AT

NEWSLETTER

Australia Telescope National Facility

CSIRO

Number 10 March 1989

EDITORIAL

This is the first Newsletter aimed more towards the potential user of the Australia Telescope rather than to the general public. As such the circulation will be concentrated towards the Australian astronomical community. As the AT moves further into its operation mode there will be an emphasis on matters of particular interest to the potential user of the instrument. Communications concerning the Newsletter should be sent to AT Newsletter Editor, CSIRO Radiophysics Laboratory, PO Box 76, Epping, NSW 2121 (Ph: (0-2) 8680226).

AT NATIONAL FACILITY

As mentioned in the September 1988 Newsletter, since 1st January the AT and support construction staff and astronomers has been an independent group with Divisional status within the CSIRO Institute of Information and Communications Technologies. Although the group is now formally separate from CSIRO Division of Radiophysics its headquarters remain at the Marsfield Radiophysics Laboratory and shares some of the services of this site.

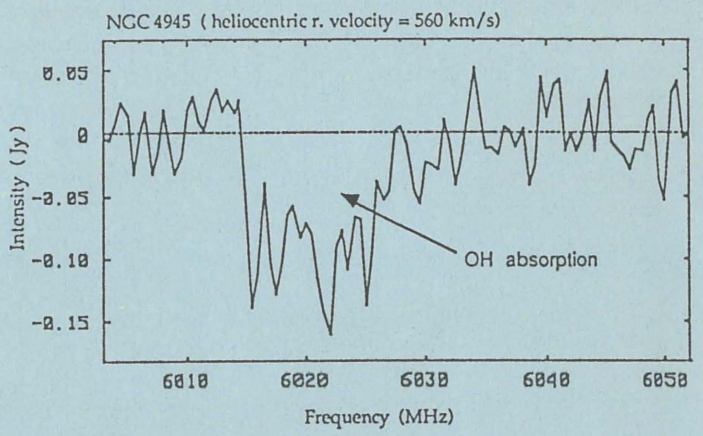
There has been considerable discussion on a formal designation of the AT group. Currently, Australia Telescope National Facility appears the most suitable; the three AT antenna sites would then be identified by adding the appropriate location Narrabri, Coonabarabran or Parkes. A possible logo design is shown at the top of the Newsletter. The Southern Cross has been orientated so that the South Pole is above it.

SITE REPORTS

Narrabri Site:

Monthly system test periods lasting a week are now being scheduled for Narrabri. The latest tests during 13th - 17th March were directed towards debugging the systems and increasing reliability. Instrumental phase oscillations that had been present previously were reduced significantly by modifications to local oscillator units. An instrumental effect which simulated the signals from faint radio sources at the field centre was traced to DC offsets in the correlator outputs. With single-channel operation at 6 cm and 3 cm, three antennas can now be used together in interferometer mode. Currently, prototype equipment in the antennas is being replaced by production quality hardware. After the completion of this phase, there will be no further major installation at Narrabri for a period of around six months while the AT construction groups concentrate on production.

As part of the commissioning process, AT National Facility astronomers have been encouraged to use the AT for limited radio astronomy projects. The first radio astronomy was carried out on 15 October 1988 when one of the antennas was successfullty incorporated into an Australia-wide VLBI system operating at 3 cm. During December observations were made of the southern pre-main-sequence star AB Dor, and more recently the three-antenna system has been used for limited astronomy observations of flare stars, X-ray stars, etc. A low-resolution spectral-line system is available, providing up to 128 channels covering 64 MHz. On 24th February, the rare detection of 5 cm excited OH-line absorption in a nearby galaxy provided a spectacular proof of this system.



Detection of $^2\Pi_{3/2}$, J=5/2 transitions of OH in absorption against the nucleus of the galaxy NGC 4945.

During AT construction the Sydney company ProVision has been making a video record of the project, primarily for archival purposes. The company will visit the three AT sites on 18th April to obtain aerial footage of the AT.

AT support personnel have been steadily moving up to Narrabri. The latest additions are Peter Martin and his family, formerly from Jodrell Bank.

Coonabarabran Site:

The outfitting of this antenna will be delayed compared with the Narrabri antennas on the 3 km railtrack. During 1989 the cryogenic gas coolant lines and fibre optics cabling have been installed on the antenna.

Parkes Site:

The multi-frequency package containing dual polarisation prototype AT receivers operating at 20, 13 6 and 3 cm continues to perform well.

NASA has contracted to use the 64-m antenna between March and August to supplement its own 70-m antenna at Tidbinbilla for the reception of signals from the spacecraft Voyager 2 during its encounter with Neptune. Less than a month after NASA began installation of its receiver, the Parkes antenna participated successfully in a full-scale Voyager test. As payment for the telescope usage, on 14th March, acting on behalf of NASA the Australian Space Office presented the AT National Facility with a cheque for $1.2 million. During this period, radio astronomers will have limited access to the telescope using either the NASA 3-cm receiver or receivers at wavelengths longer than 35 cm installed at off-axis prime focus locations. The Parkes-Tidbinbilla Interferometer will be available using the 34-m

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Tidbinbilla antenna; observing time is still undersubscribed.

After the collapse of the Green Bank 300 ft antenna, there has been some concern about the structural safety of the Parkes telescope. Accordingly, although it was realized that the Parkes telescope was built with a much greater safety factor, Macdonald Wagner, Sydney consultant engineers that were involved in the design of the 22-m AT antennas, were engaged to carry out an investigation at Parkes.

CSIRO AWARD

The Minister for Science, Customs and Small Business (Barry Jones) and the Corporate Chairman for CSIRO (Neville Wran) presented a 1988 CSIRO Medal to John W. Brooks, AT Construction Project Manager since 1982, at a ceremony held in Sydney on 5th December 1988. The award commemorated John's outstanding leadership during the construction period.

Barry Jones presenting John Brooks with his CSIRO Medal.

INAUGURAL AT STEERING COMMITTEE MEETING

In December 1988 the Minister for Science, Customs and Small Business appointed a steering committee to guide the future operation of the AT as a national research facility. This group, who will report to the CSIRO Board, will meet twice yearly. It will have its first meeting at the Marsfield Radiophysics Laboratory during the week beginning 1st May 1989. The week-long activities will include a visit to the Narrabri AT site. The committee members are:

Dr R.D. Cannon, Director, Anglo-Australian Observatory
Dr D.N. Cooper, Chief, CSIRO Division of Radiophysics
Professor L.E. Cram (Chairman), Dept. of Astrophysics, Uni. of Sydney
Dr R.H. Frater, Director, CSIRO Institute of Information & Communications Technologies
Professor K.C. Freeman, Mt. Stromlo & Siding Spring Observatories, ANU
Mr W.G. Gosewinckel, Managing Director, Aussat Pty Ltd
Dr W.M. Goss, Director, Very Large Array, NRAO, USA
Dr P.A. Hamilton, Head, Dept. of Physics, Uni. of Tasmania
Dr P.D. Jones, Chairman, Techway Pty Ltd
Professor V. Radhakrishnan, Director, Raman Research Institute, India
Dr B.J. Robinson, Chief Research Scientist, CSIRO Division of Radiophysics
Dr P.A. Vanden Bout, Director, National Radio Astronomy Observatory, USA
Professor L. Woltjer, Former Director-General, European Southern Observatory

AT SUMMER VACATION STUDENT PROGRAM

Both the AT and Radiophysics groups supported an extensive vacation student program extending from December 1988 through February 1989. Nearly 100 physics or engineering students, having just completed third or honours years in their courses, applied for the studentships, and 18 were selected - 12 for the AT and 6 for RP. Each student was assigned to a specific staff member and allocated a specific project. To familiarise the students with AT and RP activities, staff members presented a series of talks, and trips to Parkes and Narrabri were organized. Parkes observing time was provided for the students to carry out projects of their own choice.

FIRST AT POST-DOCTORAL FELLOWSHIP

Ravi Subrahmanyan, a PhD student at Tata Institute of Fundamental Research, India, is the recipient of the first AT Post Doctoral Fellowship, and will take up this appointment in September. He has worked on a broad mixture of instrumental and astrophysical problems; his experience with synthesis work has involved both the US Very Large Array and the Indian Giant Metre-wave Radio Telescope.

SYNTHESIS WORKSHOP

Immediately prior to the 1989 Annual General Meeting of the Astronomical Society of Australia an Astronomical Synthesis Imaging Workshop will be held at the Marsfield Radiophysics Laboratory in the period 30th June - 3rd July. It has been organised in conjunction with ASA's 1989 Harley Wood School of Astronomy. It is intended for professional scientists likely to be involved with astronomical imaging techniques, post-graduate students in astronomy, engineering, mathematics or physics, and honours students planning to proceed to a PhD in one of these areas. The following topics will be covered: Introduction to radio astronomy; Fourier transforms and coherence functions; radio and optical interferometry; imaging - widefield, mosaicing, spectral-line; deconvolution; AT observing strategies.

REQUEST FOR COMMISSIONING ASSISTANCE

The Director Ron Ekers has distributed a memorandum (AT/31.4/002) to the AT potential user community soliciting astronomy proposals that could be scheduled during the commissioning period. It is pointed out that until September 1989 only three antennas will be available with one channel operating at either 6 cm or 3 cm wavelength. By the beginning of October there will be several improvements: at these wavelengths a limited polarisation capability and two more antennas; two antennas with 20 cm and 13 cm systems; higher spectral resolution.

RECENT PUBLICATIONS ABOUT THE AT

R.P Norris: 'The Australia Telescope'. *Sky and Telescope*, 76, 615, 1988.

T.M.P. Percival & A.C. Young: 'Accurate digital control and rotation of the phase of microwave signals'. *IEEE Transactions on Instrumentation and Measurement*, 37, 626.

J.B. Whiteoak: 'The Australia Telescope'. *Southern Astronomy*, Sept/Oct, 16, 1988.