIMTEC '94 and highlight other upcoming conferences.

## THE AUSTRALIAN PHOTONICS COOPERATIVE RESEARCH CENTRE

The Australian Photonics Cooperative Research Centre is Australia's principal resource in optical fibre and photonic technology for research and development, education and training, and commercialisation, and aims to assist photonics to become a major industry of the 21st century.

### PARTNERS

The Australian Photonics CRC brings together most of the major players in photonic technology in Australia in a 7 year, A\$100 million enterprise. They are:

- Australian National University
- CSIRO (Division of Applied Physics)
- Electricity Commission of NSW
- Fibernet Pty Ltd
- NEC Australia Ltd
- Siemens Ltd
- Telstra Corporation Ltd

- The University of Melbourne
- The University of New South Wales
- The University of Sydney.

### BACKGROUND

Australia now has the world's largest integrated optical fibre communications networks, with over 1.5 million kilometres installed. Its significant world position in communications technology is underpinned by excellence in research and development.

Supporting Australia's now strong position in the worldwide photonics industry is a long development history beginning with the discovery of lasers in 1960. Its impact in telecommunications was enabled by the perfection in the late 1970's of low-loss optical fibres for long haul undersea and terrestrial communications. The large interexchange distances in Australia provided the rationale for Telecom (Telstra Corporation Limited) to install fibre at an early stage, and this has led to Australia having a competitive edge in this technology with over 1 million kilometres of fibre laid by 1992, and over 95% of interexchange network converted to fibre.

To achieve this, Telecom nurtured a group of telecommunications equipment supply companies, including fibre manufacturers and cable companies, with skills in design and engineering. However, Australia has missed many commercial opportunities during the last twenty years because of the inadequate coordination of research and development, particularly in the higher education sector, and product manufacturing.

The establishment of the Australian Photonics Cooperative Research Centre will assist Australia in capturing markets in the next phase of the fibre optic revolution such as the extension of the network from the exchange to the curb and then to the customer premises as the preferred

mode of delivery of broadband interactive services. This will be the largest telecommunications market in the world in the 21st Century. The rapid development of photonics is the result of the social and economic importance of communications technology as enabling the information age, in partnership with computer technology.

## RESEARCH & DEVELOPMENT

### AREAS OF RESEARCH:

#### *Optical Fibres and Devices*

Centre Researchers have developed novel designs, materials and techniques for the fabrication and characterisation of optical fibres and fibre devices. These are used in Centre research, and are available for industrial applications.

#### *Systems and Networks*

Novel photonic communications networks and network architectures are being developed under this program, to enable the full bandwidth of optical fibres to be utilised at a low cost for local, metropolitan and truck networks.

#### *Self-guiding Devices*

New technologies which will form the basis for information super-highways of the next century are being developed under this program.

#### *Photonic CAD*

A computer-aided design package for photonic devices, circuits, and systems has been developed and is currently being Beta-tested by overseas telecommunications companies. The package allows new designs to be assessed and optimised cheaply and quickly, without the huge costs associated with prototyping optoelectronic devices and system. An educational photonic-CAD package is also available and allows students to experience system design at realistic bit-rates without enormous costs associated with experimental work.

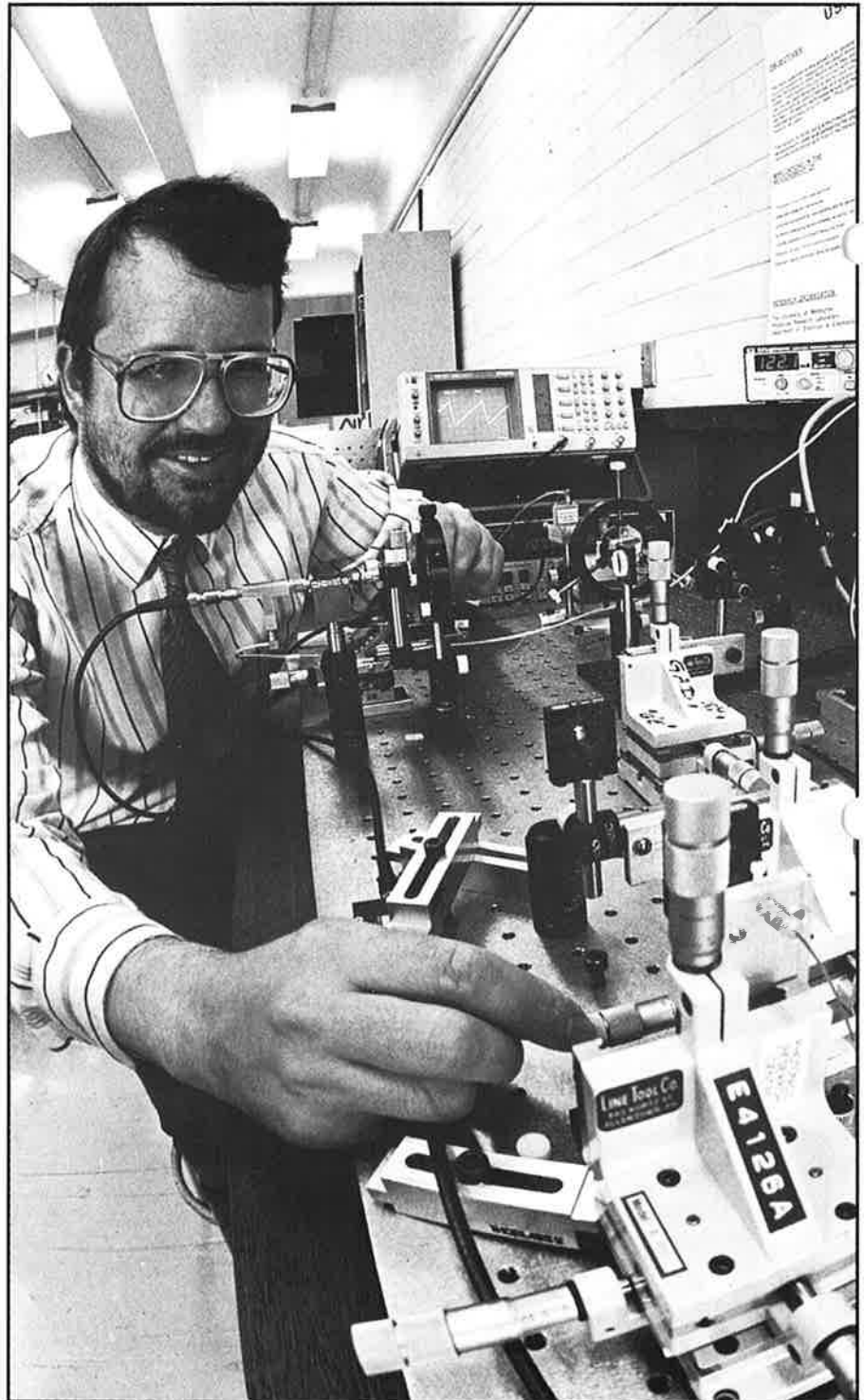
## COMMERCIAL OPPORTUNITIES

The Australian Photonics CRC is fostering joint ventures, spin-off companies and licensing arrangements to commercialise Intellectual Property developed by the Centre.

Application Specific Optical Fibre and Fibre Devices are marketed for research and industrial applications, including:

- high numerical aperture fibre for semiconductor laser pigtals
- erbium-doped optical fibre for fibre amplifiers
- phosphorus-doped Er/Yb optical fibre for fibre amplifiers.

Photonic CAD Packages (Photonics Research Laboratory (Melbourne) are being commercialised world-wide, and also provide support for experimental projects and industrial contracts.



*Arthur Lowery, a key researcher from PRL, adjusts the optical components of a prototype laser ranging system*

The Product Development Laboratory at the University of Melbourne provides an environment for the development of preproduction prototypes for industry.

Capabilities include:

- mechanical, electrical, electronic, optoelectronic and optical design
- fabrication
- assembly
- testing.

The mission of the Product Incubator Laboratory (Sydney) and the Product Development Laboratory is to facilitate the development of internationally competitive products and services by bridging the gap between photonics research and the industrial marketplace.

The Australian Photonics CRC is interested in developing links with research groups, telecommunications companies and manufacturers. Opportunities exist for exchange programs between scientists, and for contract R&D with companies.

## EDUCATION & TRAINING

This program offers a comprehensive spread of activities:

- Undergraduate Education
- Postgraduate Education and Training
- Professional Training
- Workshops
- International Education and Training
- Community Education.

A small team is developing interactive multimedia computer managed learning programs in photonic technology.

For further information on Education and Training please contact:

The Education and Training Coordinator

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## NCACI ACTIVITIES

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Should the National Committee for Automation, Control and Instrumentation be turned into a Technical Society? That is a question being posed by the Institution.

Technical Societies provide a valuable service to their members. The Process Control Society (which is attached to the Chemical College) is an excellent example. Societies enable their members to run technical meetings and learned society functions at Division level, services not proved by National Committees.

National Committees on the other hand, operate at the national and international level. NCACI for instance is the committee behind the CONTROL 'XX series of national conferences and the IFAC World Congress held in Sydney last year.

NCACI has close links with the Process Control Society (PCS), and with the Institute of Instrument and Control Australia (IICA). For example, all three collaborated in organising CONTROL '92 in Perth recently.

NCACI has concluded that for the present at least, the interests of ACI engineers would be poorly served by abandoning the national committee and forming yet another technical society in ACI field.

Rather, NCACI plans to continue in accordance with its Mission Statement, to establish a definitive ACI Constituency of those IEAust members it serves, and to improve communication with its constituent members via its ACI Newsletter. This work has been under way for some time now but is hampered by lack of funds. Fortunately, surplus funds from the IFAC World Congress allocated to NCACI will enable this work to now proceed expeditiously.

The question of whether NCACI should move towards a technical society structure and form ACI groups in the Divisions is one for the future. Any such move would only be made after full consultation with our colleagues in PCS, IICA and other interested organisations, with the only aim being to best serve the interests of the ACI engineers concerned.

Reader comments would be most welcome.

Brian Speedy  
Chairman  
National Committee on Automation,  
Control and Instrumentation

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## CONTROL '95 Meeting the Challenge of Asia-Pacific Growth

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Following on from the success of Control '92 in Perth, plans for Control '95 are well under way.

The Control '95 organising committee have chosen the theme 'Meeting the Challenge of Asia Pacific Growth' to focus attention on the developing Asian markets for outward looking Australian businesses in the later half of this decade.

The conference will be held in Melbourne on 23-25 October 1995. With a range of prominent Asian and European bigwig control practitioners

and academics being lined up for this date, (as well as our home grown stars!), Control '95 promises something for all Australian control practitioners.

Further details are contained in the attached flyer—a special A3 poster size suitable for brightening up drab offices!

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## GETTING IT RIGHT THE FIRST TIME – AIMTEC '94

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AIMTEC '94, held during April this year in Adelaide was the first major Test and Evaluation (T&E) Conference held in the southern hemisphere.

Emphasising the need for improving our T&E processes in the development of major defence and civil systems, AIMTEC's keynote speaker, former US astronaut and NASA administrator Admiral Richard Truly emphasised the need for disciplined testing programs in order to get it right the first time. He went on to say that the driving principle behind T&E is that it saves money—primarily by ensuring that expensive system modifications are unnecessary and also by the avoidance of straight out disasters.

Admiral Truly's message was reiterated by Viv Crouch of the Australian Aircraft Research and Development Unit. Mr Crouch called for the institutionalisation of T&E in Australian industry in order to reduce economic and safety risks and also to protect manufacturers and suppliers against tough product liability laws.

Australia is now fortunate to have its own multipurpose T&E test centre at the University of South Australia, The Australian Centre for Test and Evaluation (ACTE) was established recently in 1993 to provide a focus for T&E in the Asia Pacific region.

It is currently the only Australian organisation offering formal training in T&E. It also maintains a database of T&E installations and practitioners in the region.

For further information, contact:  
Professor Peter Sydenham at  
ACTE on (08) 302 3303.

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## CONFERENCES, SYMPOSIA & WORKSHOPS

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ICEX-94, Instrumentation and  
Control Exhibition Symposium and  
Workshops,  
July 5-7 1994  
Caulfield Racecourse Complex  
Melbourne  
Contact: Don Wilcox  
Fax (03) 857 5057  
Ph: (03) 816 3333.

IFAC Workshop on Computer  
Software Structures  
Integrating  
AI/KBS Systems in  
Process Control,  
10-12 August 1994  
Lund Sweden Contact:  
Eva Dagnegard  
Fax: +46 46 138118  
email ifac@control.lth.se

Indonesia Technical Tour  
incorporating Pacific Conference  
on Manufacturing,  
10-12 December 1994  
Organised by IE Aust  
Contact: Patricia McNamara  
Fax: (06) 273 5496.

IFAC Conference on Intelligent  
Autonomous Vehicles,  
12-14 June 1995  
Helsinki, Finland,  
Contact: Fax +358 01461 650.

IE Aust. Symposium on Modelling  
and Control of National and  
Regional Economies,  
2-7 July 1995  
Gold Coast, Queensland. Contact:  
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Produced for the National  
Committee on Automation, Control  
and Instrumentation of the College  
of Electrical Engineers