NRAO NEWSLETTER

1988 January 1 No. 34

VLBA

SELECTED VLBA ITEMS

The Pie Town antenna participated in the 18-21 November 327 MHz NUG run. Data was taken during most of the session, and fringes were found for the baselines that have been analyzed so far with the correlators at Charlottesville and Bonn. Sensitivity was consistent with VLBA specifications. As expected, preparations for this first scientific use of a VLBA antenna served another important purpose, namely the correction of a diverse list of minor design "bugs"--ranging from control software to antenna circuit breakers.

Timing reference for the NUG run was VLBA hydrogen maser No. 1. The first three delivered masers have now been accepted. A test to establish long term stability of the VLBA maser design is planned at JPL.

Initial software for many station computer functions has been completed. Although further tests remain in this area, programming effort is increasing for the array control computer. It is possible that Pie Town's next NUG run will be controlled remotely from Socorro.

Haystack Observatory's recently delivered first VLBA recorder and formatter are now undergoing control software integration tests at the VLA. Subsequently it is planned for installation at Pie Town. Early tests will likely include fringe tests in Mk III mode, paired with a Mk III equipped VLA antenna. It seems likely that Mk III (as well as Mk II) VLBI will be accessible for some years at Pie Town, and perhaps other VLBA sites. A contract addition to Haystack was effected to provide a second "preproduction" version of their VLBA recording system, and to complete the first playback system.

Subreflector master mold and production mold surface tolerances have now been approved. The first subreflector is scheduled for shipment for mid-January to the University of Arizona for final surface tests, and then for shipment to Pie Town.

The first subreflector/rotation mount was modified to cure design problems. This test FRM passed an endurance test, with the result allowing authorization of five production FRMs incorporating the modifications. The test FRM is scheduled for installation, with subreflector, at Pie Town in February. The first production FRM and subreflector are scheduled for installation at Kitt Peak in May.

An apparent "wobble" in the azimuth track is detected in the first three antennas. The deflections are approximately twice manufacturers expectations. The cause is not known with certainty, but attention is focusing on possible incorrect rail installation. The manufacturer has been formally notified of our concern about this part of the pointing error budget.

Antenna erection at Kitt Peak is complete, except for punch list items. Electronic and cryogenic outfitting are well underway. Antenna erection at Los Alamos is complete, with RSI now installing electrical and servo control equipment. At Fort Davis, TX antenna erection started on 7 December.

Site preparation, antenna foundation, and the control building are completed at Brewster, WA and underway at North Liberty, IA. Lease approval activities are underway for the sites at St. Croix, VI, Owens Valley, CA, and Mauna Kea, HI.

Ken Stetten

The NRAO NEWSLETTER is published quarterly by the National Radio Astronomy Observatory, Edgemont Road, Charlottesville, VA. 22903-2475 USA. NRAO is operated by Associated Universities, Inc. under contract with the National Science Foundation.

VLBA SUPPORT OF NUG OBSERVATIONS

It is hoped that beginning with the June 1988 observing session the Pie Town VLBA antenna will be available to support NUG observations. NUG proposers should request VLBA antennas in the same way as other NUG antennas in their NUG proposals. The Pie Town antenna will have receivers for the bands 1.35-1.75 GHz, 2.15-2.35 GHz, 4.6-5.1 GHz, 8.0-8.8 GHz, 10.2-11.2 GHz, 14.4-15.4 GHz, and 21.7-24.1 GHz. Receivers for the bands 0.31-0.34 GHz and 0.58-0.64 GHz will be available later in the year. Mk II observations can be supported as can Mk III observations, requiring no more than 4 baseband converters each with upper and lower sidebands and up to and including 4 MHz bandwidth baseband filters. VLBA antennas after Pie Town will be made available after they have been commissioned and tested if operating funds are available. Antennas after Pie Town will only have the 1.5, 4.8 and 22 GHz band receivers installed initially. Future NRAO Newsletters will keep NUG observers up to date on the availability of VLBA antennas. Questions regarding the status of particular antennas should be addressed to Craig Walker at 505 772-4247.

Peter Napier

In General

RON EKERS TO DIRECT THE AUSTRALIA TELESCOPE

I am very sorry to announce that Ron Ekers will be leaving the Observatory in early 1988 to take up the directorship of the Australia Telescope. Ron has done an outstanding job directing the operation and development of the VLA over the last seven years--essentially the entire period of full VLA operation. He deserves much of the credit for its success and his departure is a major loss to NRAO. I am sure you will join me in wishing him success as he brings the AT into operation.

Effective February 1, 1988, Dave Heeschen will take over responsibility for the VLA as acting director. The search for a permanent director will begin immediately. I welcome suggestions and advice from NRAO users and staff.

P. A. Vanden Bout

HEIN HVATUM RETIRES FROM NRAO

Hein Hvatum retired from the Observatory staff at the end of last year. Hein served in many roles throughout his 29 years with NRAO, from his first appointment in 1958 as a postdoctoral research associate, through a long tenure as Head of Electronics and then Technical Services, to acting director in 1984. More recently he served as VLBA Project Manager.

I want to thank him on behalf of the Observatory and the entire community of radio astronomers for his many contributions to the development of radio astronomy and to wish him the very best in retirement.

P. A. Vanden Bout

PROPOSAL LENGTH

The normal NRAO guidelines for proposal length suggest that proposals should not exceed three double-spaced typewritten pages plus illustrations. Please be reminded that lengthy proposals overtax the referees as well as the minimal administrative resources allocated to the management of the proposal review and telescope scheduling process.

When requesting telescope time, please respect the considerable burden that the proposal review process places on the NRAO referees, who in service to the astronomy community spend many hours per quarter reading and evaluating proposals. This is often in addition to other astronomy-service commitments that we all share in the peer-review process.

R. J. Havlen

NATIONAL RADIO ASTRONOMY OBSERVATORY
EDGEMONT ROAD CHARLOTTESVILLE, VIRGINIA 22903-2475
TELEPHONE 804 296-0211 TWX 910 997-0174

PLEASE POST

VLA DIRECTOR SEARCH

NRAO is conducting a search to fill the position--Assistant Director for VLA Operations. The person holding this position is responsible for the development and operation of the Very Large Array and for the interim operation, during the construction phase of the Very Large Baseline Array. A person is sought with outstanding scientific leadership and management credentials. Nominations should be sent to Paul Vanden Bout, NRAO, Edgemont Road, Charlottesville, VA 22903-2475. Persons who wish to apply for the position should express their interest by March 15, 1988. NRAO is operated by Associated Universities, Inc., under contract with the National Science Foundation. AUI is an Equal Opportunity Employer.

P. A. Vanden Bout

OPERATED BY ASSOCIATED UNIVERSITIES, INC.
UNDER CONTRACT WITH THE NATIONAL SCIENCE FOUNDATION

NEW NRAO ARRAY TELESCOPE COMPUTER PLAN

The NRAO has prepared a new "Array Telescope Computing Plan" that was submitted to the NSF in September 1987. This plan proposes a four-fold solution to the array telescope computing needs (VLA and VLBA). The four elements of the plan are (a) the installation at the NRAO of an image processing facility made up of four second-generation mini-supercomputers linked to a variety of work stations, (b) increased NRAO technical support for computing at its users' home institutions, (c) increased access to supercomputer centers for array telescope data processing, and (d) increased software and algorithm development and optimization at the NRAO. The plan is intended to take effect in 1989, when NRAO would begin procurement of the mini-supercomputers and begin hiring staff to support (a), (b), and (d).

Copies of the plan may be obtained by request to the NRAO Computer Division either at the VLA or in Charlottesville.

P. A. Vanden Bout

1988 JANSKY LECTURER

The NRAO is pleased to announce the selection of Dr. William A. Fowler of the California Institute of Technology as the Jansky Lecturer for 1988. Dr. Fowler most recently shared the 1983 Nobel Prize in Physics with S. Chandrasekhar (a former Jansky Lecturer). Dr. Fowler was honored for his leading role in developing the theory of nucleosynthesis of the heavier elements in the cores of stars.

Each year the Jansky Lectureship is awarded by the Trustees of AUI to a distinguished scientist who has made outstanding contributions to the field of astronomy or a related subject.

The Jansky Lecture will be delivered sometime in the fall of 1988 in both Charlottesville and Socorro.

P. A. Vanden Bout

$ COLOR IS PAINFUL $

The NRAO cannot provide page charge support to its users for the publication of color plates in journal articles. The hard fact is that a single color plate is approximately 20 times more expensive to produce than a normal page of text. Regrettably, in this age of fiscal constraint, and in spite of the acknowledged superiority of color presentation of certain spectral data, we cannot justify the excessive expense involved.

R. J. Havlen

Green Bank

GREEN BANK INTERFEROMETER

The interferometer in Green Bank is being reconfigured for different use by the U.S. Naval Observatory. Timekeeping via radio interferometry will still be the prime purpose, but very long baseline interferometry, because of its greater accuracy, will replace connected-element interferometry. Accordingly, one of the 85-foot telescopes in Green Bank will be instrumented as an East Coast VLBI station. It will operate simultaneously at S and X bands, and will record on the new VLBA system.

USNO VLBI will not occupy full-time. When the telescope is not so used, it will be devoted to pulsar timing. Principal investigators for this research will be Dan Stinebring, Joe Taylor, and colleagues from Princeton University.

The other two 85-foot telescopes will constitute a single-baseline, connected-element interferometer. Dual S and X-band frequencies and dual polarization will be provided. This interferometer will be dedicated to source flux-density monitoring. Scientists from NRAO, USNO, and NRL will share in monitoring the data. Both intrinsic source variations and scintillating/refracting effects will be studied.

George A. Seielstad

REPLACEMENT OF CARD READER BY A PC AT THE 140-FOOT TELESCOPE

Before mid-January, users of the 140-foot telescope have had to tediously and carefully type their observing files onto computer cards. Observers now can create and modify observing files using a PC available at the telescope. The files are identical to what observers used to enter onto computer cards but the PC vastly simplifies creating and editing files

In addition to standard screen editors on the PC, observers can take advantage of an easy-to-use, menu-driven editor, FILE-ED, to create their files. Some observers may want to bring to Green Bank editors of their own choosing. Other PC's at Green Bank can also be used to create or edit files although only the PC at the telescope can submit files to the control computer.

Some observers may desire to create their files on floppies before coming to Green Bank. In this case, the files must conform to the formats for observing files given in the 140-foot manual. Columns 1-80 in each line of the file must not contain lower case or special characters like tabs, line feeds, or escape sequences. Some parameters in an observing file will not be known until just before the observations begin, so the observer should leave those fields in the observing file blank. The editors on the PC at the telescope can be used to enter these parameters or to correct unforeseen errors in the homemade file.

The control computer still accepts observing files stored on tape but no longer accepts computer cards. If an observer has a file on tape, or has an old deck of cards, we highly recommend that the observer first transfers the file from tape or cards to a PC floppy using a program available on the analysis computer at the telescope or in the Jansky Lab. Once on the floppy, the file can be edited as the observer desires.

After the creation of an observing file on the PC, the observer can check for errors in the file using a program called CHECKER and then, after all errors are corrected, send that file to the control computer. A file cannot be read into the control computer while observations are in progress. (Both FILE-ED and CHECKER will be distributed to interested observers for home use after we have shaken the bugs out.)

The PC at the telescope is available for any other tasks like word processing, but be prepared to get off of the machine at a moments notice. The transferring of a file into the control computer and the use of the PC by the telescope operator take precedence over any other uses.

(Note that the PC at the telescope has a 20 Mbyte hard disk, hercules graphics board, an 8087 co-processor, and accepts only 5 1/4 inch single-sided, double-density floppies.)

Ronald J. Maddalena and Bob Vance

MODIFICATION TO THE NOISE-ADDING CAPABILITY OF THE 140-FOOT TELESCOPE

We have recently changed the way in which observers can add noise during their observations. The new method is more flexible than the old and allows observers free choice as to when to add noise. For example, with some receivers you can now add noise during either the On or Off half of a Total Power scan. Observers who use the nutator or who frequency switch could add noise during either the signal or reference half of their observations. Observers who use double beam switch on continuum sources can now properly add noise.

These changes dictate that observers must modify their old observing procedures in order for them to now work. Full documentation is available at the telescope.

NOTE: Some receivers cannot be used with, or must be modified for, noise adding. Always contact the engineer in charge of the receiver long before your observations are to start.

Ronald J. Maddalena and Bob Vance

SIMULTANEOUS DUAL-FREQUENCY OPERATION FOR THE 2-5 GHz DUAL-FREQUENCY RECEIVER

A recent 300-foot telescope observing program required that the 2-5 GHz receiver be altered to allow simultaneous dual-frequency band/dual-beam operation. Previously, the receiver was limited to single frequency band operation because the size of the dual-hybrid feeds normally used with the receiver prevented placing the feeds close enough together to allow efficient dual-beam operation. Smaller feeds, narrow flared corrugated feed horns, have been built and are now available which permit dual band/dual beam operation of the receiver. The 2-5 GHz receiver, with the new feeds installed, is currently being used at the 300-foot telescope for a six-month program. Measurements made during the beginning of the run give the following information about the receiver when using the new feed system.

Channel	Efficiency °K/Jansky	System Noise Temperature	Measurements Made With: f_c	IF Filter B.W.
S-Band	0.8	40 K	3250 MHz	100 MHz
C-Band	0.7	40 K	4675 MHz	100 MHz

Beam separation approximately = 12.6 minutes. Feed offset = 6.6 inches.

The current program also required the addition of two IF polarimeters, one for each band, which have been built and are now available for programs requiring the characterization of polarization.

Restrictions exist on the observing frequencies when using the dual-beam system because the LO is shared by the two bands. Observers interested in using this new capability should contact G. Behrens for details.

G. H. Behrens

COMPUTER NETWORK FOR DISTRIBUTED PROCESSING

NRAO-Green Bank is installing a network linking computers at the telescopes and shops with those in the Jansky Laboratory. The main goal is to provide easy and immediate access to data bases. Every scientist should be able to view his or her entire data set from any of several locations on the site as well as, perhaps, off it. Time-consuming and awkward transfers between computers using intermediary devices (usually magnetic tape) should be eliminated.

The pacing factor in the evolution of the new system will (surprise!) be money. So far, however, we have been able to make a start. On hand are enough fiber optics to run from the Jansky Lab to all telescopes and one Sun 3/60 workstation. These items have just been received, so are not yet installed. A second workstation is on order.

The first Sun workstation will be installed at the 300-foot telescope. It will be linked by Ethernet to the Masscomp data acquisition and control computer, and will replace the Modcomp analysis computer as soon as it (the Sun) runs POPS.

Upgraded hardware will permit analysis software to evolve. As a first step, Ron Maddalena is beginning an examination of existing single-dish data analysis software at telescopes around the world. This effort is on behalf of both the Green Bank and the Tucson telescopes. Ron will try to determine which features of the various software packages should form the core of a new one. As an interim step, NRAO might discover one or more existing packages it can make available to users.

George A. Seielstad

NEW 140-FOOT MANUALS

We have recently revised the 140-foot Observing Manual, copies of which should be available for distribution by March. In addition, I have completed a new, short manual, "Getting Started With the 140-foot Telescope," designed for novice or infrequent users of the telescope. Interested observers who desire either manual should contact Bob Vance or me.

Ronald J. Maddalena

VLA

VLA CONFIGURATION SCHEDULE

I. Schedule of Reconfiguration Dates

From	To	Starting Date	Completion Date
B	B/C	February 2, 1988	February 12, 1988
B/C	C	February 29, 1988	March 4, 1988

II. Summary 1988/89

Quarter	Configuration	Antennas Available*			Proposal Deadline
		327 MHz	8.4 GHz	23 GHz	
1988 Q1	B, B/C, C	22	15	12	
1988 Q2	C, C/D, D	22	17	15	
1988 Q3	D, D→A	27	20	18	March 15, 1988
1988 Q4	A	27	25	21	June 15, 1988
1989 F,M,A,M	A/B, B	27	27	24	October 15, 1988+++
1989 J,J,A,S	B/C, C	27	27	27	February 15, 1989+++

Maximum antenna separation for the four VLA configurations are: A-36 km, B-11 km, C-3 km, D-1 km. Further information is summarized in the "VLA Observational Status Report" available from Alison Patrick, National Radio Astronomy Observatory, P.O. Box 0, Socorro, New Mexico 87801, Telephone: 505 772-4240.

*All 27 antennas are available at 1.4, 5, 15 GHz. At 23 GHz the number given is the number of antennas with new receivers, approximately three times more sensitive than current ones.
+++Note change to configuration based scheduling. See this Newsletter for further details.

III. Approximate Long-Term Schedule

	Q1	Q2	Q3	Q4
1988	B	C	D	A#
1989	A+	B	C*	D
1990	D	A	B	C
1991	C	D	A	B

All antennas equipped for 327 MHz operation
+ All antennas equipped for 8.4 GHz operation
* Voyager-Neptune encounter August 24, 1989. Modified C array to minimize shadowing.

R. Ekers

VLA OBSERVING APPLICATION

A

rcvd:

DEADLINES: 15th of Mar., June, Sep., Dec. for Q 3, 4, 1, 2
INSTRUCTIONS: Each numbered item must have an entry or N/A
SEND TO: Director NRAO Edgemont Rd. Charlottesville, VA 22903-2475

(1) Date Prepared:

(2) Title of Proposal:

(3) Authors	Institution	Who will observe?	For Grad Students Only: Observations for PhD Thesis?	Anticipated PhD Year

(4) Related previous VLA proposal number:

(5) Contact author for scheduling:

Address:

(6) Telephone:

TWX:

E Mail:

(7) Scientific category: ☐planetary, ☐solar, ☐stellar, ☐galactic, ☐extragalactic

(8) Configuration(s)(one per column) (A, B, C, D, A/B, B/C, C/D, Any)					
(9) Wavelength(s) (90 20 18 6 3.5 2 1.3 cm)					
(10) Time requested (hours or days)					

(11) Type of observation: ☐mapping, ☐point source, ☐monitoring, ☐continuum, ☐lin poln, ☐circ poln, ☐spectroscopy, ☐multichannel continuum, ☐solar, ☐VLBI, ☐phased array, ☐pulsar, ☐other _____
(Check all that apply)

(12) ABSTRACT (Do not write outside this space. Please type.):

NRAO use only

(13) Observing style: ☐Will be present ☐Will prepare files & return to reduce ☐Will use modem ☐Absentee (NRAO prepares OBSERV file & sends calibrated data)

(14) Reduction: Number of maps_____ Number of channels_____ Maximum size of maps_____(pixels) Self cal maps_____

(15) Off-site reduction: ☐none, ☐post map, ☐post calibration, ☐everything.

(16) Help required: ☐none, ☐consultation, ☐friend(extensive help), ☐staff collaborator.

(17) Spectroscopy only:

	line 1	line 2	line 3		line 1	line 2	line 3
transitions to be observed	_____	_____	_____	number of channels (N)	_____	_____	_____
channel bandwidth (KHz)(Δ)	_____	_____	_____	number of antennas	_____	_____	_____
observing frequency (±NΔ/2)	_____	_____	_____	rms noise after 1 hour (mJy)	_____	_____	_____

(18) Number of sources_____(If more than 10 sources please attach list. If more than 30 give only selection criteria and LST range(s).)

(19) Name	Epoch 1950☐ 2000☐ RA hh mm	Dec ±xx°x	Config.	Band (cm)	Band width (MHz)	Total Flux line (Jy)	Total Flux cont. (Jy)	Largest ang. size	Weakest signal (mJy/beam)	Required dynamic range	Possible LST range hh - hh	Time requested

(20) Special hardware, software, or operating reqirements:

(21) Preferred range of dates for scheduling:

(22) Dates which are not acceptable:

(23) Please attach a self-contained Scientific Justification not in excess of 1000 words. (Preprints or reprints are not refereed)

When your proposal is scheduled, the contents of this cover sheet become public information. (Any supporting pages are for refereeing only)

THE INSTALLATION OF THE NEW VLA ON-LINE SYSTEM

The new on-line system was installed as planned over the new year. At present it is possible to fill the visibility data into the DEC-10 only, from which it may be exported as previously. It remains a high priority project to make the data directly available to other postprocessing systems (primarily AIPS).

The new system requires the same Observe file format as the old and will have almost the same functional behavior as the old. The major differences are outlined here.

1. There is a new archive tape format. This is to allow for all the spectral line data and correlator modes and to take advantage of 6250 bpi tapes, which is the archive output medium. Useful ancillary information that was not present in the old system, such as total phase and delay, and antenna positions, is now provided on the new archive tape.

2. An Antsol, based on the DEC-10 ANTSOL algorithm, is applied by the on-line system to all calibrator data. This allows for better real-time monitoring of array behavior and is also used for phased-array observations. It works on "channel zero" of spectral line observations as well as on continuum data. A side-effect of this is that pointing and delays may be checked in spectral line as well as continuum modes.

3. The new on-line system no longer imposes a limit on the maximum baseline-channel product. For narrow bandwidths, 512 channels will be available on all 351 baselines with 20 second integrations. Because of limited postprocessing resources, the scheduling committee will continue to impose limits on the use of the spectral line capability.

The speed of the filling process will dictate the on-line averaging time that can be used. Because of the archaic architecture of the DEC-10, i.e., a small address space, averaging of spectral line observations of the full array with more than 128 channels is impossible. The current filler program will fill this amount of data with 20 second integrations in about real time.

The first goal after the new system is installed is to make available a reasonable subset of the full correlator flexibility. We intend by April 1, 1988 to have available the multiple IF correlator modes as well as the full polarization modes. Note that "full polarization" means all Stokes parameters for either AC or BD IFs, but not both pairs. We intend to allow multiple spectral line subarrays, but may initially restrict them all to the same bandwidth. It is not our intent, in the foreseeable future, to allow simultaneous line and continuum observing.

Some of our longer term goals are better on-line data flagging, calibration application to non-calibrators, and attempts to ease some of the pain of solar observing. The VLA on-line system will continue to improve and evolve. Suggestions, complaints, and comments are always welcome. To a large extent priorities are governed by the wishes of the community of users.

G. Hunt and K. Sowinski

RESTRICTIONS ON NUMBERS OF CHANNELS WITH NEW MODCOMP SYSTEM

With the beginning of 1988, the new Modcomp system will be on-line with the greatly increased capability of using the full number of channels (although in early 1988 it will still process only one IF per baseline). This is a potential data throughput increase of a factor exceeding 20 for some observations. To keep data reduction requirements to a level which might be satisfiable with present computer resources, we are imposing a restriction on allowable integration times.

This policy still allows substantial advances in scientific capability without a total breakdown in NRAO's processing situation. When the additional resources requested in the new NSF proposal "Array Telescope Computing Plan" become available, we will be able to remove these restrictions. It will also be possible to provide some relief in those cases where adequate non-NRAO resources are committed to a project.

The following limits on integration times should not be exceeded without prior permission from the VLA management. Table 1 assumes all antennas in use. In the unlikely event that the observer chooses to trade number of antennas for integration time, Table 2 shows how this trade-off is to be made. It gives the number of permitted antennas versus the number of channels and the integration time.

Table 1. Minimum integration time as a function of the number of recorded channels, all antennas in use.

Recorded Channels	Min Integration Time
8	5 sec
16	7 sec
32	15 sec
64	60 sec = 1 min
128	120 sec = 2 min
256	240 sec = 4 min
512	480 sec = 8 min

Smaller integration times may be used for calibrators; one-third the duration is reasonable.

Table 2. Number of antennas permitted as a function of number of channels and integration time.

Channels \ Integration Time	3	5	7	10	15	20	30	40	60	80	120
Continuum	22	all	all	all	all	all	all	all	all	all	all
8	18	22	all	all	all	all	all	all	all	all	all
16	13	16	18	22	all	all	all	all	all	all	all
32	8	11	14	16	18	22	all	all	all	all	all
64	7	8	10	11	14	16	18	22	all	all	all
128	5	6	7	8	10	11	14	16	18	22	all
256	3	4	5	6	7	8	10	11	14	16	18
512	3	3	4	4	5	6	7	8	10	11	14

R. Ekers and B. Clark

SCHEDULING BY CONFIGURATION

Beginning in the last half of 1988, the VLA will be scheduled on a trimester basis instead of the current quarterly system. The change will have the desirable effects of synchronizing the trimesters with the duration of any given telescope configuration and minimizing the enormous administrative burden that the scheduling process for approximately 600 annual proposals entails. Additionally, the scheduling committee will be able to provide more uniform treatment of all proposals for a given configuration since their review will no longer artificially straddle two quarters.

IMPORTANT NOTE: Once rejected, single configuration proposals will not be retained for future consideration on the same configuration when it recycles 16 months later. Proposals will still be refereed as they are received, regardless of configuration, however. Proposers who submit their requests one configuration early may still get referee feedback in time to modify their requests.

Proposal due dates will fall at four month intervals with occasional shifts to keep in step with the VLA configuration changes. The next few proposal due dates are given below. (The first three lines of the table follow the current quarterly system.)

Proposal Due Date	Configuration	Dates of Observation
December 15, 1987	C, C/D, D	April, May, June - 1988
March 15, 1988	D	July, August, September - 1988
June 15, 1988	D→A, A	October, November, December - 1988 - January - 1989
October 15, 1988	A/B, B, B/C	February, March, April, May - 1989
February 15, 1989	C, C/D	June, July, August, September - 1989
June 15, 1989	D	October, November, December - 1989
October 15, 1989	D→A, A	January, February, March, April - 1990
February 15, 1990	A/B, B, B/C	May, June, July, August - 1990

R. Ekers and B. Clark

MOSAICKING UPDATE

The mosaicking technique for imaging objects comparable in size to or larger than the primary beam of an interferometer has become both better understood and better supported since its announcement in the April 1, 1986 Newsletter.

The basic observing strategy requires fully sampling the primary beam over the object of interest, i.e., roughly two samples per FWHM in both dimensions. This degree of sampling results in uniform sensitivity over the sampled area and roughly root 3 better sensitivity than for each individual pointing (except for edge effects). To obtain the best possible u,v coverage for each pointing requires fairly rapid cycling between the different pointing centers. A four minute scan length seems to be a reasonable compromise between optimizing coverage and minimizing move time.

Reduction strategies will depend to some extent on the application. Incomplete knowledge of and azimuthal asymmetries in the VLA primary beam, as well as pointing errors, limit the dynamic range of a simultaneous deconvolution of multiple pointings (via the AIPS task VTESS) because of apparent inconsistencies between them. At 20 cm wavelength, this limiting dynamic range is about 100:1. Thus, for low dynamic range continuum or spectral line problems, direct reconstruction with VTESS, including optimally appropriate total power data, is sufficient. If higher dynamic range is required (or if the simultaneous deconvolution problem is unmanageable), it is necessary to split the reconstruction problem into two pieces. To fully extract the short spacing information from the interferometer mosaic, it is necessary to deconvolve these data simultaneously (using VTESS). On the other hand, the high resolution information can be reasonably reconstructed from each pointing independently since the additional u,v coverage provided by the mosaic is a less significant fraction of the spacing between u,v tracks. A heavily tapered version of the data can then be reconstructed with the VTESS algorithm, while each pointing is individually deconvolved (if necessary) at full resolution. The full resolution images are then placed onto a common grid with (the AIPS task) HGEOM and then combined in a linear mosaic (with appropriate primary beam and rms noise weighing) with the new AIPS task LTESS. Finally, the low and full resolution mosaics are merged with the new AIPS task IMERG, which extracts the short u,v spacings from one image, normalizes within a u,v annulus, and combines these with long u,v spacings from the other image. The mosaicking tasks VTESS, STESS, and LTESS now all support up to 55 simultaneous pointings, although local disk space and CPU limitations may dictate what lies in the realm of practicality.

Testing of low resolution mosaics (MMA Memo 43) indicates that with current knowledge of the VLA primary beam accurate reconstruction of baselines as short as about 15 m is possible, with decreasing but finite sensitivity to even shorter baselines. This implies that additional, accurate total power measurements with a modest sized single dish (of order 25 m diameter) should suffice to allow imaging of arbitrary sized objects.

For more information or advice, contact Robert Braun or Tim Cornwell.

R. Braun and T. Cornwell

THE LOW FREQUENCY CUTOFF AT L BAND

Contrary to what has been advertised in the past, it is possible to get useful spectral line data at frequencies as low as 1260 MHz. Down to 1300 MHz the system is almost as good as at 1400 MHz; below that the sensitivity slowly goes down. At 1230 MHz the sensitivity has decreased by a factor two. At some frequencies there might be interference, but this is not a major problem in A and B array. For more information, contact D. Bagri or me.

Jacqueline van Gorkom

SYNTHESIS IMAGING WORKSHOP

The next Synthesis Imaging Workshop will be held in Socorro from Wednesday, June 15 to Wednesday, June 22, 1988. Blocks of dormitory rooms at New Mexico Tech have been reserved for this time period. The first half-week will concentrate on basics, and closely follow previous Synthesis Imaging Workshops, while the second half-week will concentrate on current problems in synthesis imaging. Details will be announced early in the new year.

Rick Perley

RECENT VLA MEMORANDA

The following VLA numbered memoranda have been issued since last reported in this Newsletter:

VLA Computer Memorandum No. 177, "Voyager Considerations for the VLA On-Line System" (G. Hunt/K. Sowinski) September 1987. (Note: This memo did not receive general distribution since it is VLA-specific and not of general interest.)

VLA Test Memorandum No. 150, "GLONASS-Observations I" (J. Carter) December 1987.

VLA Test Memorandum No. 151, "GLONASS-Observations II" (J. Carter) December 1987.

Copies of VLA numbered memoranda or a copy of the listings of all VLA numbered memoranda are available from Alison Patrick at the VLA, P.O. Box 0, Socorro, NM 87801 505 772-4240.

Alison Patrick

12-Meter

EIGHT BEAM RECEIVER TESTS

The eight-beam, 230 GHz receiver is nearly completed. All eight channels in the 2 by 4 array are functional. The array can be rotated to any orientation by a servo-controlled positioner. An eight-channel continuum backend built around a PC has been developed. The components yet to be completed are the phase lock system and the computer control of the beam rotator. Release of the receiver for spectral line use awaits the completion of the hybrid spectrometer, which should occur by mid-1988.

In mid-December, we conducted telescope tests of the eight-beam receiver in continuum mode. The beams were well-shaped Gaussians and were separated by about 80" as designed. More telescope tests are planned for the late spring.

D. T. Emerson, J. M. Payne, and P. R. Jewell

200-360 GHz RECEIVER

Two new pairs of mini-dewars have been added to the 1 mm receiver so that it now covers the frequency ranges 200-310 GHz and 330-360 GHz. The receiver now consists of four pairs of mixer sets covering 200-240 GHz, 240-270 GHz, 270-310 GHz, and 330-360 GHz, respectively. Three of the sets can be kept cold at a time. Each set consists of two orthogonal linear polarization channels. A change between mixer sets that are cold can be done in about a half hour. Heat switches have been installed on two pairs of the dewar stations that allow the dewars to be removed without warming up the other dewars. It takes three to five hours to cool a mini-dewar set after it has been attached to the main dewar.

J. M. Payne

HIGH FREQUENCY SCHEDULING

This observing season, we are trying a new scheduling procedure for observations in the 330-360 GHz band. Observations in this band can only be scheduled during the winter months, and even then, are more prone to weather difficulties than lower frequency observations. Under normal scheduling procedures, observers in this band who experience bad weather and resubmit their proposals would have to wait an entire year before their proposals could be considered for rescheduling. To help alleviate this problem, we are reserving a small block of time toward the end of the high frequency season to reschedule, in part, those high frequency proposals that are "weathered out." Up to 50 percent of the original time allocation could be rescheduled. Observers wishing to apply for this makeup time should send their requests to the Tucson Site Director. Any time in the reserve block that is not needed for high frequency makeup time will go to lower frequency proposals. Note that this policy applies to observations in the 330-360 GHz band only. Observers at lower frequencies that experience bad weather must still reapply through the normal refereeing system.

During the high frequency season weather conditions are sometimes unsuitable for high frequency observations but acceptable for lower frequency observations. This season, we are requiring high frequency observers to submit a low frequency backup program to the Tucson Site Director. This backup program will not be refereed, but will be checked for conflicts with other programs in the proposal queue.

P. R. Jewell

EDITOR NRAO NEWSLETTER
NATIONAL RADIO ASTRONOMY OBSERVATORY
EDGEMONT ROAD
CHARLOTTESVILLE, VA 22903-2475 USA

RETURN POSTAGE GUARANTEED

NON - PROFIT ORG.
U.S. POSTAGE PAID
PERMIT # 373
CHARLOTTESVILLE, VA

To:

DATED MATERIAL - DO NOT DELAY