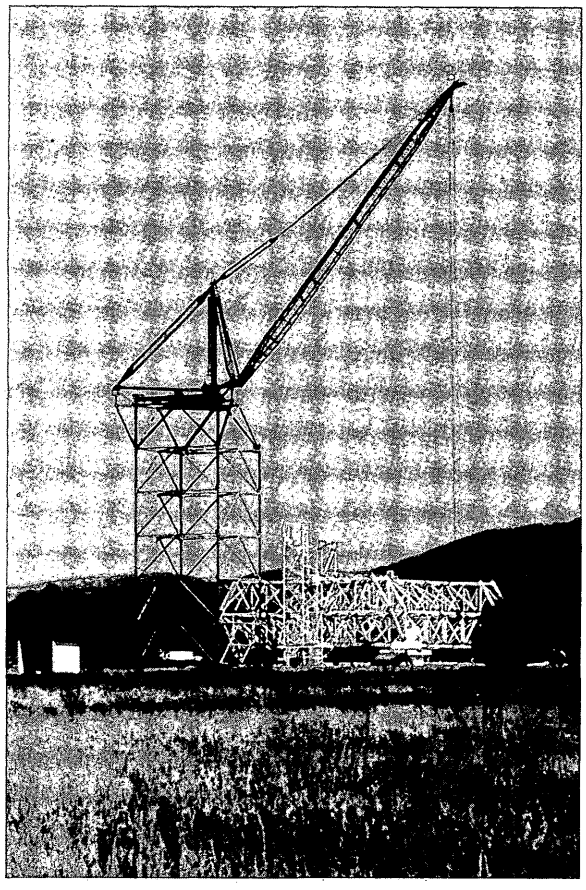
NRAO NEWSLETTER

1 October 1993 No. 57

GREEN BANK



GREEN BANK TELESCOPE

Erection of the alidade is now complete to the third level, about 100 feet above the ground, and work has started on the fourth level. A stairway to the fourth level has been installed, walkways are installed on levels 1 and 3, and work is underway on the elevator. The two emergency power generators and the servo room are in place on level 1, and the cryogenics room is under construction. Work has begun on the electrical installation for the alidade, including the main power and power switchover equipment. By the end of the year the alidade construction will be complete, with elevation axis support towers reaching the height of the base, where the rotatory boom is attached.

R. D. HALL AND F. J. LOCKMAN

RECEIVERS ON THE 140 FOOT TELESCOPE

In the past few years many 140 Foot receivers have been upgraded with HFET amplifiers to improve their sensitivity and reliability. HFET amplifiers are now in all receivers between 1.3 and 35 GHz. Below 18 GHz the receivers are dual channel and cover both polarizations, while above 18 GHz only a single channel HFET channel is available.

The 2 cm and K-band systems have been rebuilt quite recently, and performance data on them is not available at this writing. Anyone interested in further information on the receivers should contact Chuck Brockway.

F. J. LOCKMAN

The NRAO Newsletter is published quarterly by the National Radio Astronomy Observatory, 520 Edgemont Road, Charlottesville, VA 22903-2475, USA. NRAO is operated by Associated Universities, Inc., under cooperative agreement with the National Science Foundation. [Contact Joanne Nance (804) 296-0323, if you wish to receive mailings of the Newsletter.]

GBT SPECTROMETER

Design of the GBT spectrometer has made great progress over the summer. A description of the basic device and a choice of priorities for implementation are given in GBT Memo 108. The memo, written by Carl Heiles derives from discussions with the GBT Scientific Working Group. The following table summarizes some of the capabilities that the spectrometer will have in its initial configuration:

Bandwidth	1 GHz	250 GHz	62.5 GHz
IF x ch	1 x 16 K	1 x 64 K	1 x 256 K
	2 x 8 K	2 x 32 K	2 x 128 K
	4 x 4 K	4 x 16 K	4 x 64 K
	8 x 2 K	8 x 4 K	16 x 16 K
			32 x 8 K

There will also be a 15.625 MHz total bandwidth configuration and some capability for very fast sampling for pulsar observations. Anyone who plans spectroscopy or pulsar work on the GBT should examine Memo 108, and make sure that the priorities discussed there meet your needs. The memo is available from scurry@nrao.edu.

F. J. LOCKMAN

ORBITING VLBI EARTH STATION AT GREEN BANK

Two radio astronomy satellites are now under development for use as VLBI stations in high earth orbits. They will be arrayed with ground radio telescopes to produce images of compact radio sources with resolutions much finer than is possible from earth-based telescopes alone. The satellites are known as Radioastron, being built by Russia, and VSOP, being built by Japan. Both are currently scheduled for launch in 1996.

The NRAO is supporting these projects in various ways, including the construction of an earth station in Green Bank that will communicate with each satellite. The station will uplink a precise timing reference signal to the orbiting telescope, and it will simultaneously downlink the digitized astronomical signal and record it on wideband tape for later correlation. The project is funded by NASA. The station will be part of a worldwide set, including three others run by NASA, one by Russia, and one by Japan. The Green Bank Earth Station uses a 13.7 m antenna belonging to the NRAO that was originally part of the Interferometer. Over the past three years, a five person team has refurbished the antenna and developed all the electronic instrumentation and control software necessary for the project.

As of this autumn, the detailed design of all hardware and software systems is essentially complete and has been formally reviewed several times. Many hardware elements are in place. Some of these, including tape recorders and cryogenic receivers, have been adapted from VLBA designs. Construction of specialized electronic modules and software is now in progress. An all-up system test is expected to occur later this year, followed by detailed testing and debugging. Successful completion of these tests will mark the end of the construction phase, now projected to occur in March 1994.

L. R. D'ADDARIO

TECHNICAL DETAILS — 140 FOOT TELESCOPE DATA ARCHIVE

Traditionally, the disk drives attached to the control computer at the 140 Foot have been used to store autocorrelator and continuum data until they could be archived to tape. During the last year we have noticed that the disk and tape drives, because of their age and the lack of spare parts, are having more failures and are becoming unreliable. I recently initiated a way of archiving data that bypasses the Modcomp disk and tape drives.

The new method of archiving involves transferring autocorrelator and continuum data, as they are taken, directly to the analysis Sun workstation where they are stored on disk. Two identical copies of the data are stored on different disks so that in case a disk crashes the data are not lost. About once a week, the data are copied from the Sun's disk to Exabyte tape in exactly the same tape format as was used with the Modcomp. The tape is then stored as part of the permanent archive.

During three months of tests, the new archive scheme has proven to be at least as reliable as the traditional mechanism. Furthermore, the new scheme has many advantages over the old.

- The tapes are more compact and hold more data.
- Observations no longer need to be interrupted while an archive tape is made.
- Logs of the contents of each tape are permanently stored on disk so we no longer have to waste paper printing them out.
- The software automatically keeps a data base of what was written when and, thereby, significantly reduces the amount of effort we have had to expend on logging such information by hand.
- If there is interest from observers, software can be written that will search through the archive data base for specific observations.

As of September 15, we have turned off the old data archive mechanism and are relying completely on the new mechanism.

R. J. MADDALENA

(Users are refereed to the January 1993 issue of the NRAO Newsletter for an article on the technical details of the 12 Meter Telescope data archive.)

EDITOR

SABBATICAL AND VISITING POSITIONS AT GREEN BANK

There are a limited number of sabbatical and visiting positions available for scientists and engineers at Green Bank. The appointments can range from one month to one year, at a time that is mutually convenient. We are most interested in people whose research or technical interests coincide with activities at Green Bank, such as the 140 Foot Telescope or the 100 Meter GBT now under construction. The Observatory can provide on-site lodging in the residence hall or one of the Observatory houses, research facilities, and some salary. Please contact R. L. Brown if you are interested.

F. J. LOCKMAN

12 METER TELESCOPE

SUMMER SHUTDOWN SUMMARY

The staff has completed another busy and productive Summer Shutdown. Visitor observing resumed on September 20. Projects that have been completed are summarized below. A few projects that will be finished within a month or two are also listed and identified as such.

Receivers and General Engineering — *3 mm SIS.* Improvements were made to the cryogenics of this receiver that lowered the physical temperature of the third cooling stage. This should improve the reliability of the receiver and reduce the loading on the 4 K stage.

2 mm SIS. New mixers from the CDL were installed in this receiver. Whereas the old mixers were scaled from a 1 mm design, these mixers were designed specifically for the 2 mm band. The receiver noise temperature is nearly constant across the entire band, from 130 to 170 GHz.

1 mm SIS. This receiver is currently being upgraded to contain the 260-300 GHz mixer set, to have independently tunable local oscillators for each polarization channel, to have a switchable tone for sideband tuning (image rejection), and to have a new on-board computer and tuning system. Work is scheduled for completion by November 1.

Continuum Chassis. Staff members are rebuilding the continuum chassis which feeds the digital continuum backend. The modifications should reduce noise in the system. In particular, we hope to reduce 60 Hz pickup.

Hybrid Spectrometer — The staff is investing considerable time in the Hybrid Spectrometer. Over the summer, we have installed the hardware necessary for flexible tuning of all 8 IF sections. The software control for this system should follow later this year. We have also improved the cooling of the IF distribution system in an effort to increase stability.

In the Spectrometer itself, we have installed a fix to an overflow problem in the integrator card that was making the end filter segment of 600 MHz bandwidth spectra useless. This fix appears to be successful. We have also installed a lock-detect system for the analog filter section. We have not been successful in fixing the low-level "ramps" and "sawteeth" that appear in the spectra in certain circumstances. We are continuing to pursue this problem, and may have a work-around observing procedure in the interim.

Control Software — The programming staff has completed a new X-Windows user interface. This interface has numerous advantages over the old graphical user interface, including "pinnable" and "scrollable" windows. Both in-house and user-supplied line frequency catalogs are now available. These work in the same way that source position catalogs have in the past.

The engineering and programming staffs have added a number of additional monitoring devices to the system to improve safety, detect errors, and to provide better weather information for both on-site and remote observers. For example, the control system now monitors the drive system torque motor currents and temperatures. It also monitors the subreflector beam throw settings. Wind speed and direction and rain detection instruments are now interfaced to the system.

We continue to improve our remote observing capabilities. In addition to the new monitoring points mentioned above, we are also adding a video image system for selected views of control room equipment and the sky overhead.

A new "on-the-fly" mapping mode for the filter bank spectrometers is nearly finished. On-the-fly data acquisition with the Hybrid Spectrometer will be worked on during the year. The continuum on-the-fly system, developed over the last two years, is available now. Data analysis for on-the-fly observing is currently limited, but is being addressed.

Analysis Software — As mentioned in the last Newsletter, we have changed the raw disk format from PDFL to the similar SDD (Single-Dish Data) format, the native file format of UniPops. The individual scan format remains unchanged. Observers will see two advantages in the new format. First, the internal byte order follows the IEEE standard expected by the Sun workstations, rather than the VAX representation for which the byte order is swapped. Since no translation is required now, UniPops can read the data from disk more quickly. In addition, the scan directory at the beginning of an SDD file has been modified from 2 to 4 byte words, removing the earlier limit on the size of any individual data file. To ease disk management, we have limited the new size of individual data files to be four times larger than before, which should be adequate for most observing runs. Additional files can be created upon request, however.

Our Charlottesville colleague, Bob Garwood, has installed a new version of UniPops at the 12 Meter. This version can read the new SDD format as a raw data file. Offline "Save" and "Keep" files remain in SDD format as before. Bob has provided a conversion utility, called "pdfl2sdd," which will convert PDFL files from years past into the new SDD format. Bob has also made numerous other improvements to UniPops and has installed the first version of a reader for spectral line on-the-fly data.

Site Maintenance — Owing to mechanical fatigue, we have retired the "cherry picker" crane and man lift that was used to service the telescope and dome and to mount receivers and other equipment on the telescope. The cherry picker is being replaced with a flexible combination of a mobile man lift, crane, and fork lift.

The operations staff spent considerable time this summer inspecting, repairing, and relubricating the dome drive system. The drive sprockets and numerous rollers were replaced during the process.

P. R. JEWELL

EIGHT BEAM RECEIVER UPDATE

The upgrade of the 8-beam receiver with SIS junctions is proceeding, albeit slowly, owing to the pressure of other projects. We expect to have a 4-channel prototype ready for telescope tests by early in 1994. If these tests go smoothly, the final 8-beam version may be operational before the end of the 1.3 mm observing season (mid-May). We hope to accept 8-beam proposals on the January 1, 1994, deadline, but ask that you check with us in mid-December before submission.

D. T. EMERSON AND P. R. JEWELL

3 MM POLARIMETER

We are constructing a polarimeter for use in the 3 mm band. The instrument will incorporate a fast switching mechanism and should be suitable for both spectral line and continuum observations. It will be possible to measure all four Stokes parameters. This instrument will be developed and tested over the course of this observing season. We will accept proposals for the January 1, 1994, deadline (April to July 1994 observing period). Please check with us in December for an update on the progress of the development.

J. M. PAYNE, D. T. EMERSON, AND P. R. JEWELL

MAY 1994 WORKSHOP IN TUCSON

The NRAO will host a two-day workshop on "Multi-Feed Systems for Radio Telescopes" to be held on May 16 and 17, 1994, in Tucson, Arizona. The scope of the workshop is outlined below. There will be no conference fee, but participants will be responsible for the cost of their own travel, meals, and lodging.

D. T. EMERSON

Workshop on
MULTI-FEED SYSTEMS FOR RADIO TELESCOPES
Preliminary Announcement

May 16 & 17, 1994
Tucson, Arizona, USA

This Workshop is intended to cover sub-millimeter, millimeter-wave, and centimeter-wave telescopes, with both spectral line and continuum receivers. The following topics will be addressed:

- Description of existing and planned multi-beam systems
- Optical design considerations, image degradation, theoretical limits on number of feeds
- Compact feed design, compromises in feed performance
- Feed packing density
- Effects of, and minimization of, crosstalk between feeds
- Backend options
- Observing philosophies, mapping strategies, array tracking
- Beam differencing techniques
- Compensation of primary surface errors using complex image plane sampling
- Phased arrays as focal plane feeds
- Data analysis—optimization algorithms making use of the special spatial and temporal correlations present in multi-feed data
- Atmospheric cancellation using multi-beam systems
- Real-time visualization of multi-beam data
- Special considerations for multi-feed interferometer systems

Papers contributed to the workshop will be published. Those interested in attending, please contact NRAO (preferably by e-mail). For general questions about the scope of the workshop, contact Darrel Emerson (Internet: **demerson@nrao.edu**). For reservations and general logistical information, contact Jennifer Neighbours (Internet: **jneighbo@nrao.edu**). Correspondence by mail should be directed to:

Darrel Emerson *or* Jennifer Neighbours
National Radio Astronomy Observatory
Campus Bldg. 65, 949 N. Cherry Avenue
Tucson, AZ 85721, USA
Fax — 602-882-7955

VLA

VLA CONFIGURATION SCHEDULE

Configuration	Starting date	Ending date	Proposal Deadline
DnC	10 Sep 1993	25 Oct 1993	01 Jun 1993
D	29 Oct 1993	07 Feb 1994	01 Jun 1993
A	25 Feb 1994	02 May 1994	01 Oct 1993
BnA	13 May 1994	30 May 1994	01 Feb 1994
B	03 Jun 1994	06 Sep 1994	01 Feb 1994
CnB	16 Sep 1994	03 Oct 1994	01 Jun 1994
C	07 Oct 1994	12 Dec 1994	01 Jun 1994

The VLA is currently scheduling two large surveys. One will be done at night in the DnC and D configurations (18^h-06^h and 00^h-10^h, respectively, for the 1993 D configuration) and one in 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, 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
1993	B	B,C	C	D
1994	D,A	A,B	B	C
1995	D	D,A	A,B	B
1996	C	D	D,A	A,B
1997	B	C	D	D,A

Observers should note that some types of observations are significantly more difficult in daytime than at nightime. 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. The A configuration daytime will be about 01^h RA and the B configuration daytime will be about 08^h RA.

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

B. G. CLARK

7 MM RECEIVERS FOR THE VLA

The first 7 mm receiver is now scheduled to be placed on the VLA in late September. There has been a two month construction delay owing to problems in acquiring low-loss isolators in the 40 to 50 GHz observing band. However the plan remains to have five receivers installed by the end of 1993 and to have seven receivers in place near the beginning of A-configuration in 1994. All ten receivers should be installed by June 1994.

With ten antennas outfitted, assuming a 100 K system temperature and 4 x 50 MHz bandwidth, we should have an rms noise error of about 1 mJy in a one hour observation at 43 GHz. The aperture efficiency is about 17 percent at 43 GHz. Performance in the 45 - 50 GHz range will remain uncertain until we actually get a couple of receivers on the array.

The current plan is to place the 7 mm antennas on the inner stations of the A-configuration, giving a synthesized beam of about 0.3 arcseconds (HPBW). Please send me your comments on where these receivers would best be placed in later configurations.

Because systematic pointing errors can be a significant fraction of the primary beam, 7 mm band observers will probably want to use a new technique called "reference pointing." With reference pointing, observations in pointing mode are periodically made on a nearby calibrator, and the observed collimation offsets are used by the on-line system to correct the pointing model. Doug Wood and Rick Perley at the AOC have been investigating this technique and can provide more information.

R. A. SRAMEK

K-BAND CORRECTION

Although doing a bandpass calibration at K-band often amounts to nothing more than a "cosmetic" correction, there are occasions when a proper correction is called for. At K- and U-Band, the primary calibrators 3C 48 and 3C 286 are too weak to be useful. Also, the strong and popular 3C 84 is not always within reach. Below is a list which I culled from the VLA Calibrator Manual, listing some fourteen sources with U-band flux densities larger than 4.0 Jy which might come in handy when preparing a spectral line run at the higher frequencies.

The "Quality" parameter is valid for ALL VLA configurations. Only one object, 3C 273, has some uv-restrictions, indicating extended structure. This normally should be no problem if the source is used for bandpass correction only.

E. BRINKS

Name (B1950)	Alt. Name	S(Jy)	Qual.	Restrictions
0104-408		5.1	P	
0106+013		4.5	S	
0316+413	3C 84	55	P	
0355+508		10.5	S	
0402-362		4.2	P	
0420-014		4.3	P	
0537-441		4.5	P	
0851+202		6.0	P	
0923+392		6.6	P	
1226+023	3C 273	34	S	uvmin=50
1253-055	3C 279	11	S	
1641+399	3C 245	13	S	
1921-293		17	P	
2251+158	3C 454.3	15	P	

COMPUTING AT NRAO-NM

Work continues with the new online documentation system described in the last issue of the NRAO Newsletter. We have just begun testing it with selected external sites to get feedback in such areas as locating items of interest, clarity of the documentation, and ease of use of the overall system. If you would be interested in helping with this testing, please contact Stephane Beland, sbeland@nrao.edu, for information. We expect to make the system generally available by the end of October.

Real-time filling of VLA data is now available to observers at the AOC. Before we make this accessible elsewhere, a number of issues (such as privacy of the data) will need to be resolved.

This summer, the AOC began initial preparations for migrating the Sun workstations to Sun's new operating system, Solaris 2. Extensive learning, planning, and preparation by system administration staff will be necessary to ease the transition from the users' perspective. It is likely to be several months before the migration actually happens. AIPS is already supported under Solaris 2.2, and we will be testing other major applications as well. Many of our third-party packages are also already supported.

We are taking advantage of this major change to coordinate system configuration with the other NRAO sites with the goal of minimizing the cross-site differences in the new Solaris environment. This will not only make it easier for NRAO staff and visitors to use the computers at different sites, but also will allow us to collaborate on system support and reduce duplication of effort.

In keeping with Internet standards, we have created the alias "ftp.aoc.nrao.edu" to use for retrieving files from the anonymous ftp area here. That is, instead of doing "ftp zia.aoc.nrao.edu," you should type "ftp ftp.aoc.nrao.edu." The general AOC anonymous ftp area will still reside on zia.aoc.nrao.edu, so the old name will still work, but if in the future we should need to move it, using the new alias would make the change transparent to you.

R. MILNER

OBSERVE

Observe now has three new features. It supports reference pointing, /OF cards are no longer lost when reading in old observe files, and three new L band defaults are available—L1 (1364.9 MHz, 1435.1 MHz, 50 MHz bandwidth), L2 (1515.9 MHz, 1365.1 MHz, 25 MHz bandwidth), and L3 (1515.9 MHz, 1435.1 MHz, 25 MHz bandwidth).

Observe is now available for SparcStations running Solaris 2.2.

The most current version of Observe is 3.1.19, dated 1993.08.26.

W. K. YOUNG

LODGING

Your options for lodging when visiting the AOC have changed. The use of dormitory rooms on the New Mexico Tech campus has been discontinued for all but one room. For the most part, lodging reservations will be made at local motels. The AOC reservationist will continue to make reservations for visitors to the AOC and will provide information on local motel rates. The NRAO continues to have available (for use on a first-come basis) three apartments not far from the NM Tech campus. For students working at NRAO-NM the special student lodging rate will continue to be available.

M. T. ROMERO

SCIENTISTS' HOUSING IN SOCORRO

A proposal by NRAO to build a modest housing facility, or "NRAO Guest House," on the NMIMT campus received approval and is being built. The NRAO Guest House is located within walking distance of the AOC on the campus of New Mexico Tech. The facility will have twelve rooms, two apartments, a kitchen, lounge, and laundry, with a total of 5800 square feet in living space. It will be connected to the AOC computer network so that visiting astronomers can monitor the status of their computing. Construction on the NRAO Guest House started in August, 1993, with completion expected in February, 1994.

M. T. ROMERO

SHUTTLE

Below is the schedule for the Socorro Roadrunner Shuttle Service. The one-way fare is $25. To avoid long waits at the Albuquerque airport, shuttle times should be noted and your airline reservations made accordingly. If your arrival at the airport is delayed, please notify the shuttle service or the AOC reservationist:

AOC reservation desk:

0800-1700 - 505-835-7357
After 1700 - 505-854-2328

Socorro Roadrunner Shuttle Service:

505-835-1010

Socorro Roadrunner Shuttle Service
(One-way travel time ~1-1/2 hours)

Albuquerque - Socorro	Socorro - Albuquerque
0900	0600
1400	1100
1900	1600
2400	2100

Dollar-Rent-A-Car is available as a transportation option to NRAO visitors. Their rate is $26/day or $136.50/week, exclusive of taxes. To get these rates, reservations must be made through the NRAO reservationist.

M. T. ROMERO

VLBA/VLBI

VLBA STATUS

For some time, we have known that the gain curves of the VLBA antennas show strange behavior at short wavelengths, most particularly 7 mm. Overall, for some antennas the gain was lower than expected and the curves showed peaks at high elevations. A slight misalignment (a lateral shift) of the subreflector has been identified as a partial cause. This misalignment has probably been present since construction. A shift of the subreflector in azimuth caused the overall loss in gain while a shift in elevation caused the gain curve to peak at the wrong elevation. Cross-cuts through the primary beam made by observing a satellite at 38 GHz enabled an empirical determination and correction of these two errors for the Pie Town and Fort Davis antennas. At 7 mm, an overall gain improvement of up to a factor of 2 is seen, and the gain curve now peaks at elevations near 40-50 degrees. Clearly, without this fix, observations at 3 mm would have been very difficult, if not impossible. The gain curve droops at low elevation remain but further investigation will require full phase-referenced holography of the antennas, which is now under development.

Understanding of the total power performance of the VLBA antennas is now well advanced. System temperatures, pointing models, and gain curves are available for all frequencies and regular monitoring proceeds. Gratifyingly, the Mauna Kea site is turning out to be as good as we thought for high frequency observations: the 7 mm system temperature being about 30 percent lower than that of the mainland sites.

Debugging of the correlator system continues, mainly via the "First Science" effort which has the goal of producing correct, scientifically useful images. The quality of data produced by the correlator is now very good though a number of known problems exist and are being addressed. Bearing in mind the overall good quality of the data produced by the correlator, we have embarked upon another parallel effort, inevitably known as "Second Science," to pass a small number of projects (6 VLBA-format observations) completely through the correlator and through the necessary AIPS processing. While the goal of First Science is to demonstrate the correctness of the correlator in a couple of modes, the goal of Second Science is to identify and resolve operational obstacles to correlation of existing observations. As a consequence of this initiative, the VLBA correlator operators have become more directly responsible for a number of aspects of correlation. In addition, some relatively minor problems with AIPS processing of the VLBA FITS files have been identified and corrected. This shift from predominantly experimental running of the correlator to production will give us a quick start in processing and recycling tapes once the First Science goals are met.

T. J. CORNWELL

PROPOSING TO USE THE VLBA

Proposals requesting use of the VLBA either during or outside of VLBI Network sessions are welcome. Proposal deadlines are February 1, June 1, and October 1. Upcoming VLBI Network sessions are described elsewhere in this Newsletter. Observing periods for non-Network VLBA projects are identical to those for the VLA discussed elsewhere in this Newsletter.

Anonymous-guest FTP can be used to access VLBA information files in directory "pub" on host "zia.aoc.nrao.edu" [146.88.1.4]. Of prime interest to proposers are file "prop.vlba," giving details of the VLBA proposing process; and file "obssum.vlba.ps," the VLBA Observational Status Summary updated in June 1993 and available now as a PostScript file or a LaTex document. A paper copy of this update was mailed to those on the VLA/VLBA master address list.

Successful proposers should be aware that the VLBI scheduling program SCHED, plus its related files, are also available via anonymous-guest FTP on "zia.aoc.nrao.edu" [146.88.1.4] in directory /u/ftp/pub/sched.

J. M. WROBEL AND R. C. WALKER

VLBI NETWORK CALL FOR PROPOSALS

Proposals for VLBI network observing are handled by the NRAO. In particular, the network sessions for 1993 and 1994 are expected to be as follows:

Session	Dates	Bands	Proposal Deadline
4	14 Nov to 24 Nov	3.6/13, 18	1 Jun 1993
1	16 Feb to 09 Mar	1.3, 6, 18	1 Oct 1993
2	18 May to 08 Jun	3.6/13, 6, other	1 Feb 1994
3	14 Sep to 05 Oct	1.3, 3.6/13, 6	1 Jun 1994
4	TBD	0.7, 3.6/13, 18	1 Jun 1994

The Caltech Mark II processor will end routine correlation for the astronomical community at the end of 1993. In order to have an orderly shutdown of this facility, no further proposals for Mark II observations will be scheduled without assurances from the manager of a Mark II correlator that the observations can be processed.

It is recommended that proposers use a standard coversheet for their VLBI proposals. Fill-in-the-blanks ASCII forms and fill-in-the blanks TEX files (for those who have TEX support on their home computers), are available by anonymous FTP from zia.aoc.nrao.edu, directory pub/vlbicover. A new version was installed on September 9, 1993, including a new version of the EVN logo, evn.ps. Printed forms, for filling in by typewriter, are available on request from Rita Salazar, AOC, Socorro.

Any proposal requesting antennas from two or more institutions in the European VLBI network constitutes a Global Proposal. Global proposals MUST reach BOTH Networks' Schedulers on or before the proposal deadline date; allow sufficient time for mailing. In general, FAX submissions of global proposals will not be accepted. For Global Proposals, or those to the EVN alone, send proposals to:

R. Schwartz
Max Planck Institut für Radioastronomie
Auf dem Hugel 69
D 53121 Bonn
Germany
(Note the recent change in Postal code.)

For proposals to the US network, the VLBA only, or global network proposals, send proposals to:

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

B. G. CLARK

AUTHOR LISTS ON OBSERVING PROPOSALS

We have recently received observing proposals with author lists that seem to us to be excessively long. People should be listed as authors only if they will be doing substantive work with the data. Other reasons for lengthening the list are not very valid. These might be: a hope that the scheduling committee might be impressed with the number or notoriety of the authors (we aren't); a kind of tribute to a premier worker in the field with whom you have worked in the past (reprehensible in papers; absurd in observing proposals); a preemptive strike to keep them from submitting their own proposal (but if you trust them so little, are you sure you want to give them immediate access to the data, which they have as members of the team); as a cheering section (perhaps effective for a subject they consider neglected, but not for endorsing this proposal among many on a popular subject).

The first author on the list should be the person primarily responsible for handling the data taken by the proposed observation. The contact author should usually be the first author on the author list. Exceptions are reasonable when the person principally responsible for the observation is excessively hard to reach and has asked someone else to oversee taking the data for them, or when the data is taken to be the principal project of a graduate student whose advisor must carefully oversee the observation. The contact author listed should be the real contact author; it occasionally happens, and shouldn't, that when I tell the contact author about the details of date and time assigned, I am referred to someone else. We occasionally hear of people whose name has been added to a proposal author list without their knowledge. This is understandable in the case of a supervisor who will assign a subordinate to work on the project. Other cases tend to be taken seriously, and make it less likely that the project will be scheduled, as the scheduling committee may feel that the data handling in general may suffer the same sloppiness and lack of organization.

B. G. CLARK

IN GENERAL

USERS' COMMITTEE

The NRAO Users' Committee met in Tucson June 3-4. This is a summary of the report submitted by Rachel Dewey (JPL) who chaired the meeting.

The Committee unanimously reaffirmed its support of NRAO's policy of awarding telescope time exclusively on the basis of the scientific merit of the proposed research as determined by peer review, without regard to the national or institutional affiliation of the proposers. Another general issue discussed by the Committee was the low representation of women on the scientific staff. NRAO efforts to expand recruitment of women received Committee support, and the Observatory was encouraged to actively solicit applications from all segments of the radio astronomical community.

The Committee was pleased by improvements made at the 12 Meter Telescope, particularly the sensitivity of the receiving systems. Concern was expressed that software support for the rebuilt 8-beam receiver be in place by the time the 8-beam receiver is again on line.

The Committee endorsed the program of the Central Development Laboratory for the provision of the best possible receiver components, both for NRAO and, where appropriate, other radio observatories.

The Committee reiterated the strong and widespread community support for the Millimeter Array. Disappointed with the lack of funding for MMA development, the Committee urged NRAO to explore all funding routes to speed development and construction of the MMA and to continue site studies, including Mauna Kea. In the meantime, it urged that continued improvements be made in existing U.S. millimeter observing capabilities.

Many improvements in AIPS during the last year were noted by the Committee, which urged NRAO not to sacrifice support for AIPS to AIPS++ development. The Committee also noted the importance of continued support for widely-used hardware platforms and expressed concern about availability of well-tested AIPS capabilities for VLBI data processing, stressing that reliable and easy-to-use software is

The Committee recognized the need for a new or greatly revised data processing system and that the goals for this system have been clearly defined in the AIPS++ project. However, the Committee expressed a desire for more interaction between the AIPS++ project and the user community, and was concerned that the project schedule was overly optimistic. NRAO was urged to disseminate as much information as possible to the users by listing AIPS++ memos in the NRAOIS data base, and announcing the availability of significant new AIPS++ documents in the Newsletter. The Committee also strongly urged that prototypes of the package be released for user testing as soon as possible. It was noted that one of the great strengths of the current AIPS was its development by astronomers with a clear understanding of radio astronomical data processing and its potential pitfalls, and the Committee urged that active astronomers at NRAO make a long-term commitment to participating in, and supervising, the AIPS++ development. In order to facilitate communication between the AIPS++ project and the user community, an AIPS++ subcommittee, similar to those organized for VLBA, the GBT, and the MMA, was formed.

There was a lengthy discussion of VLBA operations, largely centered on the transition from intermittent Network observing to routine, full-time VLBA observing. NRAO was urged to keep the users informed of capabilities available with the VLBA during this period of rapid change. Concerned that the VLBA correlator would not achieve routine operation as scheduled, the Committee urged NRAO to continue support of the Haystack correlator through June 1994. It also called for more end-to-end tests of VLBI routines in AIPS and urged that NRAO provide for non-standard observing programs in correlator operations modes, and for re-correlation of certain types of programs.

The reviewing of VLA and VLBA proposals by a common set of referees has proved controversial and NRAO was asked to reconsider this policy. Many potential VLBA users feel that the common refereeing system has resulted in misunderstandings of important differences between the arrays and the kinds of proposals that are appropriate. The Committee also felt that providing clearer feedback to proposers when highly rated proposals were rejected, and naming an additional VLBI scientist to the VLA/VLBA scheduling committee would be helpful.

The many improvements in the VLA infrastructure were noted with appreciation by the Committee. The VLA upgrade plans received strong endorsement, as did the all-sky and North Galactic Cap surveys being undertaken. NRAO was urged to monitor the impact of these surveys on B and D configuration users for undue hardship.

The Committee was impressed by the promise of the GBT as a powerful and flexible instrument and pleased with the progress made to date. It urged the inclusion of a high-time resolution port in the GBT spectrometer for pulsar observers and also noted the importance of the laser pointing system to the success of the project.

The Chair of the 1994 Users' Committee will be Jean Turner (UCLA). Members of the various subcommittees are list below. The full report of the Committee is available on request to Phyllis Jackson (e-mail: pjackson@nrao.edu or 804-296-0221).

R. J. DEWEY AND P. A. VANDEN BOUT

USERS' COMMITTEE SUBCOMMITTEES

VLBA

Jim Cordes (Cornell), Carl Gwinn (UCSB), Colin Lonsdale (MIT/Haystack), Mark Reid (Harvard/CFA), Jean Turner (UCLA), Steve Unwin (Caltech).

MMA

Mary Barsony (Harvard/CfA) , Ed Churchwell (U. Wisconsin), Ralph Gaume (NRL) , Karl Menten (Harvard/CfA), Lee Mundy (U. Maryland), Jean Turner (UCLA), Dave Woody (Caltech/OVRO).

GBT

John Dickey (U. Minnensota), Andy Fruchter (Berkeley), Karl Menten (Harvard/CFA), Lee Mundy (U. Maryland), Jean Turner (UCLA), Dave Woody (Caltech/OVRO).

AIPS++

Mary Barsony (Harvard/CfA), Andy Fruchter (Berkeley), Ralph Gaume (NRL), Carl Gwinn (UCSB), Jean Turner (UCLA).

1993 SUMMER STUDENTS

The 1993 Research Experiences for Undergraduates (REU) at NRAO has ended, with the 18 students heading for their colleges from the four NRAO sites. As examples of the sorts of research students and their advisers undertake at the four NRAO sites, we give a short summary of the activities of several students.

Peter Bloser came to NRAO from Princeton, where he was a third year student in Astrophysics. In Socorro, he worked with Tim Bastien, primarily on transient microwave enhancements in solar active regions. One of the recent and exciting discoveries by the Japanese satellite Solar-A (aka Yohkoh) is that solar active regions are highly dynamic in soft X-rays, with magnetic loops brightening and then fading away on a timescale of order 10 min. A microwave counterpart to the SXR transients has also been found near the footpoint of the "activated" loop. Peter analyzed multiband observations of a solar active region in hopes of better characterizing the microwave counterpart to the SXR transients. Using AIPS, he reduced two of the four bands observed. Tim and Peter hope to carry on the collaboration and to produce a paper on the subject during the course of the coming year.

Vanessa Harris, a third year Computer Science student from Mississippi Valley State University, spent the summer working with Paul Shannon and Melanie Swain in Charlottesville. She planned and implemented many parts of the CV-specific xmosaic on-line information system. In addition, Vanessa developed several key C language functions for the new NRAO "lookup" utility.

James Burnell arrived at NRAO-Tucson from West Virginia University, where he was a third year student in Electrical and Computer Engineering. Jim spent the summer working with Jeff Hagen on the observer display program which displays 12 Meter Telescope scans as they are collected from the control system. That program is expected to come on line shortly at the 12 Meter.

Jason Alexander came to Green Bank from Rice University, where he majors in Physics and Math, to work with Bob Payne on the GBT data analysis system, testing and using some of the AIPS++ basic library classes. He helped design a class of data appropriate for single antenna data and modified the Unipops FITS reader so that 43 m data could be read into AIPS++ array classes.

Information and application forms will soon be mailed soliciting applications for research assistantships next summer. The majority of the assistantships will be offered to undergraduate students who are currently enrolled in U.S. undergraduate institutions and who will not receive their degrees before or during the summer of 1994. A limited number of assitantships will be available for graduate students or students from non-U.S. institutions.

Owing to the large number of applicants, and the difficulty of distributing materials among sites across the continent, the deadline for receipt of application materials will be January 20, 1994; notice of decisions will be sent by March 1, 1994. Forms are available from Department Heads or by writing to:

Director, Summer Student Program
National Radio Astronomy Observatory
520 Edgemont Road
Charlottesville, VA 22903-2475

H. A. WOOTTEN

THE MILLIMETER ARRAY

The MMA Advisory Committee met in Charlottesville September 16 and 17 to review the progress of, and the planning for, the MMA. The group heard presentations on the design criteria for the instrument, possible calibration techniques, the antenna design, system design, recent developments that affect the correlator, site evaluation studies, and progress on AIPS++, in-so-far as MMA requirements are concerned. In addition to discussing all these areas, the Committee provided their answers to a list of ten questions that dealt with the focus and scope of work to be done on the MMA in the next 12-24 months.

The Committee made a number of very specific suggestions, including the following:

— Good phase calibration will be essential for MMA operation in the two largest configurations. Two techniques seem especially promising, monitoring T_{sys} variations and direct measurement of the 22 GHz H_2O line profile shape, which need detailed study. This is best done through the MMA Joint Development Group (JDG).

— The optical layout needs to be simplified. Suggestions include designing with faster optics, eliminating the simultaneous dual-frequency, dual-polarization option, and eliminating any plans to terminate the image sideband in a cold load.

— Access to both sidebands is essential. The design should include ways to separate the sidebands at the front-end either quasi-optically or with sideband separating mixers. The latter is another area where JDG cooperation could be given further emphasis.

— MMA planning should include plans for a very wideband continuum system, perhaps involving an analog correlator or a contiguous set of wide digital correlators.

— Gain compression of the SIS mixer receivers in solar observations should be prevented by using attenuators in the optical path, not by increasing the number of junctions in series at every frequency.

— Direct on-site phase stability measurements should be made to complement the tipper stability measurements. The possibility of including a long, 3 km, baseline in the phase stability measurements should be investigated.

— Careful attention needs to be paid to the cost premium for full single dish capability on all the array antennas.

Work on the MMA in 1994 at the NRAO, and through the JDG to the extent that funds and personnel permit, will be concentrated on the issues noted above. Progress reports will appear regularly in the Newsletter.

R. L. BROWN

USER DATA RIGHTS
VLA/VLBA DATA ARCHIVE POLICY

All data obtained in VLA and VLBA observing programs are archived. That is, the raw correlator output is archived, including in the case of VLBA programs correlated data from any non-VLBA telescopes that have been used. These data are reserved for the exclusive use of the observing team for a period of 18 months following the end of the last observations requested in the original proposal or a direct extension of that proposal. For VLBI programs that use the phased VLA, the VLA correlator data are immediately available to all unless the proposal specified that a VLA image was to be made as well as a VLBI image.

To obtain archive data you need only make a request to either Miller Goss or Barry Clark. You are strongly encouraged to contact the original observer. More often than not, she or he will be happy to provide a processed image. In any event, NRAO will inform them that a request has been made. The contents of the VLA archive can be listed using the program VLASORS. See the April 1993 issue of the NRAO Newsletter for more information.

A different policy applies to data obtained as part of the VLA Sky Survey. Those data are immediately available to all, as are the images as they are produced. See the VLASS article in the January 1993 issue of the NRAO Newsletter.

P. A. VANDEN BOUT

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