NRAO NEWSLETTER

1 April 1996 No. 67

IN GENERAL

1996 BUDGET

As of the deadline for this Newsletter, the Observatory had not received its 1996 budget. Although unfortunate, this is not surprising in that the NSF itself has yet to be funded for 1996. The current expectation is that this year's budget will be settled in late April. Because the expected budget level required a reduction in personnel at the NRAO, the steps required were taken in mid-March. The overall loss to NSF-funded operations staff was six percent. Half of the staff positions lost were open positions; the other half was made up of employees who were laid off, or had their hours reduced to part-time, or were transferred to fill open positions in projects funded by other agencies.

Other measures were required beyond the reduction in staff to meet the expected 1996 budget. Unless another source of funds can be found, there will be no budget for equipment to improve the instrumentation at the telescopes or to address the Observatory computing needs. This will be the first year in the history of the Observatory that there will be no such research equipment budget. The maintenance programs at the telescopes will continue, but at minimum levels. Two offers of Jansky postdoctorals were made instead of the usual three, and the number of graduate students resident at the Observatory has been reduced from thirteen to three. Budgets for the library, for materials, supplies, and travel have all been cut.

No cuts are anticipated, however, in the support given to telescope users for travel and page charges. We recognize that the current poor funding for research is widely shared in the community. We consider it essential to preserve as best as possible the system that allows NRAO users with modest grant support, or no grant support, to observe at the NRAO and publish their results with only minimal resources needed from their home institutions.

Users should be confident that the NRAO will do everything possible to continue to provide the facilities and service they have come to expect. Our long range goals for new facilities remain unchanged: complete the Green Bank Telescope, begin the Millimeter Array, and engage the user community in planning for the VLA Upgrade.

P.A. Vanden Bout

THE MILLIMETER ARRAY

The NSF is now considering whether to include the MMA as a new start in the Major Research Equipment account for FY 1998. We are hopeful of a successful outcome as the timeliness of the MMA is now widely appreciated in the U.S. scientific community and abroad.

The database of site-testing data now includes atmospheric transparency and stability measurements made both on Mauna Kea and in Chile for a year or more. This is sufficient information to facilitate a comparison of the two sites so that we can now assess how much observing time will be available on the sites as a function of frequency and as a function of interferometer baseline. The results of this analysis will be combined with a study of long-term climatic trends, and with an operating model for the MMA on the two sites to lead us to a prioritization of the sites. Our goal is to have this *site choice* document available for review by the MMA committees and others in the third quarter of 1996.

Discussions continue with potential partners for the MMA. Recently the focus of these discussions, both with potential international partners and for the possible involvement of other government agencies, has been on an expansion of the MMA capabilities so as to provide enhanced scientific opportunities for users of the MMA. Since the proposed MMA enhancements to longer baselines and higher frequencies are very much in accord with the recent recommendations of the Millimeter Array Advisory Committee (the MAC), we hope to cement suitable partnership arrangements in the near future. We will report progress on these initiatives in future issues of the Newsletter.

Current MMA information, including summaries of the site test data, may be obtained from http://www.tuc.nrao.edu.

R.L. Brown

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AIPS++ NEWS

A very significant milestone in the development of AIPS++ has been passed: we have produced a first demonstration of the application of the AIPS++ Measurement Equation formalism to synthesis imaging. We have developed a program, imager, for polarization imaging that allows simultaneous cleaning of the Stokes parameters, IQUV, and self-calibration of the antenna-based polarization leakage D-terms. More information, including images and example source code, can be found at the URL: http://www.nrao.edu/~tcornwel/synthesis/synthesis.html. A substantial amount of effort was expended on optimization of this program, with results that should benefit general applications development in AIPS++. However, the speed can still be substantially improved by rewriting some of the gridding routines, something that we plan for the near future. Calibration information derived by imager is written to AIPS++ tables, in which form it can be viewed by tools in Glish/Glishtk such as the tablebrowser and the plotting utilities. All these are steps on the way to a full calibration package. The design and implementation of the Measurement Equation has been performed in collaboration with Mark Wieringa, who is spending six months working at the Center with the synthesis group (this visit is funded by ATNF and NFRA).

The Single Dish group proceeded with work towards a single dish analysis package for the GBT. A significant milestone in this development will be an initial test of some of the GUI components, scheduled to occur in June and July. The GUI components are being implemented using the variant of glish, glishtk, which has the tk widgets bound in. One considerable advantage of the use of glishtk is that GUI components may be developed interactively, from the command line, and other components, such as the tablebrowser, called directly via simple glish commands.

AIPS++ is being used for the immediate analysis and ultimate reduction of data from a multi-beam HI survey using the Parkes telescope. In connection with this effort, David Barnes of the survey team spent eight weeks working with the SD group in Charlottesville.

Wim Brouw (ATNF) froze the design of the Measures system (used for units, quantities and coordinates) and worked on completing the implementation. Completion of all major features except high precision VLBI support is expected in April. Parts of the code are now being reviewed, as is standard for all code developed in AIPS++.

The AIPS++ infrastructure was improved in a number of areas in response to the requirements arising from applications development:

- The AIPS++ data store for telescope data, the MeasurementSet, was redesigned, moving away from one big AIPS++ table for all data to a more conventional main table / sub-tables scheme that is similar in form to the FITS format used by the VLBA correlator. This redesign was easily implemented and is now in use in synthesis processing and will shortly be implemented for single dish applications.
- We have worked on improving the stability and robustness of glish. We also are developing a test-suite specifically for glish.
- The NCSA group made various improvements to the aipsview visualization tool with the goal of a beta release in April. The major area of improvement is the inclusion of contour plotting via the PGPLOT library.
- The AIPS++ table system underwent a number of improvements, the most important being a Tiled Storage Manager to allow efficient access to multidimensional data sets along various axes.
- A number of miscellaneous utilities such as least squares and interpolation classes were developed.
- The implementation of the Tasking system was completed and coding of applications based upon it is now proceeding.

We have completed a port to the HP/UX compiler, and are now in the process of porting to the GNU Project g++ compiler. We know from preliminary investigations that this port will work but a number of changes to AIPS++ are required. We believe this effort is well worth while since it will give us the ability to run on many platforms.

T.J. Cornwell

1996 JANSKY LECTURER

I am pleased to announce that Prof. James M. Moran of Harvard University will be this year's Jansky Lecturer. Prof. Moran is well known for his contributions to radio astronomy, especially to the development of the technique of very long baseline interferometry and its application to the study of astronomical masers. This year's lecture will be given in Socorro, Green Bank, and Charlottesville. The subject and dates for the lectures will be announced in the Newsletter.

P A. Vanden Bout

USERS COMMITTEE

The 1996 meeting of the NRAO Users Committee will be held June 17 and 18 in Charlottesville. Mary Barsony is the chair of the committee this year. If you are aware of issues that you would like to have discussed by the Users Committee, please forward those suggestions to Mary (barsony@ucrph0.ucr.edu).

R.L. Brown

STRATEGIC PARTNERSHIP BETWEEN NRAO AND NCSA

NRAO and the National Center for Supercomputing Applications (NCSA) have formally established a partnership for the purpose of "supporting and enhancing scientific research." The primary goal of the partnership will be to stimulate research in radio astronomy by providing straightforward access to high performance computing facilities at NCSA to the radio astronomy community. This partnership will lower barriers and remove bottlenecks which individual researchers and NRAO users might face in obtaining access to high performance computing facilities and developing applications.

The partnership will focus on a number of select areas, which include:

- Support for computationally intensive data reduction using AIPS;
- Image mosaicing and high dynamic range imaging using specialized packages;
- Development and use of AIPS++;
- Mechanical design calculations related to the Green Bank Telescope and Millimeter Array projects;
- Site configuration studies for the Millimeter Array;
- Archiving of various NRAO data products.

NCSA plans to provide time and accounts on the large machines for peer reviewed research projects and official NRAO projects such as the Green Bank Telescope or the Millimeter Array. This time will be managed by NRAO. Projects which require high performance computing resources found at NCSA are especially encouraged, as are development projects which lead to significant improvements in performance or functionality for community application codes. NRAO users and researchers will continue to be able to directly apply for allocations of time through the normal NCSA peer review process outside of the agreement between NRAO and NCSA.

Currently, NRAO is using NCSA facilities to perform dynamical modeling calculations for the Green Bank Telescope, and is also in the process of completing an AIPS port to the computing systems at NCSA. As experience is gained at NRAO with NCSA's facilities, procedures will be worked out to enable NRAO users with need for high performance computing to access the facilities at NCSA. Users wishing to learn more about the facilities at NCSA can find detailed information on the WWW at http://www.ncsa.uiuc.edu/.

R.S. Simon

ADASS '96: SIXTH ANNUAL CONFERENCE ON ASTRONOMICAL DATA ANALYSIS SOFTWARE AND SYSTEMS

NRAO is the host institution for the Sixth Annual Conference on Astronomical Data Analysis Software and Systems (ADASS). The Conference will be held in Charlottesville, Virginia, at the Omni Charlottesville Hotel, 1996 September 22-25. ADASS is an international conference which provides a forum for scientists and programmers concerned with algorithms, software, and software systems employed in the reduction and analysis of astronomical data.

The Program Organizing Committee for ADASS '96 has the following members: Rudi Albrecht (ST-ECF/ESO), Roger Brissenden (SAO), Tim Cornwell (NRAO), Dennis Crabtree (DAO/CADC), Bob Hanisch - Chair (STScI), Gareth Hunt (NRAO), George Jacoby (NOAO), Barry Madore (IPAC), Jonathan McDowell (SAO), Jan Noordam (NFRA), Dick Shaw (STScI), Karen Strom (U. Mass.), and Doug Tody (NOAO). The Local Organizing Committee is chaired by Richard Simon and has participants from NRAO, the University of Virginia Department of Astronomy, and the University of Virginia Computer Science Department.

The preliminary program for the Conference will be completed in the next few weeks, so watch the Conference home page for further details as they become available: http://www.cv.nrao.edu/adass/. For further information and/or to be placed on the mailing list for the conference, please send a request to either adass96@nrao.edu or to:

ADASS '96
c/o C. White
National Radio Astronomy Observatory
520 Edgemont Road
Charlottesville, VA 22903-2475
USA

Mark your calendar now and plan to attend ADASS '96.

R. A Simon

1996 SUMMER STUDENTS

Twenty students have been offered positions in the 1996 Research Experiences for Undergraduates at NRAO, filling the available positions. Details of the 1996 program, and information for applications to the 1997 program, may be found on the NRAO WWW home page at URL http://www.cv.nrao.edu/~awootten/reu96.html.

H.A. Wootten

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OBTAINING SLIDES OF IMAGES

[This is an update of the article by Brown and Smiley, NRAO Newsletter No. 61, 1 October 1994. Note the changes in the example session. See also a description in the AIPS Cookbook, Appendix Z.]

There is now a reasonably simple procedure in place by which users may make slides of their images from the NRAO telescopes. We certainly encourage users to make use of the facility both for their own professional research purposes and also as an aid to their instructional activities. Single images will usually be printed directly to the 35 mm slide format; multi-panel images will be printed to 4x5 film in addition to the 35 mm format.

The procedure for making slides is described below. The slide will be made in a day or two and returned to the individual submitting the image file. Among the reasons the NRAO offers this service to staff and users is that it enables us, in principle, to enhance the NRAO library of astronomical images. With permission of the astronomer submitting the image to be made into a slide, we will make a master copy of the slide for the library and ask for a brief image description. The NRAO will make the image available for scientific and educational purposes, noting in material sent with the slide the name of the observer(s) responsible for producing the image. In return for permission to include the slide in the library, the NRAO will provide any of the observers involved with copies of the slide, or prints of it, at no charge for as long as the image remains in the library.

To make a slide of your image:

On your workstation create a postscript file containing your image. The filename should be no more than eight characters with an extension of no more than three characters. All letters in the filename should be lower case (e.g., my-image.ps).

Ftp the file to the pub/slides/slides directory in the anonymous login area of ftp.cv.nrao.edu.

Send an e-mail to psmiley@nrao.edu giving the filename, number of slides and prints needed, your mailing address, and noting whether you would be willing to have the image included in the NRAO image library.

A typical ftp session would be the following:

```
ftp        ftp.cv.nrao.edu
login      anonymous
password   <your full e-mail address>
cd         pub/slides/slides
put        my-image.ps
quit
```

G.C. Hunt

GREEN BANK

GBT NEWS

Following a tough construction winter, which included both early *and* record snowfalls, the Green Bank Telescope site is showing more activity each day. As spring begins to come to Green Bank, the pace of the construction progress, both on the ground and on the structure, will quicken.

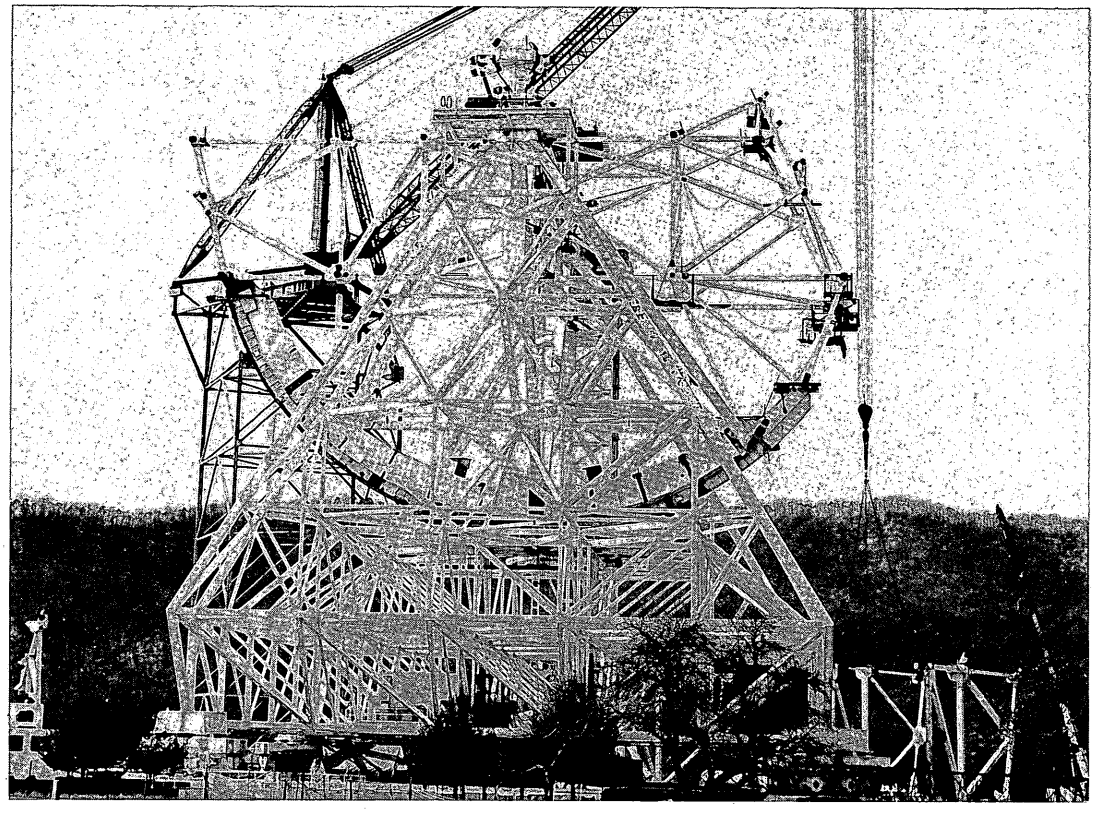
As can be seen in the accompanying recent photograph of the structure, the elevation wheel is completely assembled and welded and sixteen of the counterweight boxes are installed. Three of the 10 trusses of the box structure already have been moved from the trial erection area onto the structure.

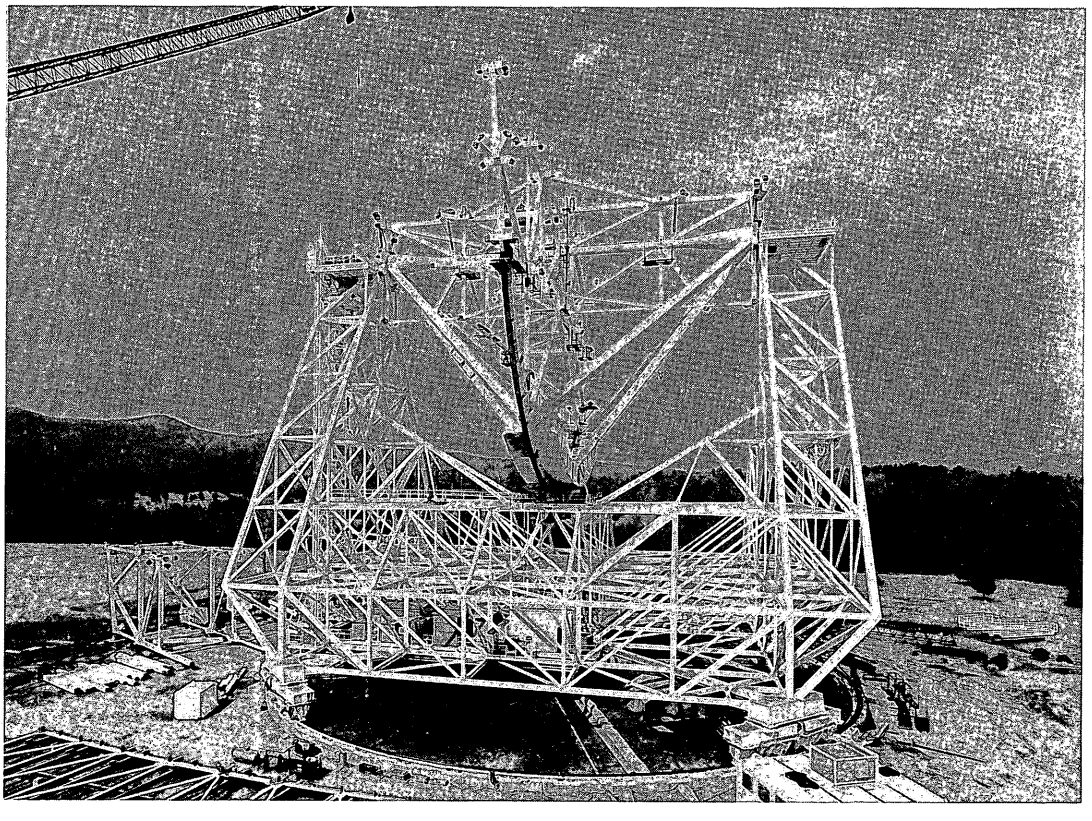
However, what cannot be seen in the photo are all the pockets of activity being accomplished on the ground around the structure. For instance, on the northwest side of the antenna, the box structure trial erection is now complete. Over the next couple of months, this huge assembly will be moved from the ground onto the structure in a series of modular lifts. In addition, the upper feed arm (the section of the feed arm which ultimately will be above the receiver room) has been assembled on the ground near the COMSAT RSI warehouse and is awaiting welding. This erection will allow the feed and subreflector positioning mechanisms to be tested and calibrated prior to lifting the assembly onto the antenna.

On the south side of the antenna is the back-up structure (BUS) assembly pad, where sixteen of the BUS ribs have been trial assembled (the center rib plus eight left and seven right) from hoops 15 to 33 (when complete there will be 57 total ribs, the center plus 28 right and 28 left, extending from the apex at the base of the feed arm for 44 hoops to the outer edge of the dish). Essentially all the interconnecting beams and fill-in members are also in place. Right now on site, there are approximately 4000 of the 7100 required members for the reflector BUS. One of the interesting construction staging problems facing COMSAT RSI is cataloging and keeping track of all the parts on site (imagine laying out over 7000 Tinker Toy parts on your floor and being responsible to find a particular one when you need it). As the pieces are put together, the magnitude of the completed structure and of the erection job becomes more evident every day.

Main reflector panel production continues at the COMSAT RSI Sterling, Virginia plant. Delivery of the subreflector (an ellipsoid 7.55m x 7.95 m) and the feed arm servo hardware were slipped from last quarter into the spring, making the next few months at the construction site full of anticipation.

W H. Porter





GREEN BANK INTERFEROMETER CLOSING

For more than 16 years, an interferometer consisting of two 85-foot telescopes at Green Bank has been monitoring a set of galactic and extragalactic radio sources at S and X band. This program was begun to measure earth orientation and polar motion for the U.S. Naval Observatory, but has also produced a unique set of measurements of variable radio sources. In recent years the USNO has moved to a VLBI network for its earth orientation measurements but continued to fund the Interferometer for variable source studies. In 1995 funding for the Interferometer was transferred to the Naval Research Laboratory. Among the several hundred objects monitored are Cyg X-3, SS433, LSI +61 303, OJ 287, BL Lac, and Algol. The Interferometer is often used as an "early warning system" to alert the community about the onset of outbursts which can then be observed by other telescopes. In recent years this mode has been used to target the VLA, the Compton Gamma Ray Telescope, and the X-Ray Timing Explorer.

Earlier this year the Naval Research Laboratory informed us that they were no longer able to continue funding the Interferometer. We are searching for other sources of support for this unique and important instrument, but as of this writing, operations are scheduled to end by the beginning of April, 1996.

F.J. Lockman

CHANGE IN 140 FOOT SCHEDULING POLICY

With the recent cutbacks in Green Bank operations staff and the growing demands of GBT development, it is necessary to make a fundamental change in the way that the 140 Foot is scheduled. Starting this summer, we will schedule the telescope to minimize equipment changes that require support from staff engineers and scientists. In practice this will mean that any particular receiver will be up for a long period, typically for a month, and all observations which require that receiver will have to be done during that time. Feed changes that do not involve removing the receiver can still occur regularly, and when the subreflector is mounted it will be possible to switch between most Cassegrain receivers. But changes from prime focus to Cassegrain or from one prime focus box to another will be limited. We will make every effort to plan equipment schedules to accommodate a specific time-dependent proposal if the proposal is received at least four months in advance.

This change of policy will inconvenience some observers, but it also opens a unique opportunity. Survey programs that require larger blocks of time with a fixed equipment configuration will be a good match to the new scheduling system. I encourage anyone who has such a project in mind to submit a proposal. Survey proposals will be refereed in the usual way, and the more highly rated will be scheduled beginning in June.

F. J. Lockman

GREEN BANK ORBITING VLBI TRACKING STATION TESTS

In March 1996, three Japanese engineers brought an engineering model of the VSOP satellite down link electronics to Green Bank for compatibility tests. The tracking station transmitted the timing tone 250 meters to the satellite. The satellite transmitted simulated telescope output signals via the 14.2 GHz down link back to the tracking station, where the data were demodulated, decoded, and interpreted. The up/down link phase stability was measured and found to be good. The wide band down link data were written to VLBA format tape and sent to the VLBA correlator where the data will be correlated to verify the data format and quality.

G.I. Langston and L R. D'Addario

VLA

OBSERVE

The most current version of observe is 3.2.28, dated 1996.02.27. This version has the updated VLA calibrator database, the new X-band defaults, better calibrator searches (uses band and array configuration to find possible calibrators), an alternative to the dreaded keypad, and several bug fixes. Please read ANNOUNCE.V3 (located at the WWW URL: ftp://ftp.aoc.nrao.edu/pub/observe) to find out more details about the changes. The latest version may be obtained via anonymous ftp from ftp.aoc.nrao.edu or from the WWW URL: ftp://ftp.aoc.nrao.edu/pub/observe/.

W.K. Young

VLA CONFIGURATION SCHEDULE

Configuration	Starting Date	Ending Date	Proposal Deadline
C	09 Feb 1996	29 Apr 1996	2 Oct 1995
DnC	10 May 1996	25 Jun 1996	1 Feb 1996
D	28 Jun 1996	30 Sep 1996	1 Feb 1996
A	18 Oct 1996	30 Dec 1996	3 Jun 1996 5pm ET
BnA	10 Jan 1997	27 Jan 1997	1 Oct 1996 5pm ET
B	31 Jan 1997	12 May 1997	1 Oct 1996 5pm ET
CnB	23 May 1997	09 Jun 1997	3 Feb 1997 5pm ET

The VLA is currently scheduling two large surveys. One will be done at nighttime in the DnC and D configurations and will be essentially completed by the end of September, 1996. The other covers the north galactic cap (07^h-17^h) in the B configuration. Observing time in those configurations and LSTs will be much reduced over past practice. On the other hand, observations disjoint with the surveys in those configurations will have more time available for scheduling than has previously been the case.

The maximum antenna separations for the four VLA configurations are: A-36 km, B-11 km, C-3 km, and D-1 km. The BnA, CnB, and DnC configurations are the hybrid configurations with the long north arm, which produce a round beam for southern sources (south of about -15 degrees declination).

Approximate Long-Term Schedule

	Q1	Q2	Q3	Q4
1996	C	D	D	A
1997	B	C	C,D	D
1998	A	B	C	C,D
1999	D	A	B	C
2000	C,D	D	A	B

Observers should note that some types of observations are significantly more difficult in daytime than at nighttime. These include observations at 327 MHz (solar and other interference; disturbed ionosphere, especially at dawn), line observations at 18 and 21 cm (solar interference), polarization measurements at L band (uncertainty in ionospheric rotation measure), and observations at 2 cm and shorter wavelengths in B and A configurations (tropospheric phase variations, especially in summer). They should defer such observations for a configuration cycle to avoid such problems.

In 1996, the A configuration daytime will be about 14^h RA and the B configuration daytime will be about 22^h RA.

Time will be allocated for the VLBA on intervals approximately corresponding to the VLA configurations from those proposals in hand at the corresponding VLA proposal deadline.

B.G. Clark

CHANGE IN THE 3.6 CM (X BAND) CONTINUUM DEFAULT FREQUENCIES

The 3.6 cm default frequencies of 8415 and 8465 MHz (band centers) were found to place the AC IF pair on top of a locally generated birdie at 8400 MHz. This is the 14th harmonic of the 600 MHz LO signal that is widely used in the VLA electronics. The effect of this birdie on the 8415 MHz continuum signal is most significant when the fringe-rate is near zero, which will happen for all the antennas when observing the North Pole. For other regions of the sky the effect is usually limited to a few antennas for a limited range of times. According to Ed Fomalont, who has carried out long observations in this most sensitive VLA band, the affected data may be offset by as much as a few Jansky.

After several tests of the RFI environment at X band, new 3.6 cm default frequencies of 8435 and 8485 MHz were assigned in both OBSERVE (see entry in this newsletter) and in the VLA on-line system on February 14. This selection maintains the majority of the band within the Deep Space Research allocation of 8400-8500 MHz. 8450-8500 MHz is allocated to space research including space to earth transmission that is not strictly limited to deep space satellites. The range 8500-9000 MHz is allocated to airborne radar, but most of the usage seems to be in the range 8600-10500 MHz. So, for the near future, the proposed defaults should be relatively free of both local and external RFI.

G.B. Taylor

AOC COMPUTING STATUS

In the VLA re-archiving project, which reformats and copies all VLA data onto Exabyte tape, we finished the 1989 data. This leaves the data from 1984 through 1988 to be done. It is difficult to estimate the date of completion, since a sizable fraction of the remaining tapes are likely to be of poor quality. It is our intention to move the data from Exabyte to another medium as soon as the current project is finished. Details of the implementation will depend on developments in affordable technology in the coming year or two. Recent hardware changes have made it easier to handle problematic tapes, and we expect an increase in the throughput. The new VLA database, which is being created automatically during the re-archiving, is directly accessible via the NRAO home page and offers standard search facilities. We are planning to further improve the user interface to this archive.

We completed making the "Socorro Visitor's Information Package" accessible via the Socorro Web page. The list of public workstations and the Visitor's registration form were already accessible on-line; to this we have added information about current and future workstation bookings. This information system should greatly assist prospective visitors to the AOC in planning their visit.

The AOC has purchased two Sparc Ultra I machines, which will replace two of the current Sparc IPX visitor's workstations. We hope that with these machines we can better serve the needs of scientists with very large VLBA and VLA projects. Tests using the AIPS "dirty dozen test" (DDT) indicate that for typical AIPS applications these machines are faster than our IBMs - currently our fastest machines - by a factor of 1.6. The new machines will be installed during the second half of March, and will be available to visitors and local staff from the beginning of April.

G.A. van Moorsel

FLUX DENSITY CALIBRATION AT THE VLA

It was recently discovered that the coefficients determined in 1990 for the primary flux density calibrators used at the VLA were rounded incorrectly in the AIPS task SETJY, introducing a positive bias in the calculated flux density of 3C286 of 0.57%, 0.87%, 1.2%, 1.4%, 1.5%, and 1.7% for P, L, C, X, U, and K band, respectively. Following standard calibration practice would therefore have communicated a similar positive bias to all secondary calibrators and program sources. This systematic error is greater than the intrinsic variability of 3C286 at frequencies below 15 GHz over the last ten years. A similar rounding was made for 3C48 and 3C147, but by chance introduced a much smaller effect, considerably less than their intrinsic variability. This error affected AIPS versions up to and including 15JAN96. The 1990 coefficients implemented in subsequent versions have been corrected to remove the rounding error. New coefficients determined in 1995 have also been correctly incorporated into the 15OCT96 version of SETJY. People interested in the most accurate flux density calibration possible should be sure to obtain the latest version of SETJY and invoke the coefficient set measured closest in time to their observations. For a more detailed description of flux calibration at the VLA and this error, see the URL: http://info.aoc.nrao.edu/doc/vla/html/setjy.shtml.

G.B. Taylor

VISITOR GUIDELINES

Recently, there have been requests to visit NRAO in Socorro, from students who have not previously been to the New Mexico NRAO facility. We are always happy to have new VLA and VLBA users in Socorro. In that connection, we restate our policy regarding students who are first-time users of the VLA or VLBA and of the AOC data reduction facilities:

First time student observers must be accompanied by their faculty advisor or a senior researcher for at least half of their first observation or data reduction visit to the AOC. Attendance at the summer schools or similar conferences held in Socorro does not waive this requirement. Once a student has gained sufficient experience, he or she need not be accompanied by an advisor on subsequent visits. VLA/VLBA staff assistance will be provided as needed and as requested on the VLA/VLBA observing application cover sheets.

Reservations

Please note and use the new e-mail address below when arranging a visit to the NRAO in New Mexico.

nmreserv@nrao.edu

For your convenience, a Visitor Reservation Form is available via the Socorro WWW home page. This form can be filled out interactively and sent to the reservation office via e-mail. This form will save you time in arranging your visit. We encourage everyone to use the form if possible.

M.T. Romero

Q BAND (43 GHz) ON THE VLA

There has been considerable activity in the area of the 43 GHz (Q band) system at the VLA. The principal action has been the outfitting of three more antennas with new Q band receivers, bringing the total to 13. Also, all the Q band antennas are having their surfaces adjusted using holographic measurements of the surface errors. Initial results indicate that this process can improve aperture efficiencies by up to 40 percent. The net effects of these improvements are: (i) significantly better u-v coverage, and (ii) improved sensitivity. We estimate that the sensitivity should improve to about 0.3 mJy in one hour using two IFs, two polarizations, and a 50 MHz bandwidth per IF at 43 GHz.

There also has been activity related to phase calibration techniques at high frequency at the VLA. A "fast-switching" mode has been tested with a minimum total cycle time of 40 seconds. This method has been shown to minimize tropospheric phase variations on baselines longer than about 300 m. Contact C. Carilli for more details.

A final important point concerns the placement of the Q band antennas in the upcoming A array. For this A configuration, in a good observing season, we will occupy the ends of the arms to obtain maximum resolution. The remaining antennas will be distributed to produce a good beam at this resolution. It is our plan that in succeeding configurations of this cycle, we shall maintain, at least roughly, the scalings to which we are accustomed in other bands. That is, in this cycle at least, objects requiring a resolution of about 0.15" should be proposed for B configuration, rather than A configuration as they were last cycle.

The current plan involves putting ten antennas in a modified "spiral" pattern (scaled from the design employed in the last D configuration). One of the three additional Q band antennas will be placed at an inner station, to improve coverage of the short spacings, while the other two will populate the outermost stations, to improve coverage on the longest spacings and to attain maximum resolution. For the A array, a resolution of 30 mas will be possible, and u-v coverage should be reasonable down to baselines of 300 m. The detailed antenna placements are summarized in the table below. We also plan to use this configuration or some minor variant of it in the B, C, and D configurations of this cycle.

Tentative Q Band Antenna Placements in A Array
(Oct - Dec 1996)

North	West	East
9	9	9
8	-	-
-	7	-
-	-	6
5	-	-
-	4	-
-	-	3
2	-	-
1	1	1

C.L. Carilli

VLBA/VLBI

VLBA STATUS

During 1995, the VLBA correlator processed a total of 275 projects, 27 of them global, and 41 tests. During the first quarter of 1996 (up to March 18), 61 projects have been processed, 6 of them test projects. The supernova backlog queue now has been finished. Of the backlog of old global projects, eight remain to be correlated. These eight were amongst the most intractable of that queue, most containing either source and/or frequency subarraying. We hope to correlate and release all these backlog projects in the coming quarter.

In the middle of March, the correlator software group released a new version of the online software with several improvements. Source and frequency subarraying now are available, the 2K FFT is now implemented correctly, the ability to load and test various window functions is also available now. Users should read Jon Romney's recent release notes and observing guidelines (available from the NRAO home page) for more details. With this software release the correlator group is positioning itself to implement various options required for Space VLBI.

As was reported in the release notes for the latest version of the software, a bug was found and fixed. This bug existed since the day the correlator was turned on. The bug resulted in the output time labels of the visibility data being mislabeled by one correlator tick (131 millisec). The effects of this bug were not catastrophic, resulting in small phases errors (residual fringe-rate multiplied by 131 millisec) which could be almost completely corrected by self-cal or phase-referencing. For more details see the release notes mentioned above.

P J Diamond

VLBI NETWORK CALL FOR PROPOSALS

Proposals for VLBI Network observing are handled by the NRAO. In particular, only one further Global Network session is planned for 1996, and it is expected that Network observing in 1997 will be dominated by the needs of Space VLBI with VSOP. The currently planned session is 16 October to 06 November, with a proposal deadline of 01 June 1996. Observing bands for this session will be 1.3 cm, 6 cm, and 3.6/ 13 cm. Further information about this session may be transmitted on the VLBI e-mail exploder (send subscription requests to vlbi-request@nrao.edu).

It is recommended that proposers use a standard coversheet for their VLBI proposals. Fill-in-the-blanks TeX files are available by anonymous ftp from ftp.cv.nrao.edu, directory proposal or via the VLBA home page on the WWW. Printed forms, for filling in by typewriter, are available on request from Betty Trujillo, Socorro.

Any proposal requesting NRAO antennas and antennas from two or more institutions in the European VLBI network constitutes a Global proposal. Global proposals MUST reach BOTH Network's Schedulers on or before the proposal deadline date; allow sufficient time for mailing. In general, fax submissions of Global proposals will not be accepted. Proposals requesting use of the Socorro correlator must be sent to NRAO even if they do not request the use of NRAO antennas. Proposals for the use of the Bonn correlator must be sent to the MPIfR if they do not request the use of any EVN antennas. For Global proposals, or those to the EVN alone, send proposals to:

R. Schwartz
Max Planck Institut fur Radioastronomie
Auf dem Hugel 69
D 53121 Bonn
Germany

For proposals to the VLBA, or Global proposals, send proposals to:

Director
National Radio Astronomy Observatory
520 Edgemont Road
Charlottesville, VA 22903-2475
USA.

B.G. Clark

12 METER

FIRST IMAGES WITH THE EIGHT-BEAM RECEIVER:

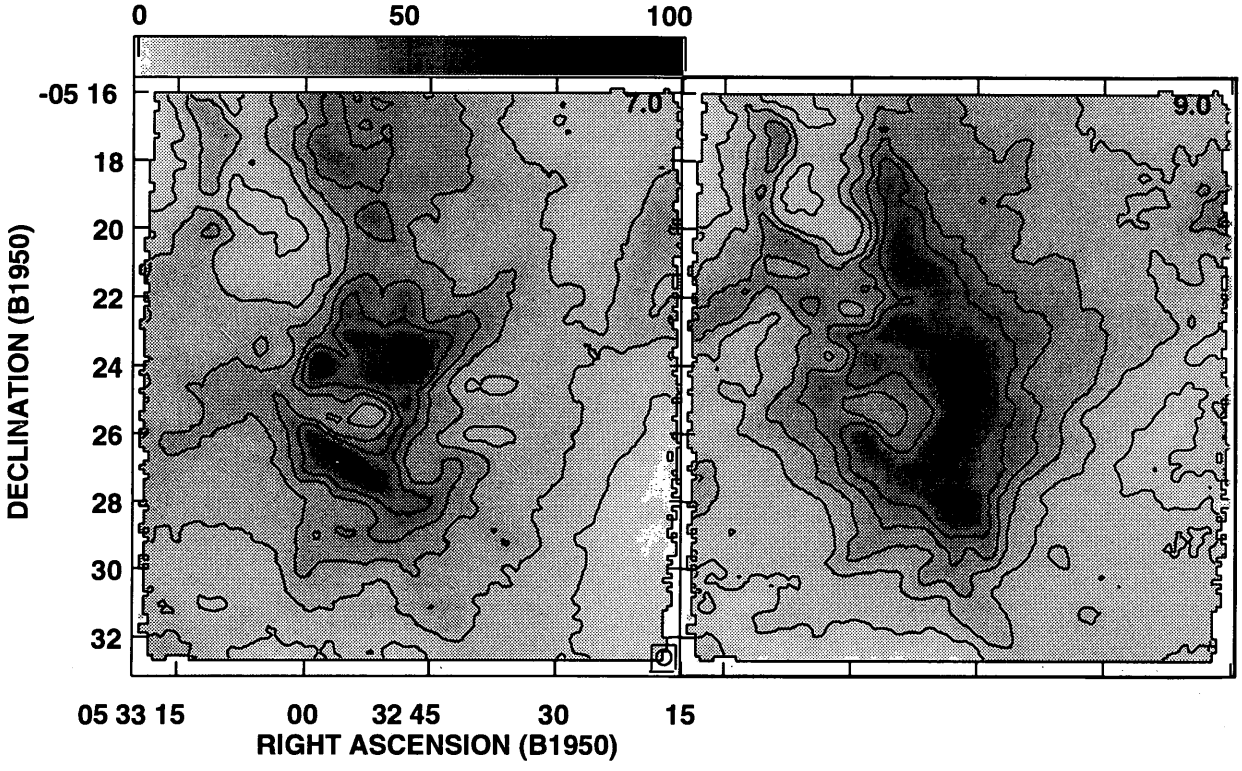
Following a brief commissioning period, observations with the 8-Beam 1.3 mm array receiver began on February 22nd. The 4 X 2 beam cluster can track parallactic angle with an arbitrary position angle offset. Considerable effort has been devoted to improving the noise performance of the 8 receivers. While there is still room for improvement, the present performance of the receiver represents a substantial gain over the existing dual beam system for mapping extended regions.

The principal observing mode with the 8-Beam receiver is the on-the-fly (OTF) mode. Two types of OTF images can be acquired. In "optimal" 8-Beam OTF observing, the map field is sampled using a two-step process. The array is canted at an angle relative to the scanning direction (RA or Dec) so that adjacent beams sample independent regions of the field while the array is rastered. Once an array "footprint" is fully sampled, the array is moved to an adjacent region of the map field to continue the rastering process. In "conventional" 8-Beam OTF observing, the array is simply scanned over the map field to achieve full sampling. Conventional 8-Beam OTF maps sample almost all points eight times, resulting in a high signal-to-noise image at the expense of time efficiency. Optimal 8-Beam OTF should be approximately two to three times more time efficient than OTF observing with the single-beam, dual-channel system.

The figure shows in two plots the CO 2-1 intensity measured toward the OMC-1 region for LSR velocities of 7.0 and 9.0 km/s (indicated in the upper right of each panel). The beam size is indicated in the lower right corner of the first panel. This 14'X14' map was acquired using the "conventional" 8-Beam OTF method. Total map time was approximately 1.75 hours, and the resulting single channel rms noise was 0.35K.

Documentation describing the use of the 8-Beam receiver is currently being prepared. Prospective observers are encouraged to contact Jeff Mangum (jmangum@nrao.edu) for information and advice on observing strategies.

J.G. Mangum, D.T. Emerson, and J.M. Payne
for the Tucson Group



REMOTE OBSERVING

We continue to support remote observing with the 12 Meter Telescope. Observers are reminded to contact the observatory staff well in advance of their scheduled observing to discuss the suitability of remote observing for their particular experiment. In addition, it is important that remote observers:

(1) Contact the Friend of the Telescope at least two (2) working days before their observations for an update on the telescope status.
(2) Provide the Friend of the Telescope with an observing plan at least one week before their observing session. This will help us complete remote observing runs in the event that communication links to the telescope are lost before or during a remote observing session.

We are working on incorporating information regarding remote observing policy within the Tucson link of the NRAO home page (http://www.nrao.edu).

D.T. Emerson, J.G. Mangum and S J.E. Radford

NOTE TO 12 METER TELESCOPE OBSERVERS

In order to make the best use of the telescope, prospective and scheduled observers are strongly encouraged to contact the Friend of the Telescope, Jeff Mangum, for advice regarding their proposed experiments. This is of particular importance for observers conducting 8-Beam and on-the-fly experiments given the complexity of these observing modes. Send questions via e-mail to jmangum@nrao.edu or by voice to 520-882-8250 ext.113.

J.G. Mangum and D.T. Emerson

EDITOR NRAO NEWSLETTER
NATIONAL RADIO ASTRONOMY OBSERVATORY
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