

# **AUSTRALIAN ACADEMY OF SCIENCE**

**National Committees for Science: ANNUAL REPORT TO COUNCIL on 2004 activities**

**NATIONAL COMMITTEE FOR: Radio Science**

**CHAIR: Dr. Phil Wilkinson**

PERIOD COVERED IN THIS REPORT: 1 January - 31 December, 2004

## **MEETINGS OF THE NATIONAL COMMITTEE**

### **THE NATIONAL COMMITTEE MET ON:**

- National Committee meeting was held in Hobart, Australia, 17 February, 2004
- WARS 2004 Conference was held in Hobart, Australia, 18-20, February, 2004

### **THE FOLLOWING MEETINGS ARE PROPOSED FOR 2005**

(include date and place, if possible):

- National Committee meeting will be held in Canberra, Australia, 1 February, 2005
- A meeting of Australian attendees and delegates to the URSI General Assembly will be held during the Assembly, in New Delhi (October 2005)
- Periodic meetings of the WARS2006 Organising Committee, a sub-committee of the NCRS, will be held during 2005.

## **MEETINGS OF INTERNATIONAL ORGANISATIONS AFFILIATED WITH ICSU**

### **IN 2004 THERE WAS A GENERAL ASSEMBLY OF** (include date and place):

COSPAR: Paris July 18 – 25, 2004

Other meetings during 2004 of interest for the NCRS were:

- Commission F Triennium Open Symposium, Cairns, Australia, 1 - 4 June, 2004  
NCRS member, David Noon, is the Programme and Organisation Chairman for this meeting.
- The Asia-Pacific Radio Science Conference (AP-RASC) 2004 conference held in Qingdao, China, August 24-27, 2004
- The URSI WG-1 Beacon Satellite Symposium, held in Trieste, Italy, 18-22 October 2004

### **IN 2005 THERE WILL BE A GENERAL ASSEMBLY OF** (include date and place):

- URSI General Assembly, New Delhi, October 23 – 29 2005
- IAGA 10<sup>th</sup> Scientific Assembly, Toulouse, France, 18 - 29 July, 2005

### **The next GENERAL ASSEMBLY/CONGRESS will be held in 2005**

URSI General Assembly, New Delhi, October 23 – 29 2005

<b>AUSTRALIAN OFFICE HOLDERS IN ICSU AND AFFILIATED BODIES</b>
----------------------------------------------------------------

**I RECOMMEND TO COUNCIL THE FOLLOWING VOTING AUSTRALIAN DELEGATION: (include title, name, address, telephone, email and fax number)**

(The delegation also represents Australian interests in URSI between General Assembly years.)

**National Delegate to URSI:**

Dr. Phil Wilkinson, IPS Radio and Space Services  
P. O. Box 1386, Haymarket, NSW 1240  
e-mail: phil@ips.gov.au  
Ph: +61 2 9213 8003 Fax: +61 9213 8060

**URSI Commission A delegate**

A/Prof Michael Tobar, School of Physics M013,  
Frequency Standards and metrology Research Group  
The University of Western Australia, 35 Stirling Highway, Crawley, WA 6009  
Email: mike @physics.uwa.edu.au  
Phone: +61 8 6488 3443 Fax: +61 8 6488 1235

**URSI Commission B delegate**

Dr. Geoffrey James, CSIRO Telecommunications and Industrial Physics  
P. O. Box 76, Epping, NSW 1710  
e-mail: geoffrey.james@tip.csiro.au  
Ph: +61 2 9372 4367 Fax: +61 2 9372 4106

**URSI Commission C delegate**

vacant

**URSI Commission D delegate**

Dr. Le Nguyen Binh, Electrical & Computer Systems Engineering, Monash University  
P. O. Box Victoria  
e-mail: le.nguyen.binh@end.monash.edu.au  
Ph: +61 2 6201 2516 Fax: +61 2 6201 5041

**URSI Commission E delegate**

vacant

**URSI Commission F delegate**

Dr. David Noon, Dept of Electrical and Computer Engineering, University of Queensland  
Brisbane, Queensland 4072  
e-mail: noon@stargate.cssip.uq.edu.au  
Ph: +61 7 3365 3871 Fax: +61 7 3365 4999

**URSI Commission G delegate**

Prof. Peter L Dyson, Faculty of Science, Technology and Engineering, La Trobe University  
Bundoora, Victoria 3083  
e-mail: p.dyson@latrobe.edu.au  
Ph: +61 3 9479 2735 Fax: +61 3 9479 1552

**URSI Commission H delegate**

Prof. Brian Fraser, Department of Physics, Newcastle University  
Callaghan, NSW 2308  
e-mail: PHBJF@cc.newcastle.edu.au  
Ph: +61 2 4921 5445 Fax: +61 2 4921 6907

**URSI Commission J delegate**

Prof. Ray Norris, Australia Telescope National Facility, Epping Laboratories,  
P. O. Box 76, Epping NSW 2121  
Ph: +61 2 +61 2 9372 4416 Fax: +61 2 9372 4310

e-mail:rnorris@atnf.CSIRO.AU

**URSI Commission K delegate**

Dr. Ken Joyner, Director, Global EME Strategy & Regulatory Affairs  
 Motorola Australia Pty Limited, 10 Wesley Court, Tally Ho Business Park  
 East Burwood, 3151, Victoria, Australia  
 e-mail: Ken.Joyner@motorola.com  
 Tel Int.: +61 3 9847 7815; Tel Nat.: 03 9847 7815  
 Fax Int.: +61 3 9847 7773; Fax Nat.: 03 9847 7773  
 Mobile Int. +61 419 230 128; Mobile Nat.: 0419 230 128

**AUSTRALIANS WHO HELD OFFICE IN 2004 WERE:**

Person	International Body	Position	Term
Wim Brouw	IAU SOFA Review Board	member	2003-06
Wim Brouw	IAU working group on astronomical data	member	2003-06
Michael Burton	IAU Working Group for Antarctic Astronomy	chair	2003-06
Mark Calabretta	IAU FITS working group	Member	2003-06
W. N. Christiansen	URSI	Honorary President	Life
David Cole	Study Group 3, Radiocommunication Sector, ITU	Chair	
David Cole	Australian Radiocommunication Study Group 3,	Member	
Peter Dyson	PSMOS Steering Committee, SCOSTEP	Member	
Peter Dyson	URSI-COSPAR Working Group on the International Reference Ionosphere	Member	2002-05
Ron Ekers	IAU	President,	2003-06
Ron Ekers	URSI Global VLBI working group	Member	
Ron Ekers	IAU working group on "large scale facilities"	member	2000-06
Brian Fraser	Scientific Discipline Representative SCOSTEP		
Brian Fraser	S-RAMP Steering Committee SCOSTEP 1999-2004	Member	
Brian Fraser	IUGG / IAGA	Australian Delegate	2003
Brian Fraser	Working Group on Solar-Terrestrial and Astrophysical Research SCAR	Member	
Anne Green	IAU Division X.	executive committee	2003
Dave Jauncey	URSI Global VLBI Working Group	Member	
Dave Jauncey	IACG Working Group on Space VLBI	Member	
Dave Jauncey	SOC for IAU JD 18	Chair	
Don Melrose	IAU commission 10 (Solar activity)	Vice-President	2000-06
Don Melrose	IAU Division II (Solar)	Vice-President	2003-06
Don Melrose	IUPAP Commission 16 (Plasma Physics)	member	2002-05
Ray Norris	IAU working group on astronomical data	Chair	2003-06
Ray Norris	IAU Commission 5	Vice-president	2003-06
Ray Norris	CODATA:	IAU representative	2003-06
Ray Norris	IAA SETI post-detection committee	Chair	
Wayne Orchiston	IAU Comm. 41 History of Astronomy	Secretary	2000-03
Wayne Orchiston	IAU / IUHPS Inter-Union Commission for History of Astronomy	Secretary	2001-03
Wayne Orchiston	IAU Working Group on Historic Radio Astronomy	Chair	2003 - 06
Wayne Orchiston	The New Astronomy: Opening the Electromagnetic Window and Expanding our View of the Earth.", Seattle, 16-19 June 2004	SOC chair	2003 - 04
John Reynolds	IAU WG on reference Frames	Member	
Elaine Sadler	IAU commission 28 (Galaxies)	President	2003-06
Michelle Storey	IAU Working Group on Publishing	Chair	2003-06
Michelle Storey	IAU Comm. 50, Protection of Existing and Potential Observatory Sites Organising Committee	Vice-Chair	2003-06

Tasso Tzioumis	ITU Radiocommunication Study Group 7 (Sciences Services).	Member	2003-06
Tasso Tzioumis	URSI representative on IUCAF	Voting delegate of URSI	2002-05
Garth Patterson	International Space Environment Services (ISES)	Member	
Bruce Ward	URSI-COSPAR Working Group on the International Reference Ionosphere	Member	2002-2005
Carol Wilson	Australian Radiocommunication Study Group 3,	Chair	
Phil Wilkinson	URSI Commission G Working Group 1, Ionosonde Network Advisory Group	Secretary	2002-2005
Phil Wilkinson	URSI-COSPAR Working Group on the International Reference Ionosphere	Member	2002-2005
Phil Wilkinson	URSI Commission G Working Group 4, Ionospheric Research to support radio systems	Chair	2002-2005
Phil Wilkinson	URSI Standing Committee on Publications	Member	2002-2005
Phil Wilkinson	URSI representative on FAGS (Federation of Astronomical and Geophysical Data Analysis Services)	Member	2002-2005

**THE FOLLOWING NOMINATIONS WILL BE MADE IN 2005:**

No nominations will be made in 2005.

<b>ACTIVITIES OF THE NATIONAL COMMITTEE</b>
---------------------------------------------

**1. Completed, or extended activities (including Work Plan outcomes)**

• **WARS04, Hobart 18-20, February, 2004**

The WARS2004 Conference received URSI Mode A sponsorship, which leads to URSI recognising and advertising the meeting in advance plus publishing a report on the meeting afterwards. The report is published in the Radio Science Bulletin and is attached to this report. It gives an extensive overview of the WARS Conference.

• **NCRS Website (<http://www.ips.gov.au/IPSHosted/NCRS/>)**

• **(a) NCRS Mailing list**

The NCRS electronic mailing list currently has 615 members, a small (6%) increase in size compared to last year and consistent with adding extra members after the WARS2004 Conference. Failing email addresses are culled as they are detected.

• **(b) Directory of Australian Radio Science**

As part of the Academy Scoping study, members of the NCRS Mail list were asked for additions and corrections to the Webpage Directory. A few pages were consequently made.

• **(c) Directory of radio science related meetings**

Meetings of interest to Australian radio scientists is maintained on the NCRS Website. Periodically, all members of the Mailist are asked to supply additions to this, but usually the Chair relies on occasional meeting reminders and other lists for conference notices posted here.

• **Develop contacts with Australian societies with radio science interests**

There was no significant progress in this area.

• **International activities**

Encouraging membership of URSI is a slow process that can depend on individual efforts, often on an opportunistic basis. Dr Le Binh, NCRS Member has continued to encourage scientists in both Vietnam and more recently Singapore to consider forming National Committees

Attendance at local regional meetings is also important. Although the NCRS believes it is useful to support regional meetings, unfortunately due to other engagements no Australian delegates attended AP-RASC04.

Other international support comes from work within URSI to strengthen the parent body. The NCRS Chair is the Editor in charge of the Radio Science reviews that are published in the Radio Science Bulletin as well as participating in various Working Groups.

- **Academy of Science scoping study**  
During May the Academy carried out a review of National Committee activities. The NCRS supplied a reply for this.
- **Academy of Science study for “Maximising the Benefits from International Scientific Linkages”**  
The NCRS supplied input to this Academy of Science study.
- **Australian Space Weather Plan**  
The NCRS was invited by the National Committee for Space Science (NCSS), through the Academy of Science, to comment on the NCSS Draft Space Weather Plan. The Committee endorsed the plan, agreeing that it met a current need and should be implemented as recommended by the NCSS.
- **Comments on the Future of IAGA**  
An invitation to offer comments on the future of IAGA was taken up and comments were supplied. IAGA was encouraged to maintain its present format, if feasible.
- **DEST Global Science Forum**  
The NCRS raised the issue that the DEST acronym SETI for “Showcasing of Australian Science, Engineering, Technology and Innovation” was possibly short-sighted since SETI is now a famous acronym for “Search for Extra-Terrestrial Intelligence”.

## 2. Anticipated activities

- **WARS2006**  
Planning for the next WARS Conference will take place this year
- **URSI General Assembly**  
The principal activity for the NCRS during the forthcoming year is support for the URSI General Assembly. Especially important will be support for successful Young Scientist applicants. In the past, the NCRS delegates to URSI have agreed to waive their claims for travel support in favour of the Academy supporting successful Young Scientists who would otherwise not be able to take up their awards.

## 3. Other Australian Radio Science Activities

### Commission G

- a) TIGER (Tasman International Geospace Environment Radar) ([www.tiger.latrobe.edu.au](http://www.tiger.latrobe.edu.au)) is now entering its fifth year of operation as a component of the international SuperDARN (Super Dual Auroral Radar Network). A second radar has now been constructed in Invercargill, New Zealand. This radar, called the Unwin radar after Dr R. S. Unwin a New Zealand scientist who pioneered this form of radar research, is operational and will be commissioned early in 2005.

### Commission J

- a) The discovery of the first-known double pulsar system, made with CSIRO's Parkes radio telescope, has been named by the journal 'Science' as one of the top ten science breakthroughs of 2004. The discovery was published in Science on 8 January 2004.
- b) The upgrade of the Australia telescope Compact Array to millimetre wavelengths was completed in September 2004, marking the end of an innovative seven-year engineering development project. This historic upgrade moves the capabilities of the Compact Array into a new radio window to study the Universe. Millimetre telescopes are traditionally built on tops of mountains, but the relatively low site of the Compact Array near Narrabri in NSW is compensated for by the large antennas and the excellence of the state-of-art receivers, making it amongst the most sensitive millimetre telescopes in the world. It is expected to shed new light on star formation and the evolution of galaxies in the early Universe.
- c) Australian participation in the international next-generation telescope project, the Square Kilometre Array (SKA), continues to intensify. An Australian site at Mileura, in Western Australian, has been selected as the Australian candidate site, and an intensive environmental and engineering study is now starting at that site, as well as construction of technology demonstrators. These tests will culminate in the international site selection process in 2006, in which Australia is widely regarded as a front-runner.

### Commission K

- a) **Research**  
As a result of requests from other scientists interested in the possible effects of vascular permeability of the brain following exposure from mobile phone signals,

Australian researchers published the individual animal data on the vascular permeability for 197 mice exposed long term to GSM mobile phone signals (Finnie JW & Blumbergs PC, Pathology 2004; 36: 96-97). In the original study (Finnie et al, Pathology 2002; 34:344-347), mice were exposed to a 900 MHz GSM mobile phone signal for 60-minute using a purpose-designed far-field exposure system for 5 days per week for 104 weeks at specific absorption rates (SAR) of 0.25, 1.0, 2.0 and 4.0 W/kg. Control mice were sham-exposed or permitted free movement in a cage to evaluate any stress-related effects. The vascular permeability was evaluated in all exposed and control groups and reported as group data. The conclusion was "the results suggest that prolonged exposure to mobile telephone-type radiation produces negligible disruption to blood-brain barrier integrity at the light microscope level using endogenous albumin as a vascular tracer". This latest publication allows other researchers open access to the individual animal data. Importantly, the conclusion of the original study remains unchanged.

b) **Standards Initiatives**

Standards Australia has initiated a review of AS2772.2-1988 Radiofrequency Radiation Part 2 – Principles and Methods of Measurement – 300 kHz to 100 GHz. The standard specifies techniques and instrumentation for the measurement potentially hazardous electromagnetic (EM) fields in both the near and far field of EM sources in the frequency range 3 kHz to 300 GHz. The review is necessary because the standard does not totally reflect current best practice for measurement and instrumentation, particularly the measurement of mobile phone base stations which were introduced into Australia in 1987 just prior to the publication of the standard. As such the current standard does not contain guidance on appropriate procedures and instrumentation necessary for measurements around digital (GSM, CDMA and 3G) mobile phone base stations. There is work going on in other international standards bodies such as the IEC and ITU concerning the measurements around digital base stations and this work needs to be incorporated into the new measurement standard for Australia.

c) **Government Information Campaign**

The Australian Communications Authority (ACA) released a comprehensive information package on electromagnetic radiation and mobile phone base station towers to address community concerns about health issues. The information package is known as "Mobile Phone Towers and EMR - Information for Communities and Councils," and was developed by ACA with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). The kit includes a series of ACA and ARPANSA fact sheets, frequently asked questions (FAQ) and a DVD "Mobile Communications and Health".

**I SUBMIT THE FOLLOWING REPORT TO COUNCIL ON THE ACTIVITIES OF THE NATIONAL COMMITTEE IN calendar year 2004 (200-250 words):**

The Hobart venue of Hadleys Hotel for WARS2004 (Workshop on the Applications of Radio Science) Conference proved very successful. Papers were offered under two categories: information and research. All research papers were refereed satisfying DETYA E1 classification for publications. One half-day special session was devoted to papers and discussions on two major proposed radio astronomy projects: LOFAR and SKA. Both these projects encompass a wide range of NCRS interests from signal processing to ionospheric corrections in LOFAR, including potential spin-off industrial and non-astronomical scientific outcomes. WARS offered an ideal forum to discuss these topics given the wide representation across national radio science disciplines that the Conference attracted. The Committee also focussed on further improving communications with Australian radio scientists, the principal outcome being further enhancements of the NCRS website ([www.ips.gov.au/IPSHosted/NCRS/](http://www.ips.gov.au/IPSHosted/NCRS/)). Information from this site formed the major input of the NCRS to the Academy of Science study for "Maximising the Benefits from International Scientific Linkages"

Yours faithfully,

Phil Wilkinson  
28 January 2005