

General activities

IAU GA 2003

The 25th General Assembly of the International Astronomical Union (IAU GA) was held during 13 – 26 July at the Sydney Convention and Exhibition Centre (SCEC) in Darling Harbour. The Assembly was hosted by the National Committee for Astronomy of the Australian Academy of Science, together with the Astronomical Society of Australia. The local organisation was managed by a National Organising Committee, co-chaired by Dr John Whiteoak (ATNF) and Professor Harry Hyland (James Cook University). Much of the local organisation, including registration and accommodation bookings, was contracted to a professional meetings management organisation, ICMS Australasia Pty Ltd.

The meeting was generously supported by two major sponsors, CSIRO and Connell Wagner and by grants from the Australian Federal Government. In addition, AARNet and GrangeNet provided support for the internet traffic, the Gruber Foundation provided support for the Opening Ceremony, and Sydney's Lord Mayor provided a welcome reception. The UNSW, Donovan Trust and British Council supported some of the associated events. Significant travel grant support for participants was provided by the European Southern Observatory and NASA in addition to the IAU travel grants.

The GA was attended by more than 2000 IAU members, invited participants and other guests who came to Australia from at least 65 countries. A spectacular opening ceremony was held at the Opera House on 15 July 2003. The ceremony included an organ recital by Australia's chief scientist Robin Batterham and the formal presentation of the Gruber cosmology prize to Rasheed Sunyaev (Space Research Institute, Russian Academy of Sciences, Moscow). The closing ceremony was held on 24 July, during which Professor Ron Ekers became the IAU President for the period 2003 – 2006.

The scientific meetings held during the IAU GA included six Symposia, 21 Joint Discussions, four Special Sessions, including one on Education, three invited discourses and numerous working group and ad-hoc meetings. In addition, at least 1,300 poster papers were on display throughout the meeting. Scientifically, the Assembly was an outstanding success. Those attending the General Symposia were treated to excellent talks and meetings, Sydney's best weather and an excellent venue. Locals and visitors renewed old acquaintances, met new people and formed new collaborations. The General Assembly was also an excellent place to showcase Australian astronomy. Many ATNF staff were involved in the organisation of the scientific programs. Four of the symposia had



The IAU Astro-Expo at the Sydney Convention and Exhibition Centre in Darling Harbour
Photo: © Shaun Amy



ATNF co-chairs or SOC members (IAU216 Maps of the Cosmos; IAU217 Recycling Intergalactic and Interstellar Matter; IAU218 Young Neutron Stars and their Environments; IAU220 Dark Matter in Galaxies).

Two different Special Sessions on the history of radio astronomy were held during the GA. These were organised jointly by Commissions 40 (Radio Astronomy) and 41 (History of Astronomy). A one-day meeting featured poster and oral papers about Australian radio astronomy, 1945 – 1988, presented mainly by retired radio astronomers from Australia and overseas. An additional half-day event on “Pioneering Observations in Radio Astronomy” included papers on early radio astronomy developments in Australia, France, Japan, Russia and Sweden, and presentations about the “founding father” of radio astronomy, Grote Reber, and the first two female radio astronomers, Elizabeth Alexander (NZ) and Ruby Payne-Scott (Australia). ATNF staff co-chaired the Organising Committees of both meetings.

Other activities during the GA included an “Industry Day” and an “Astro-Expo”. The Industry Day was funded by the Commonwealth Department of Industry, Tourism and Resources. This was a one-day workshop, attend by 125 representatives from 75 organisations. Presentations on the needs for future astronomical instrumentation, and opportunities for industry, were made by an international group of IAU participants. The Astro-Expo was available to both participants and the general public; it contained 45 individual displays, including one showcasing the ATNF’s work. Part of the exhibition was an “Australia Pavilion”, aimed at presenting Australian science to an international audience. It was funded by a grant for international showcasing from the Commonwealth Department of Education, Science and Training.

Many outreach activities were held in association with the IAU GA. The “Festival of Astronomy” provided a month-long program of public events that included a series of public talks, a Schools’ Day, a Teachers’ Workshop Day and “Science in the Pub”. The website for the Festival of Astronomy was provided by the ATNF. The “Astronomy on the Go” program, organised by the UNSW, toured more than a dozen schools in regional NSW as well as several schools in Sydney.

The Descendance dance group performing in the Sydney Opera House at the Opening Ceremony of the IAU General Assembly.

Photo: © Vincent McIntyre

The ATNF oversaw the operation of the press room at the meeting – the main point of contact with the media. Working with the home institutions of researchers attending the meeting, eleven media releases were issued highlighting science results and other significant developments. Sheets of media highlights were presented to the media, culled from the programs of the meeting’s symposia and joint discussions and potential interviewees, picked for their media attractiveness. Sixteen press room staff – mainly university students studying public relations and related fields – worked in shifts to answer phone queries, schedule face-to-face interviews, accompany visiting television crews, and act as “runners” to retrieve delegates from the individual sessions.

Two hundred and ten media stories were identified that related to the Assembly or the science discussed. More than 80% appeared in print or on the web; slightly less than half of the stories recorded (94) came from Australian media outlets.

The public relations goals for the meeting included raising the Australian public’s awareness of Australia’s past and present standing in world astronomy, and updating the public’s knowledge of how astronomy is practised; and, for Australian “opinion formers”, to present astronomy as one of Australia’s most successful and technologically innovative sciences, and to emphasise the benefits of Australia’s participation in large international ventures such as the SKA or Extremely Large Telescope projects. The media coverage focussed on the “straight” science being presented at the meeting; nevertheless, the coverage of the SKA and ELTs, the science stories originating in Australia, and of the meeting as a whole, gave a positive picture of the state of astronomy in Australia.

The ATNF also oversaw the production of the in-house conference newspaper, *The Magellanic Times*. This appeared every week day of the Assembly, informing delegates of changes to the program and official announcements from the IAU, and highlighting interesting people and projects. Delegates were so keen to contribute material that the newspaper ran to eight tabloid pages a day. The Editor, Seth Shostak, and graphic artist, John Tierney, were housed in the press room, and were able to call on the press room staff to interview delegates and report on sessions – experience that the student workers enjoyed.

One aspect, coordinated by ATNF staff, that contributed to the overall success of the IAU GA was the provision of a comprehensive data communications network throughout the SCEC. Reliable and high performance networking is a necessity at any major conference involving the physical sciences.

The network was configured and tested at the CSIRO Radiophysics Laboratory during the week leading up to the IAU GA. With the assistance of the SCEC Network Manager, David Tattersall, a small group of ATNF, CTIP and CMIS staff and a few student volunteers, deployed the bulk of the network over the course of a very long Sunday. The network consisted of many kilometres of fibre optic cable and unshielded twisted pair cabling. Around 15 ethernet switches were interconnected using Gigabit ethernet with each switch providing numerous switched 100Mbit/s connectivity to various locations throughout the venue such as the Internet cafe, meeting rooms, media centre and the exhibition floor.

For the first time at an IAU GA a wireless communications network was provided. Using nine access points and a variety of antennas, distributed throughout the main areas of the SCEC, around 120 users could be simultaneously connected to the network from their wireless-enabled laptop computers and hand-held devices. As well as reducing demand on fixed terminals, this technology enabled conference delegates to access network resources from various locations in and around the conference and exhibition areas. Feedback received suggested the provision of the wireless network was a resounding success.

In addition to the impressive network installed throughout the venue, a Gigabit ethernet link was provided to connect the IAU GA to the Internet. This high-bandwidth wide-area link enabled real-time demonstrations of technologies such as grid-based computing and access to multiple astronomical databases using Virtual Observatory tools.

Astrophysics group

Astrophysics events

Whilst the major focus of the year was the IAU General Assembly and the associated scientific symposia, several other astrophysics events happened during the year to which the ATNF was able to contribute. These included a workshop on the Low-Frequency Universe at the University of Sydney, a joint AAO/ATNF symposium at Mount Stromlo, the sixth Synthesis Imaging Workshop at Narrabri, the Annual Student Symposium, a workshop on the Variable Radio Universe workshop, held at Parkes to mark the occasion of Dave Jauncey's 65th birthday, an International SKA workshop in Geraldton, the Third Annual Millimetre Science workshop and an "Astrofest" at the end of the year.

Staff

Several postdoctoral positions at the ATNF are shared appointments with other institutions. In 2003 two new postdoctoral appointments were funded through a new ARC/CSIRO scheme – Virginia Kilborn (Swinburne/ATNF) and Tony Wong (UNSW/ATNF, formerly a Bolton Fellow) – while Nina Wang's continuing postdoctoral appointment is shared with the University of Sydney. Mark Walker left his joint ATNF/University of Sydney fellowship to be supported entirely by the University, though he remains a frequent visitor. D.J. Pisano will remain at the ATNF as a postdoctoral fellow for a further year, his two-year tenure as a NSF MPS Distinguished International Postdoctoral Research Fellow having concluded.

Other term appointments in 2003, for staff with an astrophysics background but with a different primary functional area, were Michael Dahlem and Maxim Voronkov at Narrabri and Carole Jackson and Tara Murphy in Marsfield.

The appointment of two Federation Fellows in 2003, Ron Ekers and Dick Manchester, is a significant boost for astrophysics research at the ATNF. Ron and Dick will lead two highly focused research groups in the respective areas of: (1) high-redshift star formation, SKA and interference mitigation; and (2) precision pulsar timing.

Visitors program

The IAU General Assembly provided an opportunity for many of the world's astronomers to visit Sydney in 2003. Some of these were able to spend some time at the ATNF and other institutes in Australia, increasing our usual number of visitors. Under the auspices of the Distinguished Visitors scheme, it was a pleasure to host visits during the year from Joe Taylor (Princeton University, USA), V. Radhakrishnan (Raman Research Institute, India), Rajaram Nityananda (National Centre Radio Astrophysics, India), S. Ananthkrishnan (Giant Metrewave Radio Telescope, India), Ken Kellermann (National Radio Astronomical Observatory, USA), Jayanne English (University of Manitoba, Canada), Ned Ladd (Bucknell University, USA), Brent Tully (Institute for Astronomy, Hawaii), Namir Kassim (Naval Research Laboratory, USA), John Dickey (University of Minnesota, USA), Don Melrose (University of Sydney), Arnold van Ardenne (ASTRON, The Netherlands), Bill Imbriale (Jet Propulsion Laboratory, USA), Dan Stinebring (Oberlin College, USA) and Esko Valtaoja (Tuorla Observatory, Finland).

Marsfield scientific computing group

The Marsfield scientific computing group provides scientific computing and information technology (IT) support for National Facility users. The IT infrastructure is managed by the CTIP computer services group (CSG) and many IT services are contracted to the CSG.

The group was lead by David McConnell from January – June 2003. Following a secondment to CTIP, Neil Killeen resumed the leadership role from July 2003.

Information technology

The open-source operating system Linux is used at the ATNF in a variety of systems. In 2003 the ATNF continued to invest in scientific Linux systems, using the Debian distribution, mainly for its excellent maintenance tools. The ATNF now has a tailored Linux system that can be installed on a range of systems in a uniform way. For desktop systems, a good working environment is now available. For laptops, it is more difficult to provide a stable working environment because laptop hardware evolves very rapidly.

IT in CSIRO continues to evolve towards a centralisation of services and management. CSIRO is preparing a One-IT development plan in which IT resources across the organisation are expected to be used more effectively. ATNF is an active participant in the planning processes.

In 2003 the computer networks at Parkes and Narrabri were renumbered to be consistent with the rest of CSIRO in New South Wales. This change enabled a better separation of online and offline systems, with improved security.

Virtual Observatory software

Over the last decade astronomy has changed into a data-rich discipline. To be able to manage, analyse and make sense of the large volumes of data now flowing from telescopes, new data handling paradigms are needed. The ATNF is a founder-member (2002) of the Australian Virtual Observatory (Aus-VO), which in turn is a member of the International Virtual Observatory Alliance (IVOA). Aus-VO is contributing to the effort to provide a distributed, uniform interface to data, and specifically to the data archives of Australia's major astronomical observatories. In November 2003 the ATNF hosted the second Aus-VO workshop and this proved very successful. ATNF staff also attended IVOA conferences.

Two VO software projects were started in 2003. The first project, funded through an ARC grant, is for a "Remote Visualisation Server (RVS)". This distributed (CORBA) system takes an image in "FITS" format and transfers it to a server. The image is then processed by the AIPS++ Display Library on the server and displayed on the client's desktop. In 2003 a prototype RVS was successfully developed and it is expected that this will be in use for various image archives in 2004.

The second VO project, funded through CSIRO Emerging Science, is a collaboration between the ATNF and the CSIRO ICT Centre. This project aims to make the Compact Array archive data available online to astronomers. In 2003 the archive data was transferred from Narrabri to hardware at the ICT Centre in Canberra. Software was developed for searching and retrieving the data. In 2004 the archive will be made available through a simple web interface system. Work also began to provide a "pipeline processor" to generate images from the archive. This pipeline will enable non-expert users to process Compact Array data.

AIPS++

AIPS++ is an astronomical data processing environment. Until 2003, AIPS++ was developed by an international consortium. In early 2003 the AIPS++ international software project underwent a review. Although the review was positive about the project, the international consortium was dissolved soon after. Since that time, ATNF and NRAO have sought a less formal means of collaborating and taking advantage of each others' expertise. The ATNF is now focussed on using AIPS++ for specific software projects, such as the RVS described above, and less involved in generic development.



Outreach & education

One of the strategic objectives of the ATNF is to conduct an effective outreach program. Astronomy generates a high level of public interest and is ideally suited to promoting science and to encouraging the next generation of students towards a science-based career. The key outreach goals for the ATNF are: to attract young people into science; raise the profile of astronomy and science in Australia; and maintain and foster good relations with local communities. In 2003 these were promoted through a range of activities as described below.

A celebration at Dover Heights

Rodney Reserve, on the cliff tops at Dover Heights in the eastern suburbs of Sydney was one of the most remarkable and important astronomical sites in New South Wales. Between 1946 and 1954, this former WWII radar station was the leading field station of the CSIRO Division of Radiophysics, and was home to a succession of different radio telescopes that were used to make outstanding advances in radio astronomy. Using converted radar equipment from the Second World War, John Bolton, Gordon Stanley and Bruce Slee discovered the first extragalactic radio sources. They identified them as galaxies Virgo A, Centaurus A and Cygnus A, millions of light-years away. This revolutionised space exploration. By looking at the radio waves emitted by objects in space, we can probe deeper and reveal the very distant universe. These Dover Heights discoveries showed that radio waves could be used to study the universe “from the solar system to the Cosmos” and firmly established Australia as a world leader in the emerging science of radio astronomy.

A full size replica of an 8-element Yagi array that was used at Dover Heights during 1951 - 1952. This was one of several Yagi arrays that were used on the site as a “sea interferometer”. In this technique, an interference pattern was recorded by combining radio waves detected directly from the source and from a reflection off the sea. The replica antenna has been installed on the cliff top next to the original mount, as a scientific memorial.

Photo: © Barnaby Norris



To celebrate the history and achievements of the Dover Heights site, in November 2002, the ATNF submitted an application to the Waverley Council to build a scientific memorial on the site, consisting of a full-size replica of one of the early radio telescopes, a display panel with information about the site and a commemorative plaque. This application was approved by the Council in June 2003.

On 20 July 2003 a ceremony was held on Rodney Reserve to open the new memorial. The ceremony was timed to coincide with the historical sessions of the IAU General Assembly and many international and Australian visitors with a keen interest in the history of radio astronomy gathered for the event. Guest of honour at the ceremony was Her Excellency, Professor Marie Bashir, Governor of New South Wales. Other invited speakers were Professor Woody Sullivan (University of Washington, USA), Professor Ron Ekers (ATNF) and Mr Paul Pearce, Mayor of the Waverley Council.

Media relations

Media relations at the ATNF are coordinated by the Communications Manager, Helen Sim. The ATNF has a strong media profile. Typically the ATNF issues 10 media releases a year and features in approximately 100 press items and 50 radio and TV interviews. From late 2002 through to July 2003 most of the ATNF's efforts in this area were directed towards preparing for and publicising the IAU General Assembly.

Education

Each year the ATNF coordinates a summer vacation program and hosts approximately eight undergraduate students. The 2003/2004 program was held jointly with CTIP and the ICT Centre; 280 applications were received for a total of 18 student positions. The students worked for 10 weeks on a research project under the supervision of a research scientist or engineer. They also used the ATNF radio telescopes to take observations, and gave presentations on their work at a student symposium.

For younger students, the Parkes and Narrabri Observatories provide a work experience program. Typically, 15 high-school students per year spend a week doing work experience at the Parkes Observatory while three or four students visit Narrabri. The Parkes Observatory also provides professional development weeks for school teachers and receives an increasing number of requests for such support.

Professor Marie Bashir, Governor of New South Wales, and Professor Ron Ekers at the Dover Heights celebration on 20 July 2003

Photo: © David Smyth



CSIRO Summer vacations students on the Parkes radio telescope. From left: Lap-hang Ho (CTIP), Ryan Clements (ATNF), David Jones (ATNF) and Marija Vljajic (ATNF). Photo: © Robert Hollow

Several new educational initiatives began in late 2003, following the appointment of Rob Hollow as Education Officer in October. An online web-based resource for high school students and their teachers is being developed which will provide content for the NSW high school Higher School Certificate astrophysics course. The web resource will be provided in 2004 and will later be expanded to cover a range of ages and skill levels. Another initiative is to provide workshops for high school teachers. A three-day workshop targeting teachers of Year 7-10 Science will be held at Parkes in May 2004, with others planned to follow.

SEARFE

The SEARFE Project (Students Exploring Australia's Radio Frequency Environment) aims to give senior high-school students practical experience in the value and use of the radio-frequency spectrum, an overview of the scientific objectives of the next generation radio telescopes and a practical understanding of why these telescopes have to operate in radio-quiet areas. In 2003 the project was in a pilot phase, with participating schools in Sydney, Canberra, Narrabri, Kimba (South Australia) and Geraldton (Western Australia). A SEARFE kit was also installed at the Parkes Visitors Centre for staff to show to visiting high school students and other groups.

The SEARFE project received considerable media during the year with several television and newspaper reports. Leading up to the IAU General Assembly, the SEARFE Project was a major feature in the University of New South Wales-led "Astronomy on the Go" program that toured more than a dozen schools in regional NSW and several schools in Sydney. During the Assembly, students from Abbotsleigh School in Sydney demonstrated the project.

Students from the high school Nagle Catholic College presented their work on the project to conference delegates at the International SKA 2003 conference held in Geraldton. The University of Technology Sydney displayed SEARFE at the "Science in the City" exhibition at the Australian Museum in Sydney and again for "Science in the Bush" in Tamworth.

The SEARFE project receives support and sponsorship from the University of Sydney and its Science Foundation for Physics, CSIRO ATNF, University of Technology Sydney, University of NSW, IBM Australia, BAE Systems Australia, Engineers Australia, Perth Observatory and Australian Geographic. Details on the SEARFE Project are available at www.searfe.atnf.csiro.au.



Geraldton Nagle Catholic College students Alice Wenderling, Hoanh Hoang, Adam Harvey and Kylie Judd explaining their work on the SEARFE Project to International SKA Steering Committee Chair Jill Tarter (left) and other conference delegates at the International SKA 2003 Conference in Geraldton.

Photo: © Barnaby Norris

ATNF photoarchive

The ATNF historic photographic archive dates from 1939 to the mid-1990s and comprises over 100,000 individual negatives or slides, and associated prints. The collection includes images of many of the key figures in Australian radio astronomy, photographic records of key events in the history of Australian radio astronomy and images of the radio telescopes and field stations used by the Division of Radiophysics and the ATNF.

The photographic archive is being systematically scanned to create a digital archive of historic images. In 2003, approximately 2,000 images, covering the years 1965 – 1970 were scanned, bringing the digital collection to around 4,500 images in total. The scanned images are catalogued and organised using an asset-management database program, Cumulus with detailed information on the images entered into the database.

The digital archive is being developed as a resource for research on the history of Australian astronomy and for exhibitions, education and public relations. In 2003, the collection was used to provide pictorial support for detailed biographical papers about two pioneering radio astronomers, Bruce Slee and the late Gordon Stanley, and to illustrate ten different historical papers presented at the IAU General Assembly. A selection of images from the photographic archive also appeared on the display panels prepared for the Dover Heights heritage project, and in a paper about the Chris Cross at Fleurs which was published in a conference proceedings. This same volume also contained a well-illustrated paper about the photographic archive.

Parkes outreach

In 2003 the Parkes Visitors Centre hosted 136,000 members of the public, slightly more than in 2002 (134,000 visitors). This is a remarkable result given that other tourist attractions in the region reported substantial down-turns in visitor numbers over summer 02/03 due to the exceptionally dry hot weather associated with the El-Nino related drought. The majority of visitors continue to be families on holiday in the region, travellers along the Newell Highway and school and coach groups. With these visitor numbers Parkes Observatory remains CSIRO's most significant point of personal contact with the public.

As the prominence of the movie *The Dish* fades, providing a positive and notable experience to visitors becomes crucial to sustaining numbers. A significant step taken in this direction during 2003 was the opening of the *Dish Cafe* on March 28. The cafe is located in a dramatic new building adjacent to the Visitors Centre and offers a spectacular view of the telescope. During the official opening on 9 April Ron Ekers, then Director, made a symbolic first cup of coffee. The cafe is operated by independent lessees and has had a positive effect on the experiences of visitors to the Observatory. Visitors are now staying longer and many locals report having visited the Observatory for the first time in years. The cafe caters to groups and hosts evening functions by prior arrangement, leading to an increasing number of requests to open the Visitors Centre in the evening.



Staff and visitors at the opening of the *Dish Cafe* at the Parkes Visitors Centre. Coffee with a view!
Photo: © John Sarkissian



Special visitors during 2003 included the Federal Minister for Science, Peter McGauran, the US Ambassador Thomas Schieffer, and the NSW Minister for Small Business and for Regional Development, David Campbell. Peter McGauran visited with a number of his staffers in February as part of an astronomy tour of Coonabarabran, Narrabri and Parkes, where the Federal member for Parkes, John Cobb, joined the group. The US Ambassador's visit marked the official start of the tracking of spacecraft for NASA using the Parkes Telescope over a particularly busy period associated with the close approach of the planet Mars. David Campbell made a presentation from the Department of State and Regional Development to the cafe operators Andrea and Michael Carter.

Other notable events included the hosting of the release of a new four-wheel-drive vehicle to motoring journalists and two days of filming of a Korean TV romance drama.

After 17 years of sterling service, Rick Twardy, the manager of the Parkes Visitors Centre, left to pursue new challenges. John Smith took up a new role as Parkes VC Manager and Coordinator of the Parkes and Narrabri Visitors Centres in August 2003. Visitors continue to provide strong feedback that their interactions with the friendly and knowledgeable staff are a significant contributor to their positive impressions of their visits.

Revenue was down slightly in 2003 due to a large drop between February and April, compared with the previous year, but then recovered, with most subsequent months stronger than in 2002. A continuing partnership with Swinburne University to produce 3D audio-visuals remained very positive. Planning for new displays and improved services to visitors is well underway, after a full day meeting in December 2003 devoted to identifying outreach priorities. The operation of the Visitors Centre and other outreach activities at Parkes continues to be strongly supported by other observatory and ATNF staff, the local council and other tourism operators and businesses in the region.

US Ambassador Thomas Schieffer and Parkes Officer-in-Charge John Reynolds pose for the cameras at the Parkes Mars tracking launch on 31 October. In a reference to the film *The Dish*, CSIRO presented the Ambassador with a cricket bat signed by ATNF staff; the Ambassador, former manager of a US baseball team, reciprocated with a baseball bat.

Photo: © John Sarkissian

Narrabri and Mopra outreach

The Narrabri Visitors Centre hosted approximately 10,000 visitors in 2003, a similar number to previous years. The Visitors Centre also held several star-gazing evenings for community groups and local staff. Several of these were timed to coincide with the close approach of Mars.

In October, an Open Day was held at the Observatory as part of the township's Spring Festival. The main attractions of the day were visits to the Control Room, the Visitors Centre and the vertex of an antenna. Approximately 300 visitors attended, with 200 climbing to an antenna vertex room.

Work began on a long-needed revamp of the Visitors Centre. Several new displays were added, and new brochures were produced. New landscaping of the area around the Visitors Centre was completed near the end of the year.

An Open Day was held on the site of the Mopra radio telescope in October as part of the annual Coonabarabran "Festival of the Stars". Approximately 130 visitors toured the telescope vertex room and control room. Tours and demonstrations of the telescope were also given to two high school groups for the "Cosmology Distinction Course" and an "Astro Camp" during the year.

Spectrum management

Spectrum management relating to the protection of radio astronomy has been an important activity for CSIRO for more than 30 years. The ATNF has continued to support such activities and at present is involved in the following areas:

- ◆ **Participation in** national spectrum planning and protection activities through the Australian Communications Authority (ACA).
- ◆ **Participation in** regional and international meetings under the auspices of the International Telecommunications Union (ITU). The primary activity is the regular meetings of ITU Working Party 7D (radio astronomy) in Study Group 7 (Science Services). This group is responsible for all technical studies and ITU Recommendations for the protection of radio astronomy.



ATNF Staff members John Smith, Michael Dahlem and Euan Troup (wearing blue safety hats) and visitors at the Narrabri Open Day in October 2003.
Photo: © CSIRO

- ◆ **Participation by** Federation Fellow Professor Ekers in the Working Party meetings of the OECD megascience forum where an international task force was set up to investigate radio-frequency interference and protection measures. The final report was produced in late 2003 and approved by the OECD science ministers.
- ◆ **Participation in** IUCAF (Scientific Committee on the Allocation of Frequencies for Radio Astronomy and Space Sciences), an inter-union committee of the IAU, URSI and COSPAR. IUCAF has been very active in ITU meetings and has had a significant impact on Study Group and WRC deliberations.
- ◆ **Participation in** the Radio Astronomy Frequency Committee in the Asia Pacific region (RAFCAP). This committee participated vigorously in Asia-Pacific Telescope (APT) meetings and helped establish regional WRC positions supporting the protection of radio astronomy.

The major focus of activity for the year was the World Radio Conference, WRC2003, held in Geneva in June – July 2003. Despite strong commercial pressures on the radio spectrum, radio astronomy protection was maintained. However, to ensure such protection, it became necessary to register all radio telescopes and operating bands with the ITU. Although ITU registration has always been possible, no astronomy stations worldwide had been registered since the 1960s. This registration can only be done by each country's spectrum administration; all Australian telescopes have now been registered through the ACA.

The Productivity Commission recommended in its review in 2002 that "radio sensitive sites" be established around existing radio astronomy facilities. The ACA has agreed to implement this recommendation and is working closely with ATNF to develop appropriate guidelines.

The new 50-cm receiver at Parkes has highlighted considerable interference in this band from the digital TV rollout in Australia. The interference level is expected to increase. The Australian Broadcasting Authority (ABA) has been very helpful in identifying the sources of this interference to assist with interference mitigation efforts.

New web pages were developed in 2003 to coordinate ATNF spectrum management activities and provide a single point of contact for outside organisations interested in this area. These are available at <http://www.atnf.csiro.au/spectrum>.

Human resources

Staff satisfaction survey

The ATNF remains an employer of choice. Responses to the 2003 CSIRO Insight Staff Satisfaction Survey placed the ATNF as the top Division of CSIRO for the third year running. Furthermore, the staff satisfaction within the ATNF is considerably higher than that across comparative Global R&D organisations surveyed by the consultants International Survey Research.

The overall ATNF results for 2003 were essentially the same as in 2002, remaining very positive across all 21 categories of questions. The greatest strengths of the ATNF are our staff and our clear focus on operating world-class facilities to support astronomical research, and leading-edge technology development for future facilities. The strong team spirit of ATNF staff is an enormous asset and is clearly reflected in the survey results.

ATNF project management and resource allocation associated with the large number of internal and external projects underway (including large initiatives such as the SKA) were raised as concerns in the staff survey. These issues are being addressed through a commitment from the Senior Management to implement better resource planning for internal and external projects.

Equal employment opportunity

The ATNF has an EEO group with five EEO contact officers. Two are based in Sydney, two are at Narrabri and one is at Parkes. Staff at any of the sites can contact any of the EEO officers and are assured that all discussions will be held in confidence. The EEO officers work to promote good workplace relations, to provide information and advice

to staff and management on EEO policies, and to support staff involved in complaints procedures. EEO talks are given at each of the ATNF sites and are also given to summer vacation students and to new staff. The group maintains web pages at

www.atnf.csiro.au/overview/management/eeo/.

Occupational health, safety and environment

In line with CSIRO's Occupational Health and Safety Policy, ATNF sites are systematically undertaking risk management activities under an OHS Management System to ensure that work environments and systems of work present no risk of injury or illness to ATNF staff or visitors. Some points of interest with regard to this in 2003 are as follows:

Brett Preisig (HSR) and Tom Lees (Site Safety Officer) received a Divisional Award for their efforts in conducting safety inductions at the Parkes Observatory for staff, visiting astronomers, contractors, and work experience students, and for their efforts in developing and maintaining the site safety manual. While the Divisional Awards singled out Brett and Tom, they represent an endorsement of the efforts of many staff throughout the ATNF to promote a safe OHS&E culture.

A number of training and awareness programs were implemented in 2003 including presentations to staff on positive OHS&E culture, cryogenic and gas safety, supervisor safety, fire safety, working safely on roofs, safe operation of elevated work platforms, safe use of overhead cranes, defensive driver training, first aid and ergonomics.

Four incidents in 2003 required notification to COMCARE: a falling ceiling tile, a dog bite, a car accident and a minor electric shock. Incident data reveal an increase in occupational overuse/manual-handling-related injuries and increased travel-related incidents.

In 2004, the systematic review of the key risks facing ATNF staff in their workplace will continue. This includes addressing safety issues presented by work-related travel, electrical usage, manual handling, and slip, trips and falls and reviewing safety practices associated with work at heights.

New OHS&E initiatives include the purchase of an elevated work platform for the Marsfield antenna range and the installation of a roof safety line and anchor points for use with a safety harness roofer's kit and appropriate training. Both initiatives will reduce the risks associated with working at heights.

Under the CSIRO Environment Policy, all ATNF sites are implementing an Environmental Management System to minimise the impact on the environment by the activities of ATNF and its staff. The current focus in Marsfield is to reduce resource usage such as electricity, water and paper, whereas in Narrabri and Parkes a different range of environmental initiatives exist.

Environmental initiatives include the remediation of some past poor land practices and the control of weed infestation at the Narrabri site, and tree planting to create an animal corridor and prevent soil erosion at the Parkes site.

