NRAO NEWSLETTER

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http://www.cv.nrao.edu/html/newsletter/

GREEN BANK

Green Bank Telescope

Antenna Structure — Construction of the GBT is moving ahead steadily, taking advantage of the recent good weather at the site. One half of the 22 modules that make up the backup structure are now in place on the elevation box. Inter-module welding on the structure is keeping pace as new modules are added. Only six modules remain to be moved out of their trial assembly position. The other five have already been moved to a position that the large derrick can reach for lifting onto the elevation structure.

The initial photogrammetric measurement of the subreflector surface has been completed. The overall surface error of the 158 measured points was 0.0138" RMS, which is in close agreement with CRSI's initial estimate of 0.014" RMS, based on theodolite measurements. Corrections for each of the adjustment points were computed and the adjustments have been completed. The expected subreflector panel accuracy is 0.004" RMS or less.

The truss work which holds the feed arm vertex platform has been fabricated and trial erected on the ground. This will be lifted into place on the horizontal feed arm in one lift. Also, the frame work that makes up the vertical cable wrap is now in place. The electricians have completed much of the wiring in the servo cabinets for the azimuth and elevation drives.

Servo – Tests of the feedarm servo have demonstrated that the system presently does not meet the velocity specification for some trajectories. NRAO staff is working in conjunction with CRSI/PCD to solve the problem.

A testing program continues to exercise all components of the feed arm servo on a weekly basis. Junction box interiors are inspected monthly for traces of moisture, following replacement of ineffective seals.

Metrology — *Production*: Machine shop work on the instrument bases was completed in mid-November. The twenty-two base castings were then delivered to the vendor for anodizing. Custom stainless steel tooling balls for the mounts have been received, which completes the parts needed to assemble the instruments. A major program to assemble and calibrate 20 production instruments and spares has begun. An agreement has been reached with The University of Arizona on reworking the spherical retroreflectors which were returned to The Optical Sciences Center in mid-November.

Experimental Work: Additional RFI testing was conducted on the oscillator boxes. The 1500 MHz leakage was just above the detection threshold in the anechoic chamber. All of the instruments were moved from the GBT to the 140 Foot Telescope and tested in mid-November. About the same time, experiments with four instruments and three spherical retroreflectors were conducted at the 140 Foot Telescope. These experiments should provide sufficient data to test data analysis software. Then the instruments will be moved back to the GBT for the performance measurements program and refractometer baseline experiments.

Performance Measurements Program: A rare and no longer manufactured autocollimating prism (Wild GAP1), required to set the elevation bearing retroreflectors as well as other calibration measurements, has been located and a rental agreement has been reached.

Monitor and Control — The M&C group welcomes Arno Granados to its number. After familiarization with the M&C system, Arno will work initially on bringing the software controllers for the holography and DCR backends into shape for inclusion in the new release.

Progress on release 2.7 of the M&C software continues. More libraries were checklisted for better compliance with coding standards and to fix outstanding bugs.

For development of the graphical user interface (GUI) for use by operators and engineers, tcl/tk was selected. A GBT memo outlining this decision will be available shortly. Specifications for enhancements to the GUI builder are being developed.

Electronics — *Atmospheric Monitoring System*: The tipping radiometer to monitor the atmospheric opacity at 3 mm has been completed and tested. Users can look forward to seeing this data on the WWW in the near future. Initial results are consistent with expectations—a satisfying fraction of the time the opacity is 0.1 or better.

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[Contact Joanne Nance at jnance@nrao edu, if you wish to receive mailings of the Newsletter.]

Quadrant Detector III: After taking data for several days, it was realized that the system was temperature sensitive. The power supply and modulation circuit have been placed inside a temperature-controlled box and tests have resumed.

Accelerometers: Accelerometer data was recorded while the subreflector was being moved plus or minus one centimeter at rates of 0.4 Hz to 1.1 Hz. Fred Schwab will analyze this data to determine the amount of motion induced in the feed arm, to which the subreflector is mounted. This test is clearly preliminary, as only the top end of the feed arm has been assembled and used in this test.

Communications: The operations group has proposed video, telephone, and intercom systems for telescope communications using fiber between the control room and the antenna. A search for potential system vendors is underway.

Weather Station: The weather station that will eventually go to the GBT was moved from the interferometer to Laser Station 10 at the 140 Foot Telescope. The station was installed and connected to the 140 Foot control room via fiber optic cable. It was then recalibrated.

Receivers: Progress has been made on various receivers. In particular, the C band receiver was reinstalled at the 140 Foot Telescope in early November, and except for short episodes of warming on the 15K stage of the dewar, no problems have been noted. The warming was caused by contamination in the helium supply. An attempt will be made to eliminate this problem by installing a filter. The L band receiver was cooled in preparation for polarization calibration, noise temperature measurement, and vacuum leak check. The K band receiver has now been running cold for 7.5 months. VSWR and radiation pattern measurements were performed on the 450 MHz prototype.

Short Back Fire Antenna (SBFA): A second prototype SBFA with a conical reflector has been designed in an attempt to increase pattern bandwidth.

LO Reference Distribution System: Construction of a 5 MHz distributor module has been completed.

S.C. Smith, G.C. Hunt, T. Weadon, D.H. Parker and R.J. Lacasse

Green Bank Telescope - Changes in Appointments

We are pleased to report a number of changes in positions of responsibility in the Green Bank Telescope Project that have taken place since the last Newsletter. Mark McKinnon has replaced Roger Norrod as Deputy Project Manager for NRAO Systems, allowing Roger to devote more time to GBT engineering tasks. Mark has also been appointed as deputy site director with the responsibility for GBT commissioning. The software effort associated with the GBT has been reorganized with Gareth Hunt assuming responsibility for managing all GBT computing. The activity headed by David Hogg as coordinator for GBT pointing systems has been subsumed into Gareth's area of responsibility, although David will continue as a consultant as needed. This move will free time for him to work with the team preparing AUI/NRAO's case for upcoming arbitration proceedings. (We have been unable to reach a negotiated settlement of the claims submitted by the GBT contractor and these have now been submitted to binding arbitration.) After two years of outstanding service, Harvey Liszt resigned as Project Scientist and has been replaced by Jim Condon. Harvey will continue to lead the Single Dish AIPS++ effort, and is in addition a member of the arbitration case preparation team. Finally, David Heeschen is leading the in-house effort to assemble our arbitration defense. We want to thank all those who have relinquished responsibilities for the contributions they made, and to express our appreciation to all those continuing or assuming new responsibilities for their willingness to do so.

R.D. Hall and P. A. Vanden Bout

First Science and Commissioning Workshop for the Green Bank Telescope

The GBT is a fully steerable 100 m telescope with an unblocked aperture which is scheduled to become operational early in 1999. At first it will be useable at wavelengths > 2 cm, but active control of the telescope surface and pointing should lead to operation at 7 mm or even 3 mm.

A two-part workshop sharply focused on the first observations to be made with the GBT will take place in Green Bank from 1998 July 27 through 29. At least two days will be devoted to astronomical observations with the GBT, and part of the third day will cover telescope commissioning.

The workshop will begin with a tour of the GBT and status reports on the antenna, receivers, backends, software, and operations. Potential users are encouraged to discuss their planned observations, present the scientific rationale for them, describe their technical requirements, and suggest improvements in NRAO support. Groups of observers with common interests in large programs which can be scheduled immediately after commissioning (e.g., HI or pulsar surveys) may wish to meet and plan joint proposals.

Some astronomers have also expressed an interest in the GBT commissioning observations. The third day of the workshop will cover the observations and measurements needed to characterize and improve the astronomical performance of the GBT.

All potential users of the GBT are invited to attend, although attendance may be limited by the available facilities. There is no registration fee, and the NRAO will provide free room and board in Green Bank. Limited travel support may be available. Additional information about the workshop will appear on the GBT home page: http://www.gb.nrao.edu/GBT/GBT.html

J.C. Condon

140 Foot Telescope Availability in 1998

As noted in earlier Newsletters, the 140 Foot Telescope will continue to be operated as a visitor facility through much of 1998. All the prime focus receivers will be available covering frequencies from 50 MHz to 5 GHz, as well as Cassegrain receivers for 5 GHz, 8-10 GHz and 18.0-26.5 GHz. VLBI observations using either VLBA or S2 recorders can be made with all receivers except the 8-10 GHz. Dana Balser (dbalser@nrao.edu) can be contacted for more detailed information about general systems availability and for spectrosopy, while Frank Ghigo (fghigo@nrao.edu) handles scheduling and VLBI. We will try to keep the Front-End status sheet that is available on the web as current as possible.

Those who submitted proposals in November will be notified of their status in early January 1998. A final deadline for new proposals is March 30, 1998. As the GBT is expected to be near completion in late 1998, there will be a period of transition as some equipment now at the 140 Foot is moved. Detailed information on the phase-out of the 140 Foot will be placed on the web site as soon as it is known.

F.J. Lockman

Web-Based Reservations for Green Bank Residence Hall

Visitors to Green Bank can now make room reservations and some travel arrangments over the Internet. Just go to the Green Bank home page (www.gb.nrao.edu) and select "Visitors." Reservations will be confirmed by email. All the required information is on the form; however, you can still call Becky Warner (304-456-2227) for further assistance. Maps of routes to Green Bank are also available on the web. We encourage your comments or suggestions of other information that would useful to our visitors.

After some remodeling in our Residence Hall, we now have two "quiet" rooms for visiting observers. These rooms are particularly suitable for visitors using the telescope at night and sleeping during the day. If you have any comments or questions about your visit to Green Bank, please give Becky a call.

R.A. Warner

IN GENERAL

Millimeter Array

We are very pleased to report that the fiscal year 1998 appropriation for the NSF that was approved by Congress and signed by the President includes funding for the initial 3-year design and prototyping phase of the Millimeter Array. With initiation of the MMA project, all of the Large Programs recommended by the Bahcall Committee Report for astronomy in the decade of the 1990s have been approved and funded by NASA or NSF. The U.S. community can take a large measure of pride in this achievement as it is a tangible endorsement of the effectiveness of our decadal review and prioritization process. It serves astronomy well.

In 1998 serious prototyping of all the MMA instrumentation will begin. Indeed, there are paper designs of much of that instrumentation already and the next step is to validate the performance of those designs with prototype hardware. This same prototyping process will provide the basis for a sound cost estimate to be made for the entire MMA project. For a synthesis array telescope such as the MMA which is comprised of multiple identical elements, a prototyping phase to initiate the construction project is an appropriate and well-suited project management approach. The specific prototyping plans for the MMA will be presented to a NSF Project Review Committee in February; their endorsement will be the basis for a recommendation to the National Science Board meeting in May at which we hope to receive approval for the MMA spending plan.

Meanwhile, considerable progress has also been made in pursuit of international partnerships for the MMA. The report of the joint MMA/LSA antenna working group provides a sound and consistent basis on which the antenna costs for a common array can be evaluated. The dialog between the LSA and MMA science working groups helped clarify issues of agreement between the two communities and issues requiring further analysis. With these reports and analysis as background, the possibility for a collaboration with the LSA was considered by the MMA Advisory Committee (MAC) at the annual MAC meeting held this year in Chicago on November 15. The report of the MAC is given below by the committee Chair, Ed Churchwell. Finally, with all of this as input, a still broader meeting was held in December with participants from Europe, the U.S. and Japan present. Ideas were exchanged for how the efforts of all three groups could be combined to the greatest mutual benefit; these discussions will continue on a regular basis.

With the encouragement of the MAC we are working with the LSA group in an attempt to define a common project that would be agreeable to both sides and to define a management structure that would enable the expertise on both sides of the Atlantic to be brought into that project. There are many possible approaches to study, the analysis of which will take some time. We expect the process to converge. While that process is in progress it is essential that the MMA project meet the milestones of our stand-alone project yet keep open the expectation that collaboration with the LSA and perhaps the Japanese LMSA groups will come to fruition in a reasonably short time. I believe this can be done in a manner that keeps the MMA on schedule should the current partnership initiatives fail and yet builds constructively toward the partnership that the MAC, the MDC and all of us hope can be forged.

R.L. Brown

Report of the Millimeter Array Advisory Committee

On November 15, 1997 the Millimeter Array Advisory Committee (MAC) met in Chicago with representatives from NRAO to discuss technical and scientific issues raised by the proposed 50/50 merger of the Large Southern Array (LSA) planned by European astronomers with the Millimeter Array (MMA) planned by US astronomers. Thirteen members of the

MAC were present for the meeting: J Bieging, G. Blake, J. Carlstrom, E. Churchwell (Chair), N. Erickson, N. Evans, R. Hills, J. Knapp, J. Moran, L. Rodriguez, J. Turner, E. van Dishoeck, E. Wilcots. Based on a combination of MMA memos, MDC working group reports, and other presentations at this meeting, the MAC made the following recommendations:

1) We strongly and unanimously recommend collaboration with the Europeans.

2) We recommend against a heterogeneous array.

3) We unanimously recommend that NRAO and the European partners focus a design effort on a dish of 12 m diameter, giving careful consideration to the use of active metrology to achieve the surface accuracy (25 microns rms) and pointing (1/30 of the primary beam at 300 GHz) specifications. On a time scale of about six months the results, with both passive and active metrology, should be reviewed by the MAC and other relevant groups (MDC, European committees) to decide if the 12 m design is acceptable.

4) We believe that the "fall-back" issue should not dominate discussion about dish size.

5) We recommend keeping options open regarding a potential cooperation or collaboration with the Japanese LMSA project as well as the potential incorporation of other international associate partners.

6) The MAC recommends that anomalous atmospheric refraction not be included in the pointing error budget of antenna designs.

7) In the context of an international partnership, attention needs to be focused on defining the management structure of the MMA/LSA project. The MAC particularly recommends establishment of a single international advisory committee, with balanced representation of the various disciplines within astronomy, that would advise the combined MMA/LSA management.

8) The MDC has played and continues to play a critical role in the development of the MMA project and we recommend that this important group, with its wide range of experience and expertise, continue to be an integral part of this project, whether it is internationalized or not.

9) We recommend that an international meeting be held sometime within the next 12 to 18 months. The collaboration and antenna design issues should be clearer before the workshop is held. Issues like the configurations, receiver suite, etc., should still be open to discussion and the antenna design and institutional arrangements should be reviewed. This meeting should include a meeting of the international advisory committee, but it may also involve a larger group.

10) We strongly recommend that software design and development for the MMA/LSA be placed on an equal footing with receivers, antennas, electronics, etc. As with the other groups, it should have a timeline and be periodically reviewed to determine if the timeline is being adhered to.

11) Finally, we commend NRAO on its willingness to pursue this collaboration and the efforts of those working to make it a reality.

Committee remarks that expand on these recommendations can be found accompanying the full text of the committee report that is on the MMA WWW pages under *MMA Meetings* that can be accessed via the NRAO home page.

Ed Churchwell (MAC Chair)

AIPS++

As mentioned in the last Newsletter, the second beta release was made in mid September. Since then a number of beta testers both inside and outside NRAO have used the system and provided some feedback. However, we believe that much more feedback will have to await further changes in both functionality (particularly in the synthesis applications) and interfaces (where a graphical used interface is being developed). Our schedule calls for a further beta release in early spring followed by the first limited public release in early summer.

To improve our documentation, we now have a technical writer on board, Kate Weatherall, who is shared equally between AIPS++ and the MMA. As part of an initiative to increase knowledge of our activities, we expect to issue a monthly email newsletter shortly. This will be edited jointly by Kate and Bob Hjellming. This will be HTML-based and will provide information on latest developments as well as links into our web-based documentation tree.

As part of a collaboration with NCSA, we have started development of parallelized code within AIPS++. While this work is primarily targeted for massively parallel computers, it should also benefit inexpensive systems with a small number of processors. If networking speeds are sufficient, we will allow transparent access of NCSA hardware from Charlottesville and the AOC. The first parallel applications will be available for the first limited public release.

T J. Cornwell

VLBA/VLBI

Space VLBI: VSOP Progress at The AOC

The VLBA correlator has completed 35 Space VLBI observations, made through the end of November 1997, with the VSOP mission's HALCA spacecraft. Twenty of these were General Observing Time (GOT) scientific observations, of which twelve also used the VLBA and eight had EVN-only ground arrays. The proportion of science to tests has increased markedly since the first scientific observations last July, with 16 GOT experiments among the 20 occurring since the beginning of September. The total of 35 programs spanned about 370 hours of HALCA observations, and 3870 ground-space baseline-hours.

Four of the five tracking stations now have compiled a fairly solid record of reliability. Tracking passes no longer fail for unexplained reasons. Occasional failures due to hardware faults or adverse weather conditions are being detected by tracking station personnel, who usually also provide the first notification of failures on the spacecraft, typically resulting from scheduling faults or mispointing of the data link antenna. The previous large constant delay offsets have been removed, and recent progress has aroused some hope of eliminating the delay instabilities currently exhibited by two of these stations at the level of a few hundred nanoseconds. These four tracking stations now are substantially more reliable, in terms of both recording quality and ancillary data, than many of the ground telescopes involved in the global ground arrays which have become nearly universal in VSOP observations. There also has been some recent encouraging progress in producing an accurate "time correction file," the principal obstacle to using the remaining tracking station.

These developments have made possible several major steps toward integrating VSOP observations into normal VLBA operations, with a goal of completing this process by February 12, 1998, the first anniversary of HALCA's launch. First, we are no longer loading and examining all these observations in AIPS, but instead are using a specialized version of the "sniffer" software routinely used to validate ground-based VLBA observations. Occasional apparent anomalies will continue to be diagnosed using AIPS, just as is done with ground-based data. And as part of our continuing development of Space VLBI data analysis techniques, selected observations still will be carried through the entire process for test purposes.

Secondly, the standard delay and rate windows for VSOP observations have been narrowed—and will be narrowed further if the delay instabilities can be cured. Despite this improvement, these windows probably always will produce uncomfortably large data sets for many computer systems, even at the minimum widths corresponding to the orbit reconstruction specifications.

Experience with VSOP observations led to a number of revisions in AIPS, included in the 15OCT97 release. It is strongly recommended that any site where AIPS is used to analyze VSOP data upgrade to this version. UVFIX can now recalculate (u,v,w) coordinates for an orbiting antenna. A new version of COHER has been written to estimate coherence times prior to fringe-fitting. INDXR now accepts a list of times at which scans must be broken, so that AIPS programs do not average or produce solutions for intervals in which tracking-station clocks were reset. And hard restrictions on the size of the residual delay-rate space that may be searched have been removed in BLING.

VSOP investigators based at U.S. institutions are reminded that assistance in analyzing their data is available at our Space VLBI User Support facility. Reservations for the Silicon Graphics computer system (described in NRAO Newsletter No. 71) may be requested by indicating data type "VSOP" on the NRAO/Socorro Visitor Registration form. For an introductory period, the NRAO Space VLBI Project will also pay the $150 deductible of the NSF-sponsored transportation reimbursement.

J. D. Romney

VLBA Developments

Summarized below are major VLBA developments, during the second half of 1997, of potential interest to Array and Correlator users. For further information, please contact the undersigned or those identified with specific topics. Recent Space VLBI developments are summarized elsewhere in this Newsletter.

VLBI at the VLA: Hardware and software upgrades, done during August, permit complete computer control of the VLBI signal path and a simple one-to-one mapping of VLA to VLBA IFs. A new 1 cm system was installed on VLA antenna 9 in September. Its receiver temperature is about 30 K, roughly half that of the best VLBA receiver at 1 cm. In September,

VLA antenna 9 became the default for single-antenna VLBI at all wavelengths except 7 mm (antenna 9 lacks a 7 mm receiver). [Contact - G. Taylor]

Instrumentation Tapes: Thick (26 microns) tapes were not accepted for correlation after September. Many foreign stations were very successful in changing over to using thin (16 microns) tapes.

Correlator Output Data Rate: Version 4.19 of the Correlator software was tested by AOC staff during August and September and released for general use in October. With version 4.19, the Correlator's maximum output data rate increased from 350 to 500 kB/s, thereby achieving the design specification. Output file sizes were increased, so even at the higher data rates there should be less fractionation of users' output into numerous small files. Data correlated with software version 4.19 must be loaded with task FITLD from the AIPS release of 15APR97 or later.

Postpassing Speed: Postpassing instrumentation tapes can reduce tape damage but takes time. Recent tests showed satisfactory postpass results at the rewind speed of 330 ips, faster than the 160 ips used previously. Postpassing at 330 ips was implemented on the Array in November and on the Correlator with software version 4.19. [Contact - G. Peck]

Three Millimeters: Testing of the PT 3 mm system is continuing. PT participated successfully in a number of CMVA runs during 1997. Installation of the second receiver at LA is expected in January 1998. Recent tests of LO purity in the VLBA signal path indicate that no significant coherence losses should be expected at 3 mm. [Contact - V. Dhawan]

Documentation: "The SCHED User Manual" was updated and the "OK-Modes" list now includes validated Mark 4 modes; these VLBA documents can be accessed from the NRAO home page. "VLBI at the VLA" was revised substantially; this VLA document can be accessed from the NRAO home page.

In Progress: During the next few months, AOC staff will continue to test automatic tape allocation (see the following article), pulsar gating, calibration transfer, and 512 Mbps. A project also is underway to rebuild the operations software using Object-Oriented Java.

A.J. Beasley and J.M. Wrobel

Use of Tape Autoallocation on the VLBA

The original VLBA design concept was that observers would schedule the array without having to take cognizance of the actual tape motions; the observer would specify the sources to observe, and the observatory would somehow arrange to have tape available to be written when the time came. Instead, partly because the VLBA correlator was completed later than the antennas, it was easier to adopt the Mark III model, in which a tape is mounted on a transport for a particular project, and the observer of that project decided how to use the tape area to their advantage.

This is proving to be a limitation on the scheduling of the VLBA, and, in particular, tends to prevent us from scheduling short projects. Since the stations are not continuously manned, and since the array spans seven time zones, it is not practical to mount a tape for a short project and then have it removed and a new tape mounted for an immediately following project.

We are taking the first steps toward removing this limitation. The station software has the capability of keeping track of what tape has been used at each station, and allocating tape as requested by the observer. This software is being extensively used in a test mode now, and we expect it to become the standard observing mode by early next spring. Observers will be requested to put "autoallocate=1" (suitable for phase referencing observations, or others with short scans) or "autoallocate=2" in their observe files.

Having this system working smoothly is one of two prerequisites for being able to schedule short observations. The second is a software system for keeping track of the correlation status of all projects on a tape, to ensure that the tape is not erased before all have been correlated. This is coming as part of a major rewrite of the general correlator bookkeeping system, which is currently quite cumbersome. It is anticipated that these software prerequisites will be available sometime this summer.

As a longer term goal, the original VLBA concept also included the idea of dynamic scheduling, in which the scheduling of the VLBA should be decided only hours in advance. This would ensure, in a fairly automatic fashion, that observations would not be scheduled if stations they needed were not available, and would make the system more flexibly respond to targets of opportunity. There are as yet no firm plans for implementing this mode, but we shall shortly add to the VLBA cover sheet an item requesting the proposer to tell us if the project is suitable for dynamic scheduling.

B.G. Clark

VLBI Network Call for Proposals

Proposals for VLBI Global Network observing are handled by the NRAO. Global network sessions currently planned are:

Date	Bands	Proposals Due
11 Feb to 04 Mar 1998	1.3 cm, 6 cm, 18 cm, other?	01 Oct 1997
27 May to 10 Jun 1998	1.3 cm?, 6 cm, 18 cm, 3.6 cm?	01 Oct 1997
09 Sep to 30 Sep 1998	1.3 cm?, 6 cm, 18 cm, other?	02 Feb 1998
11 Nov to 02 Dec 1998	1.3 cm?, 6 cm, 18 cm, 3.6 cm?	01 Jun 1998

It is expected that European VLBI observing during this year will be dominated by observations with the VSOP satellite.

It is recommended that proposers use a standard cover sheet 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, AOC, 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 even 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 Network proposals, send proposals to:

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

Proposals also may be submitted electronically, in Adobe Postscript format, to proposevn@hp.mpifr-bonn.mpg.de or propsoc@nrao.edu, respectively. Care should be taken to ensure that the Postscript files request the proper paper size.

B.G. Clark

VLA

VLA Upgrade Design Review Meeting Scheduled

On Monday and Tuesday, June 29 and 30, 1998, we will be hosting a scientific and technical meeting in Socorro to discuss the proposed VLA Upgrade plan. The choice of date has been made to follow the "Interferometry and Imaging" symposium. We invite all interested astronomers to participate.

This meeting will be critical in the development of a formal VLA Upgrade proposal. We are currently writing a "Design Document," which will include a great range of improvements and extensions to the current VLA's observing capability. Included in the document will be both cost and time estimates for implementation of the proposal. In preparing this plan, we have been guided by the directions given in the "VLA Development Plan," which was produced following a science workshop help in Socorro in January 1995.

We anticipate that by the middle of next year, we will have in hand a solid proposal for discussion by the scientific and technical community. There will be many choices to make, for it is likely that not all the improvements we are capable of designing will be both affordable or even desirable. In many cases, improvements in one capability cause degradation in another, and there will be tradeoffs to consider. And in some cases, the science goals may have changed significantly since the last workshop, so it will be useful to review these.

Our goals for this meeting are to present and critique the technical plan, to review the science potential in the upgrade, to modify the technical parts of the plan in the light of the science drivers, and to permit a ranking of the diverse parts of the upgrade plan as a guide to future development.

Implementation of any VLA Upgrade will require both a good plan and solid support from the observing community. This meeting will be an excellent opportunity to add your voice to the effort. If you are interested in attending, please contact Rick Perley, by mail, by telephone (505-835-7312), or by email (rperley@nrao.edu).

R. A. Perley and R. A. Sramek

VLA Configuration Schedule

Configuration	Starting date	Ending date	Proposal Deadline
D	31 Oct 1997	02 Feb 1998	2 Jun 1997
A	20 Feb 1998	01 Jun 1998	1 Oct 1997
BnA	12 Jun 1998	29 Jun 1998	2 Feb 1998
B	03 Jul 1998	21 Sep 1998	2 Feb 1998
CnB	02 Oct 1998	19 Oct 1998	1 Jun 1998
C	23 Oct 1998	11 Jan 1999	1 Jun 1998
DnC	22 Jan 1999	08 Feb 1999	1 Oct 1998

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 degree declination) and extreme northern sources (north of about 80 degree declination).

Approximate Long-Term Schedule

	Q1	Q2	Q3	Q4
1998	D,A	A	B	C
1999	D	D,A	A	B
2000	C	C,D	D	A
2001	B	B,C	C	D
2002	A	A,B	B	C

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 1998, the B configuration daytime will be about 8^h RA and the C configuration daytime will be about 16^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. The VLBA spends about half of available observing time in coordinated observations with other networks, with the scheduling dictated by those networks. In decreasing order of the time devoted to the observations, these are HALCA space VLBI, Combined Millimeter VLBI Array, geodetic arrays coordinated by GSFC, and Global astronomical VLBI with the EVN.

Any proposal requesting NRAO antennas and antennas from two or more institutions affiliated with the European VLBI network is a Global proposal and must be sent to the EVN scheduler as well as to the NRAO. VLBA proposals requesting only one EVN antenna, or requesting unaffiliated antennas, are handled on a bilateral basis; the proposal should be sent both to NRAO and to the operating institution of the other antenna requested. Coordination of observations with non-NRAO antennas, other than members of the EVN and the DSN, is the responsibility of the proposer

B G. Clark

AOC Computing Status

The copying of the VLA archive from 9-track tapes to Exabytes is steadily moving along. Just over two years of data from the mid eighties is all that remains to be reformatted and copied before the project is completed. We anticipate this to happen in the latter half of 1998.

Use of the archive and its catalog is on the rise, and a number of problem areas with the catalog have been pointed out to us. For instance, occasionally, visibility data in the archive do not have a counterpart in the catalog, and sometimes fields in the catalog contain erroneous information. These occurrences

are rare, but we encourage you to report any problem you experience in accessing the catalog. We need this feedback in order to unravel such bugs and make the catalog more robust and complete. As soon as all data have been moved from 9-track to Exabyte some time next year, we plan to spend a number of weeks completely rebuilding the catalog. We have had no complaints about the contents of the archive itself.

We further improved computer resources for visitors to the VLA site. We added a second workstation for use of the general observers at the site. This workstation, named puck, is located in the visitors' office on the second floor. The main visitors' station, miranda, which had been upgraded to a SPARCstation 20 earlier, received much more disk space. Visitors to the site are encouraged to make suggestions for further improvement.

We recently have begun testing Solaris 2.6 on one of the visitors' workstations at the AOC. One of its main advantages over previous versions is its support of file sizes greater than 2GB, which is gaining increased importance when accessing large datasets in AIPS from e.g., the VLBA.

The AOC's anonymous ftp server has been moved to a dedicated system (still accessed as ftp.aoc.nrao.edu) and now has considerably more space available to staff members and their collaborators. However, due to a minor security incident in November, we have had to revise our policy for access from outside NRAO. If you need to deposit files here for an NRAO colleague, you will now have to use the directory path pub/staff/account, where "account" is the person's first initial and up to seven letters of the last name. If this directory does not already exist, please contact your NRAO collaborator so they can arrange for it to be created with the proper access permissions.

The public-domain "ssh" package is now supported on all AOC Sun workstations and the SVLBI Silicon Graphics systems. "ssh" is a suite of encryption routines which prevent passwords and other information from being transmitted over the network in the clear, thus making connections immune to "sniffing." We encourage our user community to take advantage of this facility when doing remote logins to NRAO computers.

The AOC's general-purpose system, zia.aoc.nrao.edu, was upgraded in October from a 7-year-old Solbourne running SunOS 4.1.1 to a SPARCstation 20 running SunOS 5.5.1. NRAO's WWW home page moved to the new system as well (still accessible as www.nrao.edu). However, any Web-based interfaces to databases, such as the VLA archive, the library database, and the VLAIS system, had to be kept on the old computer, now known as oldzia.aoc.nrao.edu. We believe that all links in our web pages have been updated to reflect this change; please contact "webmaster@nrao.edu" if you find any that do not work. Any personal bookmarks pointing to these areas will have to be modified. Work is underway to move all database applications onto other platforms.

Jon Spargo, affectionately known as "Dr. Delete" to many of our visitors (due to the dedicated manner in which he removed old data from the public workstations in order to make them ready for new users), is now full-time safety officer for NRAO/New Mexico. His previous responsibility of assigning and organizing public workstation bookings has been taken over by the Data Analysts.

G. A. van Moorsel

1998 Synthesis Imaging Summer School

The Sixth Summer School in Synthesis Imaging will take place from Wednesday, June 17 through Tuesday, June 23 of 1998. The summer school will be hosted by the NRAO and New Mexico Tech and held in the new Workman Center on the Tech campus in Socorro, New Mexico. In addition to lectures covering all aspects of radio interferometry, data reduction tutorials on June 20 at the Array Operations Center (AOC) will allow attendees to get "hands-on" experience with data calibration and imaging for both VLA and VLBA data.

The timeline for the school is reproduced below. Further information, including the complete program, can be found at http://www.nrao.edu/~gtaylor/synth98.html. Electronic registration for the summer school is encouraged through this web page or via the form distributed in the last NRAO newsletter.

Important Dates for the 1998
Synthesis Imaging Summer School:

15 September 1997	First Announcement
1 February 1998	Early Registration Due
15 February 1998	Second Announcement (Participants)
15 May 1998	Early Registration Payment Deadline
1 June 1998	Contributions Due From Lecturers
17 June 1998	First Day of School
20 June 1998	Data Reduction Tutorial at AOC
21 June 1998	VLA Tour
23 June 1998	Last Day of School

G.B. Taylor and C.L. Carilli

12 METER

3 mm Array Receiver Development

Progress has been made on the initial phase of construction and testing of the four-beam 3 mm receiver. The following milestones have been achieved recently:

1. The receiver dewar and cryogenics system have been tested. Tests indicated that it will be possible to cool with eight SIS mixers, eight HEMTs, cold optics, cold LO tripler, and radiation loading from the four windows.

2. Two receiver inserts have been constructed, cooled, and tested.

3. A new 6-wire SIS mixer bias circuit has been designed and tested.

At present, tests continue on some of the optical and local oscillator components that are adding noise to the system. Construction is about to commence on the receiver frame, the warm optics, and the remaining receiver insert parts.

W.P. Shillue

12 Meter Participation in the Mars Global Surveyor Mission

Mars Global Surveyor (MGS), which entered Mars orbit on September 12, 1997, is an orbiter mission which will conduct, among other things, the first global mapping of the surface mineralogy and elevations, magnetic field measurements, and high/medium resolution imaging. During the next six months, Todd Clancy of the Space Science Institute and Brad Sandor of JPL will conduct observations of the martian CO absorption using the 12 Meter Telescope, which are being used to provide atmospheric sounding measurements of the martian atmosphere in support of the aerobraking maneuvers of the MGS orbiter. During these aerobraking maneuvers, MGS will dip into the upper atmosphere of Mars in order to circularize its orbit for mapping operations. Due to a problem with a damaged solar panel, MGS aerobraking is now being conducted at a 60 percent reduced intensity (i.e., at 117 km altitude versus 110 km, to accommodate the damaged solar panel). This change has lengthened the aerobraking schedule to a much longer period (now planned into late 1998).

12 Meter observations of the martian atmospheric CO absorption provide measurements of the dust heating of the lower martian atmosphere (0-50 km). These measurements will provide early warning to associated changes in the atmospheric densities to be encountered by the MGS orbiter. During the past several months, 12 Meter measurements of the CO 2-1 absorption from the martian atmosphere have produced the most accurate measurements of the pressure changes at an altitude of ~70 km. These measurements show a very good correlation with the density changes MGS has seen so far (up to +100%) at the aerobraking altitudes and above (110 km up to 170 km, when they backed off). Therefore, the 12 Meter measurements are now employed as a primary indicator of Mars atmospheric behavior for MGS aerobraking decisions.

Due to power consumption constraints, during the January through March 1998 conjunction period, the onboard instruments which measure the martian atmosphere will be turned off. This means that other than the real-time spacecraft acceleration (engineering) measurements, the only measurements of the martian atmospheric behavior will be those obtained at the 12 Meter. Since this period occurs during a season when large global dust storms are known to start up, the 12 Meter measurements will be of critical importance to the MGS mission during this period.

J.G. Mangum

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