Operations

National Facility Support

The ATNF National Facility Support group, located in Marsfield, provides support for public relations activities, external communications, educational programs and time assignment processes.

Staff changes

In September 2000 Dr Raymond Haynes retired from CSIRO after 28 years of service. Raymond held several key roles at the ATNF, most notably as Head of Computing from 1977 to 1983 and later as Head of the Scientific and Community Liaison Group from 1994 until 2000. We also said goodbye to Tracy Denmeade, the ATNF Lodge Manager who worked for ATNF over a period of seven years. Helen Sim, the ATNF Communications Manager, spent four months on secondment to the National Radio Astronomy Observatory, to work on public relations activities for the opening of the 100-m Green Bank Telescope (GBT) in West Virginia, USA.

After some restructuring of the Management group, Jessica Chapman was appointed in September 2000 as the Head of External Relations.

Public service medal

Dr John Whiteoak, Deputy Director of the Australia Telescope National Facility since 1989, was awarded a Public Service Medal in the Australia Day honours list for 2001, for his contribution to the ATNF and his role in establishing high-frequency spectrum allocations for astronomical research.

One of John Whiteoak's major contributions in the international radio astronomy world has been his work on the protection of radio frequencies for astronomy, as chairman of an International Telecommunication Union (ITU) Working Party. This group has proposed vastly increased protection in the radio spectrum at frequencies between 71 and 275 GHz, the proposals endorsed at the recent World Radiocommunication Conference in Istanbul (page 40).

Higher-degree students

Education is one of the ATNF's key performance indicators. ATNF staff members participate in a long-standing program to co-supervise higher-degree Masters and PhD students. This arrangement gives students access to world-class observing facilities and the chance to interact with a range of practising astronomers. At the end of 2000, 24 students were taking part in the program: their projects are listed in Appendix G. Four students completed their PhDs during the year, their theses are listed in Appendix H.

Most of the higher-degree students undertake studies in astronomy, but the ATNF also offers higher-degree projects in areas of engineering such as microwaves, digital and electronics and in computer-related topics.

Melanie Johnston-Hollitt is a PhD student at the University of Adelaide with a co-supervisor at the ATNF.

Operations

Summer vacation program

For more than a decade the ATNF has coordinated a program each summer for undergraduates in science, mathematics, computing and engineering who are in at least the third year of their degree. For the 2000–2001 program there were 170 applications for 20 positions, seven with the ATNF (two of these at the Narrabri Observatory) and 13 for CTIP.

The students work on individual research projects under the supervision of research scientists for 10 to 12 weeks. During this time they experience the working environment of a major research facility. The vacation program includes a series of introductory lectures on the work of the ATNF and CTIP; a tour of the CSIRO Marsfield and Lindfield laboratories; and a weekly session where a staff member talks on a research topic.

A highlight of the program is the observatory trip where the students visit either the Parkes radio telescope, or the Australia Telescope Compact Array and are given the opportunity to work in small teams to take observations for a project of their own choice. This year the observatory trips were supported by John Whiteoak (Parkes) and Bob Sault (Narrabri).

At the end of the program the students organize a one-day symposium to report on both their individual and group research projects. In past years, some of the students in the program have later returned to the ATNF, either as employees or to do a co-supervised higher degree under the scheme outlined above. The students are also responsible for the production of a magazine, *The Jubbly Jansky*.

Australian access to SEST

A Memorandum of Understanding (MOU) between the ATNF and the Onsala Space Observatory, signed in August 1997, has been effective in providing Australian astronomers access to the Swedish-ESO Submillimetre Telescope (SEST) in Chile. It was formally established to provide a 10% share of the Swedish observing time on the telescope. This agreement has now been renewed for a further two years, until April 2002.

In return for this access the ATNF has built a wideband digital correlator for SEST to enhance its spectral-line facilities. This was delivered in March 2000 and is now available to SEST observers. Australia also provides part of the observing support for the SEST telescope.

Spectrum management

CSIRO, initially through the Division of Radiophysics and later through the ATNF, has been involved in activities related to spectrum management and the protection of radio astronomy for about 30 years. In preparation for John Whiteoak's retirement in 2001, Tasso Tzioumis has been taking increased responsibilities for these activities. The areas in which the ATNF are currently involved include:

Participants of the summer vacation student program, December 2000.

Operations

- Participation in national and international meetings under the auspices of the International Telecommunication Union (ITU). These include regular meetings of ITU Study Group 7 (Science Services).
- Participation by the ATNF director in the Working Party meetings of the OECD megascience forum where an international task force is being set up to investigate radio-frequency interference and protection measures.
- Participation in IUCAF, an Inter Union Commission for the Allocation of Frequencies and in the spectrum planning activities of the Australian Communications Authority (ACA).

A major event in 2000 was a month-long meeting for the World Radiocommunication Conference (WRC-2000), held by the International Telecommunication Union (ITU) in Istanbul during May 2000. This meeting was attended by about 2,500 participants including a dozen radio astronomers.

The purpose of the meeting was to revise pre-selected parts of the ITU radio regulations which form the basis of planned international usage of the radio spectrum. Several of the agenda items for the meeting involved radio astronomy. The most important item concerned spectral allocations to radio astronomy (and the Earth-exploration satellite service) in the frequency range 71–275 GHz.

The WRC-2000 meeting was a huge success for radio astronomy: all of the proposals for improved allocations (almost 100 were needed to cover the 71–275 GHz band) were finally adopted by WRC-2000. Even extra protection proposed only by Asia-Pacific countries for some spectral lines not covered by the allocations was approved.

Figure 24 shows the gain in radio frequency allocations. The line profile shows the variation of zenith atmospheric attenuation with frequency. Atmospheric

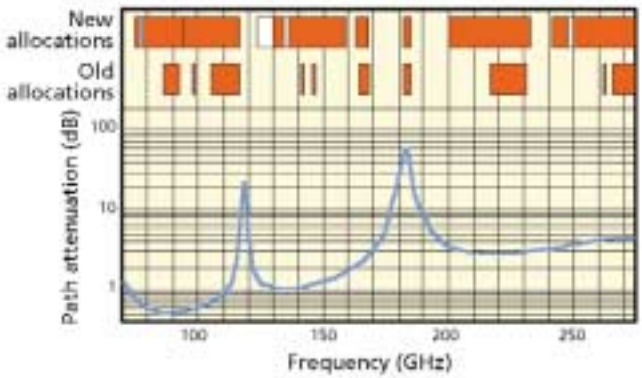


Figure 24 *The radio frequency allocations for 71 – 275 GHz. Unfilled blocks represent secondary allocations.*

"windows" containing attenuation minima occur in the ranges 70–115 GHz, 125–175 GHz, and 195–275 GHz. The new radio astronomy allocations now extend across most of the windows, and for the central window in particular, the improvement in protection is enormous. The radio astronomy allocations also include a band centred near 183 GHz which will be used for calibration purposes to study the attenuation and distortion of astronomical signals caused by atmospheric water vapour.

As a consequence of the bargaining to increase the allocations, some of the allocated frequencies will have to be shared with ground-based fixed, mobile or satellite uplink services. If these services are developed, their operations will have to be coordinated with radio astronomy. However, it is commonly believed that this will not be a problem at these high frequencies where ground-level atmospheric attenuation is high.

Unfortunately, WRC-2000 provided no opportunity to review the radio astronomy allocations at lower frequencies. In any event, the spectrum is so congested with services that it is difficult to see how radio astronomy could gain more allocations without affecting the operation of other existing services. The only possible gain may be in the protection of allocated bands from unwanted emissions of transmitters operating at frequencies outside those bands. A dedicated task group has been working on this problem for several years, and this will continue. Hopefully this work will result in improved radio astronomy protection levels which can be included in the Regulations at the next WRC.

Public outreach

The ATNF supports a wide range of public outreach activities. During the year, ATNF staff gave over 70 public talks. The ATNF also featured strongly in the media with staff involved in approximately 50 radio interviews and 25 television interviews. Over 100 newspaper articles on ATNF research activities and engineering developments were published during the year.

The National Facility Support group provides resources targeted for school students and educators. The group publishes a range of educational material which includes brochures, fact sheets and posters. To help high school teachers with the new HSC astronomy syllabus, a workshop for science teachers on "Peering Inside the Cosmic Engine" was held in Epping and, early in the year, at the University of Western Sydney. This was highly rated by the school teachers who attended.

Work experience students

The ATNF also gives students in Years 10 and 11 the chance to do "work experience". Each year, typically 30 students do a week of work experience at either the Parkes Observatory or at the Compact Array. Over the past few years the ATNF has initiated a Disadvantaged Youth Program for Year 11 high school students. The scheme is aimed at high schools in low socio-economic areas and provides a week-long work experience program for two to three students per year.

Narrabri outreach

At the Narrabri Visitors Centre, the estimated number of visitors for the year 2000 was 8,900, compared with about 9,700

Photograph

during 1999. There were fewer visitors around September, possibly because of the Sydney Olympics. There was another quiet period during the floods and very wet weather in November.

A highlight of the year was an Open Day held at Narrabri on 16 April 2000. The day was a great success, with more than 600 visitors. Two antennas were made available for inspection and were very popular. Tours of the control room, correlator room and receiver lab were also conducted. A series of six talks was given during the day, on a variety of astronomical and engineering topics. All were well attended with the seating capacity (30) of the conference room insufficient for all but the first talk of the day. Narrabri staff were joined by a number of volunteers from Marsfield, and were kept busy until an hour after the nominal closing time at 3 p.m.

Parkes outreach

The year 2000 marked several outstanding events and developments for the Observatory Visitors Centre and Outreach program — a very successful year in every respect.

A major upgrade to the existing Visitors Centre, funded by the CSIRO corporate building development program, was completed in August, furnishing approximately double the former interior space, a refurbished audio-visual theatre and several additional facilities for staff and visitors, including a new toilet block and landscaping of the Centre grounds. Much of the additional space is designed to encourage visits from school groups, particularly from those in the surrounding regions.

In tandem with the reopening of the upgraded Visitors Centre, a new audio-visual show was premiered, replacing a program which had run essentially unchanged for many years. The new show retains the multiple slide projector format, rendering visual material of extremely high quality and creating the illusion of animation. Response to the new show from the public has been excellent, both in direct feedback and increased attendance. The new show was produced for the ATNF by Australian Business Theatre, with assistance from staff at the ATNF and other astronomical research institutions. During 2000, the Visitors Centre attracted 58,700 visitors. Figure 25 shows the number of visitors for 1999 and 2000.

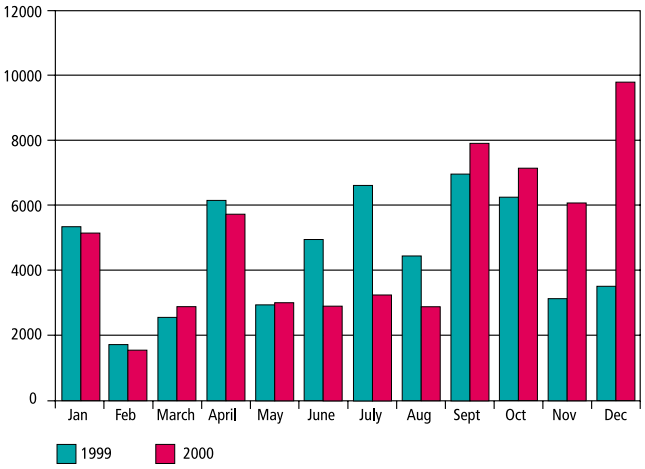


Figure 25 *Number of Visitors in 1999 and 2000 to the Parkes Visitors Centre.*

The Visitors Discovery Centre at the Parkes Observatory

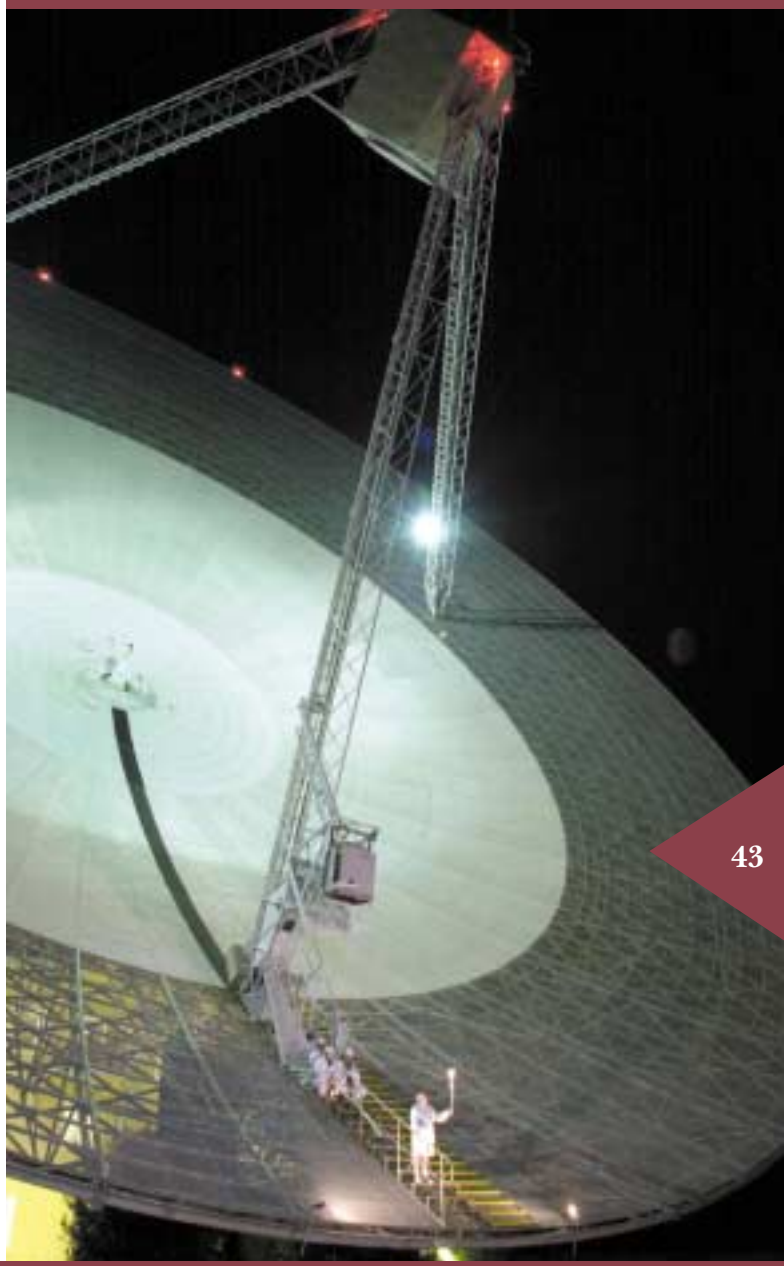
Operations

Olympic Torch

The Olympic Torch Relay came to Parkes on 18 August, a day which culminated in memorable scenes of the Mayor of Parkes, Robert Wilson, riding the floodlit dish, holding the Torch aloft. The event received good media coverage and was an invaluable opportunity to further consolidate good relations with the local community and council. A TV advertisement incorporating shots of the telescope and a local Olympic athlete, made by IBM to promote their Olympic sponsorship, was shown widely throughout the Olympics both in Australia and overseas, generating wide interest in, and visibility for, the Observatory.

The Dish

An Australian feature film *The Dish*, a dramatisation of the role played by Parkes in the first manned lunar landing, was released commercially in October 2000 to outstanding critical acclaim, becoming in quick time the highest grossing Australian film on record. Produced by Working Dog Productions, *The Dish* was shot on location at the Observatory during 1999 with the cooperation of ATNF and Observatory staff. The film generated excellent and sustained visibility for the Observatory and ATNF in many forms, including wide media coverage over several weeks, and a dramatic increase in public interest at the Visitors Centre.



Photograph

Robert Wilson, the Mayor of Parkes, carries the Olympic Torch on the Parkes radio telescope

Operations

Computing

Epping computer services

At Epping, the information technology (IT) infrastructure is managed by the computer services group of CSIRO Telecommunication and Industrial Physics (CTIP), while ATNF-specific tasks such as astronomical software and user support are managed by the ATNF. The computer services group was not fully staffed in 2000 (partly because of outsourcing: see below) with some resultant impact on the ATNF.

Staff

In 2000, Henrietta May, David Barnes and David Loone departed the ATNF. Henrietta joined CSIRO in 1978. Her most recent role was in system and astronomical applications support. David Barnes worked for two years in the aips++ astronomical software project, specifically on the visualization of data. David Loone was with the ATNF for some 10 years, most of which was spent in Narrabri. He led the ATOMS software project, to develop object-oriented real time systems, for his last two years from Epping. Thanks are due to each of them for their respective contributions to the excellence of the ATNF.

Vince McIntyre and Malte Marquarding joined in 2000. Vince takes over from Henrietta and Malte from David Barnes. David Loone's position (and the management of ATOMS) has reverted to Narrabri.

Observatory Computer Committee (OCC) and Computerfests

Computer staff at each of the three main ATNF sites report to a local program leader, but coordination across the sites is performed by the four-person OCC. The OCC meets three times a year, with the meetings rotated between the sites.

"Computerfests" are held in association with the OCC meetings. These gather together the many ATNF staff working in computing-related areas. The purpose is both social and technical, and they have been very successful. They enable staff to promote, communicate and coordinate their work activities, and also to socialise.

Outsourcing of IT support

Following a Cabinet decision in 1997, Government policy has been to outsource IT infrastructure services in budget-funded government agencies, subject to the outcome of competitive processes. In mid-2000, the Department of Finance and Administration conducted a "scoping study" for outsourcing IT infrastructure for CSIRO and other scientific agencies. At the end of 2000, following an independent review of implementation risks, the Government accepted a recommendation that the responsibility for the implementation of outsourcing should be devolved to the relevant agencies. CSIRO is therefore responsible for managing any outsourcing of its own IT infrastructure.

During 2000, the impact on CSIRO and

the ATNF of the outsourcing process was substantial. CSIRO formed an outsourcing project team of some 10 people, many seconded from their divisions. Each division also provided an outsourcing coordinator. Then began a process of gathering data describing the IT environment in great detail. These data had to be delivered on a fast schedule, and it became necessary for staff to delay other matters in order to meet the requirements. This clearly had a negative effect on the level of support it was possible to offer users at the ATNF sites. There were also many concerns amongst staff whose jobs were potentially at threat. This contributed to the computer services group's difficulties in retaining and hiring staff.

aips++ development

aips++ is an object-oriented data processing environment being constructed by an international consortium of leading radio astronomy observatory led by Tim Cornwell at NRAO. In 2000, Jodrell Bank rejoined the consortium (which also includes ATNF, BIMA, NRAO and NFRA) as an active member. The ATNF contributes four people who work (part time) on core aips++ development. The ATNF also uses aips++ as its toolkit for the development of the successful multibeam pipeline.

The project continues its development cycle of six months, with a new CD release at the end of each cycle. These are distributed to some 10 institutions in Australia and internationally.

In 2000 the ATNF held its first aips++ workshop. This was well received and another will ensue in 2001. aips++ demonstrations continue, and advice is given as part of the migratory and critical-mass gaining process.

ATNF development is mainly in the area of image visualization (in which we have a strong history) and analysis as well as basic astronomical infrastructure services. The central aips++ display tool, the Viewer, has been largely developed at the ATNF. The Viewer was designed to be "data" oriented (previous ATNF display tools such as the "kview" program were purely image oriented) and its functionality is now being broadened (at NRAO) to handle the display of visibility data. ATNF staff continued to improve the capability of the image-based displays and applications. Progress reports are given at http://www.atnf.csiro.au/aips++/weekly/docs/project/quarterlyreports.html.

Equal Employment Opportunity (EEO)

The ATNF has an active 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 meet several times a year and work to promote good workplace relations, to provide information and advice to staff and management on EEO policies, and to support staff involved in

Photograph
© S Amy

complaints procedures. To promote EEO within the ATNF, staff talks are given at each of the ATNF sites. EEO talks are also given to summer vacation students and to new staff. The group has an EEO resource library and maintains extensive Web pages at http://www.atnf.csiro.au/overview/management/eeo.

Occupational health and safety

Each ATNF site has its own occupational health and safety committee, which meets at least four times a year to review issues and identify any new hazards. Each workplace is assessed annually by a member of the local committee, and a formal report made. Training programs in a number of areas (e.g. ergonomics, correct lifting techniques, electrical safety and defensive driving) are offered throughout the year.

Over a number of years the ATNF's rate of occupational health and safety incidents has been in line with that of similar institutions, such as the Anglo-Australian Observatory and the Very Large Array. In the past year the ATNF recorded a total of 15 incidents with a total time lost of 1.6 weeks. The standardized incidence rate of 115 incidents per 1,000 full-time equivalent employees, was somewhat lower than the standardized rate of 150 for all of CSIRO.

Photograph
© J Sarkissian

Operations