NRAO NEWSLETTER

1 October 1999 No. 81

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

GREEN BANK

The Green Bank Telescope

The Antenna Structure - The tip of the Upper Feed Arm was raised on Tuesday, July 20, with attendance from many COMSAT and NRAO personnel. The topping-off was made with traditional ceremony, including the appropriate flags. The welding of the Upper Feed Arm was completed just one week later. On July 28, the antenna was moved in elevation from 96 degrees back down to the access position at 77.6 degrees, to continue the installation of the man lift up the arm and of the various platforms on the arm. Additional counterweights totaling nearly 200,000 pounds were put in place. This work was completed on August 12, and the antenna was rotated to the "birdbath" position at elevation 66 degrees, the attitude at which the surface panels will be installed. The accompanying figures show the GBT at this attitude.

With this milestone passed, the antenna structure is essentially complete. Work continues on details such as ladders and platforms. The grease in the main azimuth bearing has been flushed and the seal adjusted. The azimuth wheels are scheduled for alignment.

A number of the remaining tasks must await the installation of the panels. Included are such items as the final measurement of the surface using photogrammetry, alignment of the gear sectors in the regions of the elevation gear which have not yet been traversed, checkout and acceptance of the servo systems, and the painting of surfaces marred by welding during the erection of the structure.

The large S-70 derrick crane, a feature of the Green Bank skyline for many years, is no longer needed. The GBT was rotated in azimuth to get it out of the way of the disassembly of the S-70. One of the crawler cranes has been modified for use in the dismantling. The single-most difficult task, the lowering to the ground of the 250-foot boom of the S-70, has been completed. It is currently anticipated that the entire task will be finished by the end of October.

The Surface Panels - The manufacturing of the panels is continuing at the RSI facility in Sterling, Virginia. At the time of writing the manufacture of 1710 panels has been completed. After the panel surfaces have been measured on a Coordinate Measuring Machine (CMM) NRAO verifies the calculation of the rms for each panel, visually inspects selected panels, and witnesses a new set of CMM measurements on selected panels. A total of 1514 panels (76 percent of the total of 2004) from 30 tiers have passed the requirement of surface accuracy. The median rms manufacturing accuracy is 60 microns (2.4 mils); 93 percent of the panels have an rms of 75 microns or less, and no panel rms exceeds 100 microns (4 mils). The panels are then painted, and again inspected by NRAO to ensure that the thickness of the paint coat meets the spec for uniformity and adhesion. At this time, 951 panels have passed the paint inspection.

The panels are shipped to Green Bank in modified sea shipping containers, each of which holds between 14 and 20 panels, depending upon the panel size. COMSAT plans to use a total of 20 sea vans. The first van arrived in Green Bank during the week of July 12. As this is written 736 panels had reached Green Bank where they are kept in a temporary storage area near the GBT.

After the antenna was tipped to birdbath, the checking and alignment of the actuators was begun. COMSAT is using two metrologists, each with a total station. One instrument is applied to the alignment of the actuators which support the panels. In order to facilitate the installation of the panels, the actuators are being aligned to within 1/8 inch in each of the three coordinates. After the actuators are aligned to accord with the design parabola they are welded in anticipation of the placement of the panels. By mid-September, 702 actuators (32 percent of 2209 total) were positioned, and 572 of these had been welded.

The process of installing the panels is now underway. The second metrologist with a total station is supervising the positioning of the panels, but care must also be taken to ensure that the panel gaps are correct for the ambient temperature obtaining at the time of installation. A significant effort was devoted to the installation of the panels of the centrally located tier 26 since that tier is the key to the entire job. Once the placement of the panels of tier 26 was completed satisfactorily, the pace of installation began to accelerate. A total of 217 panels are now in place, some of which are illustrated in the accompanying photograph. When a number of tiers of panels have been installed, a crew will return to make a fine adjustment to the corners, so that the panels will be set with precision with respect to both the actuator and the adjacent panels. This process will use a panel setting tool developed at NRAO by David Parker and Tim Weadon.

R. D. Hall and D. E. Hogg

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[Contact Ernie Allen at eallen@nrao.edu, if you wish to receive mailings of the Newsletter.]

Green Bank Interferometer-NASA Radio Monitoring Program

The Green Bank Interferometer (GBI) is contributing to the study of galactic transients sources, such as GRS 1915+105 (See IAU Circular 7195, June 8, 1999). An X-ray flare in the cataclysmic variable star, GB Sgr, triggered a radio flare which was followed by both the VLA and GBI. (see IAU Circular 7254, Sept.16, 1999).

The GBI is a two telescope interferometer that operates simultaneously at 2.7 and 8.3 GHz. During the last two decades the GBI program has evolved from doing radio astrometry and interstellar scintillation towards X-ray binaries and X-ray active AGNs.

There are three categories of sources included in the GBI-NASA program. The highest priority is observations of both transient and persistent galactic X-ray and gamma-ray sources. The other two categories of sources are active stellar binary systems and extra galactic sources: AGN, blazars, etc. Among the prime sources are GRS1915+105, GRO J1655-40, Cyg X-3, Cyg X-1, GRS1716-249, SS433, and LSI+61 303. The observing program for GBI-NASA is expected to include typically about 20 sources in addition to those used for calibration and data quality checking. Preference will be given to radio sources proposed for high energy X-ray and gamma-ray simultaneous observations.

The GBI-NASA steering committee has adopted the policy that all GBI data will be made publicly available. Please see the web page http://www.gb.nrao.edu/fgdocs/gbint/gbint.html for more information.

The GBI source list is continually changing in response to new observations of transient sources. Researchers wishing to add a source to the GBI program should consult the web pages for information on how to submit a request for observations.

The GBI's 1960s vintage control computer is being replaced with a new VME system, which will insure that the GBI can continue to function in future years. However, prospects for continued funding of the GBI by NASA are uncertain. Sources of new funding will be necessary for continued operation.

F. D. Ghigo and G. I. Langston

Warm Ionized Gas in Galaxies Workshop

A Green Bank workshop on "Warm Ionized Gas in Galaxies" was held on September 23-25. About 35 attendees gathered to discuss our current understanding of the warm ionized gas (WIM) in our galaxy and in other galaxies and also to help determine which observations are needed to further our understanding.

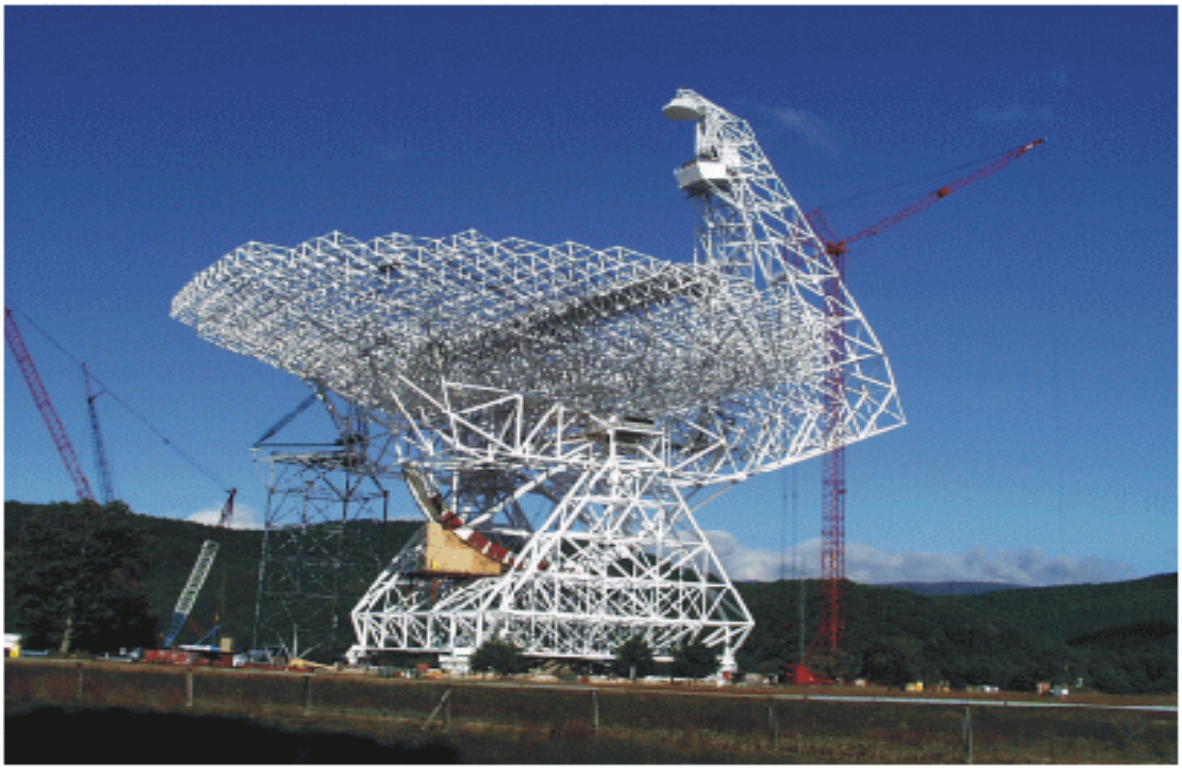
During the course of this workshop several new surveys of the H-alpha emission from the WIM in our galaxy were presented. Other topics included radio observations of the WIM and how the GBT can help advance our knowledge of the WIM, the connection between the WIM and other components of the interstellar medium (ISM) in our galaxy, comparisons of the WIM in our galaxy to that in other galaxies and theoretical modeling of the WIM. The workshop attendees were also treated to a sneak-preview of a preliminary spectrum from the recently launched FUSE satellite and a close-up tour of the "soon to be launched" GBT.

Several conclusions on our current knowledge of the WIM arose during the workshop. A general consensus was that an extra heating mechanism beyond photoionization heating is needed in the WIM in our galaxy and in that of other galaxies. This extra heating may arise from such sources as dust grain heating from polycyclic aromatic hydrocarbons (PAHs), turbulent energy dissipation, cosmic ray interactions or magnetic field reconnection just to name a few. It was also generally concluded that the main source of ionization in the WIM comes from OB stars although it is not understood how 10 to 15 percent of the hydrogen ionizing photons can leak out to large distances from the OB stars. A general understanding that the WIM covers most of the disk of galaxies with enhancements towards spiral- arms and star-forming regions was also obtained.

The workshop was a success and a good time was had by all.

A. H. Minter, D. S. Balser and F. J. Lockman

The GBT as seen from the Jansky Lab.



The GBT, showing the completed feed arm with Gregorian mirror and Feed/Receiver Room.

Completing the installation of the first tier of panels.

NRAO and COMSAT personnel examining panel corners.

ALMA

MMA/ALMA

At the end of the past quarter the MMA/ALMA Project had completed three of the four major milestones set for the MMA Design and Development phase of the Project; these are:

1. Recommendation to the NSF of an international partnership in the Project—this was completed in June 1999 with the agreement between the NSF and European partners for the joint ALMA Project;
2. Provision to the NSF of a thorough cost estimate for the construction of the MMA that could be audited–the cost estimate for the Millimeter Array U.S. Reference Project was audited by a NSF Lehman Review Panel in July 1999;
3. Receipt of bids from antenna contractors for fabrication of a prototype antenna that meets MMA specifications and is within the budget envelope specified by the Project–these bids from four potential antenna contractors were received at the end of June 1999.

The fourth major Project milestone in the Design and Development phase, permission to use the selected site in Chile, is one that the NSF and our European partners in the ALMA Project agreed would be done in common: its achievement is no longer solely in the province of the U.S. MMA Project.

The milestones and deliverables remaining on the MMA Project list for the Design and Development phase are all focused on preparing for the construction phase of the Project. They include hardware designs and prototypes, many of which will be evaluated on the test interferometer, together with the preliminary and critical design reviews that are part of the process by which the design for each major subsystem is adopted by the Project. These steps will all be done in close collaboration with our European partners in the ALMA Project.

ALMA planning is proceeding in three steps that are being taken in parallel. First, the U.S. Division Heads and their counterparts in Europe are engaged in the process of outlining a joint tasking for the ALMA Design and Development phase. Second, these Division Heads are each assisted by an advisory committee of experts that is given the task of reviewing critically the planning as it is made. The U.S. and European advisory committees meet together so that a common vision can be established for each task. For the U.S. part of the ALMA Project, the composition of each of the advisory committees is made up of representatives from the NRAO and the MDC. Finally, the ALMA Executive Committee receives the input from the respective Divisions and has the responsibility to establish a Work Breakdown Structure (WBS) for the joint D&D program. This includes the schedule of tasks to be accomplished and the resources to be assigned to each task. A draft of the joint WBS will be given to the ALMA Coordinating Committee in November. With their approval, the joint ALMA Project will have the framework needed to operate effectively in 2000.

R. L. Brown

12 Meter

Improvements to the 12 Meter Telescope

During the 1999 summer shutdown period, the following improvements were made to the 12 Meter Telescope system:

(1) *New dome cover:* See associated article.

(2) *New Prime Focus Control*: We have a new control system for the axial, north-south, and east-west translation stages. Developed by Matt Waddel and Jeff Hagen, this new system will allow for finer control of these prime focus axes and for better determination of their movements. This new system includes digital encoders in all three axes with a resolution of ±2 microns.

(3) *Global Positioning System Station Clock*: Our old WWVB receiver station clock has been replaced with a clock that uses the Global Positioning System (GPS) satellites. The higher transmission frequency of the GPS system will make it more reliable (less susceptible to weather) than the WWVB system.

(4) *New MAC Features*: The Millimeter Autocorrelator (MAC) capabilities have been expanded to include On-The-Fly (OTF) observing and mode "windowing" (the ability to select the channels you want for a given spectrometer mode). See http://www.tuc.nrao.edu/news/new_correlator.html for further information.

(5) *Frontend Cleanup*: All of the 12 Meter frontends received their usual summer clean-up. The cryogenic systems were cleaned and repaired where necessary.

(6) *NRAO Tucson Home Page*: We have revised the NRAO Tucson Home Page. A plethora of new information has been added to this site, including a search engine.

(7) *User's Manual Update*: The 12 Meter User's Manual has been revised. Many sections have been updated to reflect the current state of the 12 Meter system. Comments on this document are appreciated.

(8) *Visitor's Guide Update*: The "Visitor's Guide to the NRAO 12 Meter Telescope" has been updated.

(9) *Equipment and Calibration Status Report Update*: This report includes updated information on the equipment and calibration status of the telescope.

J. G. Mangum for the Tucson Staff

New Dome Cover for the 12 Meter Telescope

A new dome cover was installed at the 12 Meter Telescope this past summer. The dome cover was last replaced in September 1980 and had become worn beyond repair. The 12 Meter Operations staff and the contractor for the project, Eide Industries, began the removal of the old dome cover on July 12. With a workforce composed of five workmen from Eide Industries and four NRAO staff, the project was completed on July 29. A number of improvements to the design of the dome cover were made in order to improve its maintainability, including easier access to the electrical systems which control the dome motion. These maintenance improvements, along with the better weather resistance of the fabric, will give this new dome cover a lifetime of at least ten years.

J. G. Mangum and T. W. Folkers for the Tucson Staff

VLA

VLA Configuration Schedule

Configuration	Starting date	Ending date	Proposal Deadline
BnA	08 Oct 1999	25 Oct 1999	1 Jun 1999
B	29 Oct 1999	14 Feb 2000	1 Jun 1999
CnB	25 Feb 2000	13 Mar 2000	1 Oct 1999
C	17 Mar 2000	30 May 2000	1 Oct 1999
DnC	09 Jun 2000	26 Jun 2000	1 Feb 2000
D	30 Jun 2000	18 Sep 2000	1 Feb 2000
A	06 Oct 2000	08 Jan 2001	1 Jun 2000

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

Approximate Long-Term Schedule

	Q1	Q2	Q3	Q4
1999	C,D	D	A	B
2000	C	C,D	D	A
2001	B	B,C	C	D
2002	A	A,B	B	C
2003	D	D,A	A,B	B

Observers should note that some types of observations are significantly more difficult in daytime than at nighttime. These include observations at 327 MHz (solar and other interference; disturbed ionosphere, especially at dawn), line observations at 18 and 21cm (solar interference), polarization measurements at L band (uncertainty in ionospheric rotation measure), and observations at 2cm 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 2000, the D configuration daytime will be about 10h RA and the A configuration daytime will be about 18h 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, Global astronomical VLBI with the EVN, and geodetic arrays coordinated byGSFC.

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

First Images on VLA - Pie Town Link

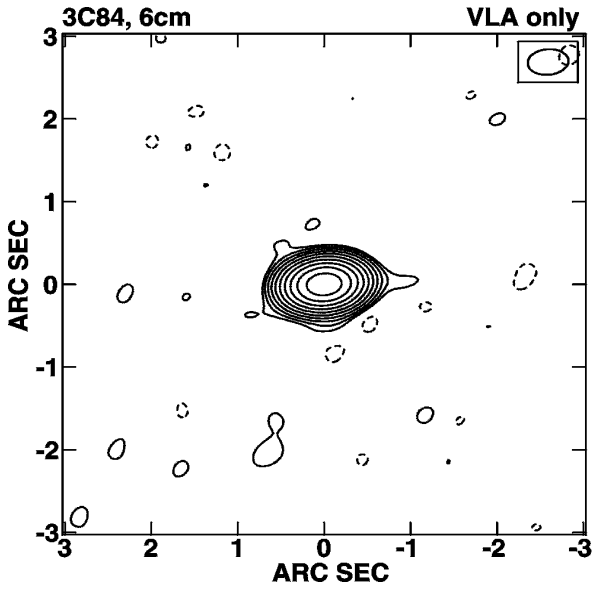
The VLA-Pie Town real-time link has recently obtained its first images, following the first fringes reported in NRAO Newsletter No. 78 (1 January 1999). On August 12, 1999, fringes were detected from Pie Town (PT) to all the antennas of the VLA in 2 IF bands (the AC IF pair), with the VLA in the A configuration. Along with test data of various types, a 30-minute snapshot was obtained on the radio galaxy 3C84 at 6 cm wavelength. A "first image" using the VLA+PT was made from this observation; the source was completely unresolved, with the synthesized beam reduced by nearly a factor of two in east-west extent. (A full synthesis track is required to obtain the best two-dimensional resolution.) The dynamic range for the VLA+PT image is as good as that for the VLA-only image, well over 10,000:1 with rudimentary self-calibration, indicating that phase-closure errors are quite small. The first image is shown below; further information and (u,v) coverage can be accessed at http://www.nrao.edu/~julvesta/vlapt_dir/first-images.html.

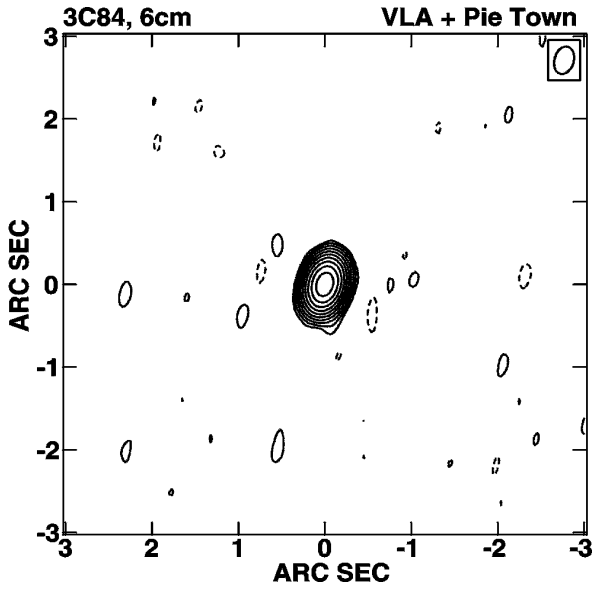
In August and September 1999, the first scientific observations were made with the VLA+PT. Four projects selected by the Scheduling Committee were observed; all were mainly spectroscopic observations. The first science observation using VLA+PT was a project to study redshifted HI absorption toward the gravitational lens PKS 1830-211, at a frequency of 1191 MHz. This project (scientific investigators were Chris Carilli, Marc Verheijen, and Karl Menten) was observed on August 20, 1999, and was deemed very successful, resolving the HI absorption components against the two main sources in the gravitational lens. Results from the other three science projects are pending. These scientific observations made use of translator software written by Barry Clark, which converts a VLA observing file into the file format needed for the Pie Town VLBA computer to operate the antenna and frontends at PT.

During the next several months, the final design of the link hardware will be implemented and tested. Included in this design and implementation will be a full 4 IF capability. Testing and characterization of the phase stability of the link, as well as testing and implementation of phase-correction algorithms, will be performed. Development of necessary user calibration techniques as well as definition of operational requirements will also be a focus of the near-term future. Full operation of the link as a user facility is expected for the next VLA A configuration in the fourth quarter of 2000. NRAO plans to advertise the official availability of the VLA-PT link well in advance of the June 1, 2000, proposal deadline for that configuration.

NRAO would like to give a special acknowledgment to project engineer Ron Beresford, who is responsible for the design and much of the implementation of the fiberoptic connection hardware at Pie Town and the VLA. Ron has been in Socorro since June 1997, on leave from the Australia Telescope National Facility, and will be returning to Australia near the end of this year.

M. J. Claussen and J. S. Ulvestad





Status of VLA Q-band (7 mm) Receivers

Additional antennas equipped with 7 mm receivers will become available for the upcoming VLA configurations. Until recently, only 13 of the 27 VLA antennas were equipped with Q-band (7 mm) receivers. Starting in August 1999, new Q-band receivers are being installed on other VLA antennas. Antennas 18, 19 and 21 will be out fitted with new receivers by mid October 1999. Three more antennas are expected to be equipped by the end of the year, bringing the total number of antennas with Q-band receivers to 19. If things proceed as scheduled, then we expect 25 VLA antennas to be equipped with Q-band receivers by the end of 2000.

K. R. Anantharamaiah

Engineering Services Status

Engineering has embarked on a project which promises to be the most significant hardware improvement to VLA antenna blind pointing since the yoke and major structural members were insulated in the mid 1980s. Currently, electronics for the Inductosyn absolute position encoders used on the VLA permit cyclical excursions of several arcseconds in pointing accuracy. In addition, an unreliable overlap between coarse and fine encoding causes frequent telescope failure. The new electronics are expected to reduce the cyclical errors to the subarcsecond level and eliminate the unreliable overlap problem altogether. Additional bits in the new encoder system will provide higher resolution in measuring absolute position and provide improved reliability in detecting the state of the azimuth cable wrap-up.

A prototype of the new encoder electronics has been installed on Antenna 24 for evaluation and is working satisfactorily. Together with mechanical projects such as improved encoder couplings and replacement of failed azimuth bearings, the new encoder electronics project is expected to lead to 6 arcsecond blind pointing on the VLA antennas. Ten arcsecond pointing is the current mean. The project may also have important implications for VLBA pointing improvements since the same type of absolute position encoders are used for the VLBA antennas. The design is based on earlier encoder electronics work at the UA/SAO MMTO. More information is available in VLA Test Memo 218 or e-mail bbroilo@nrao.edu.

C. C. Janes and B. M. Broilo

New Mexico Computing Developments

After one year of centrally administered Linux support, the AOC has now approximately 40 workstations and laptops running this operating system. Thirty of these are new purchases, and ten are machines that used to be running Windows. Nearly all standard software packages available under Solaris have been installed for use under Linux. These packages include AIPS, AIPS++, IRAF, miriad, gipsy, sched and jobserve. For the foreseeable future, we intend to continue full local support for both Solaris and Linux.

We are completing our preparations for dealing with the Y2K bug. We intend to complete the final phases of ensuring operating system Y2K compliance over the next few months. All SGI systems have been upgraded to IRIX 6.5.3. All Sparc systems at both the AOC and VLA will be upgraded to Solaris 2.6, and the Linux systems will be upgraded to Redhat 6.0. All system upgrades should be completed by early November at the latest. At the VLA site, the operating system for the VLA control computers has now been updated with the Y2K patches. Y2K compliant application software was installed during the September update of the VLA online software.

The AOC help desk has been in existence since the beginning of July. During the first 2.5 months, approximately 200 requests were received, 130 of those requests have been resolved. Many of the remaining requests are long term projects. The help desk is staffed Monday through Friday 9 a.m. to 12 p.m. and 1 p.m. to 4 p.m. The office may be reached at (505) 835-7213. Requests may be submitted either by sending mail to helpdesk@aoc.nrao.edu or by filling out the form on http://helpdesk.aoc.nrao.edu. Users can track the status of their own and other outstanding items on the web as well. We feel that the introduction of the help desk has improved feedback to the users ,and at the same time, allows more efficient use of the systems administrators' time.

Testing of the new VLA correlator controller has begun. This system will eventually replace the VLA correlator system controller, a Modcomp computer, and the Array Processor. Enough hardware and software is now complete to allow initial testing at the VLA site. The VLA expansion computing team is defining system requirements, evaluating technology, and developing a computing plan. Development of an interface to the VLA monitor and control system was begun. This interface will be used by the new control system during the transition from current to modified VLA antennas, and as a test bed for the VLA expansion computing design.

A prototype of a computer system which will deliver geometric delays for the VLA Upgrade and the VLBA correlator has been built. This model server is built on Goddard Space Flight Center Calc version 9.1 and runs on an independent computer. Requests from the instruments for delays come over a network connection. The prototype is under test with the VLBA correlator.

G. A. van Moorsel

Gas and Galaxy Evolution: A Conference in Honor of the 20th Anniversary of the VLA

In celebration of 20 years of VLA observations, NRAO and New Mexico Tech are jointly sponsoring a workshop on the role of gas in galaxy evolution. The workshop will take place May 21-24, in Socorro, New Mexico. The theme of the workshop will be the role of gas in galaxy evolution, concentrating on the interplay between galaxies and their environments, with some emphasis on HI imaging. Questions we hope to address are: What are the residual signatures of the formation process around galaxies? Do galaxies evolve along the Hubble sequence? If so, how and in what direction? Do mergers really convert spirals to ellipticals? Can continuing accretion "grow" dynamically-cold disks into the present? What can we learn about the history and fate of galaxies from the structure of their gaseous envelopes? We would like to confront the vast range of current observations with theoretical predictions and interpretations, and to map out new directions for the future.

The workshop will conclude with a discussion on technology and the future, followed by the VLA Twentieth Anniversary Celebration at the VLA site. The SOC consists of:

Jacqueline van Gorkom, Chair (Columbia University)
James Binney (Oxford)
Julianne Dalcanton (University of Washington)
Ron Ekers (CSIRO)
Ken Freeman (ANU)
John Hibbard (NRAO/CV)
Michael Rupen (NRAO/Socorro)
Renzo Sancisi (Bologna)
Francois Schweizer (Carnegie Institute)
Linda Sparke (University of Wisconsin)
David Westpfahl (New Mexico Tech)
Ann Zabludoff (University of Arizona)

The first mailing will be sent out shortly, by email; see our web page http://www.cv.nrao.edu/vla2000/ for continuing developments. We especially encourage recent graduates to attend. We look forward to seeing you there!

J. van Gorkom
J. Hibbard
T. Romero
M. Rupen

NRAO 2000 Synthesis Imaging Summer School

Planning for the Seventh VLA/VLBA Summer School in Synthesis Imaging is underway. The summer school, tentatively scheduled for June 20-27, 2000, will be hosted by NRAO and New Mexico Tech in Socorro, New Mexico. An announcement, complete with a preliminary list of lectures and registration information, will be made in the latter part of this year.

The school will entail a week of lectures on aperture synthesis theory and techniques at a level appropriate for graduate students in astrophysics. Practical tutorials demonstrating data collection, calibration, and imaging of both VLA and VLBA data will be given.

There will be a nominal registration fee, sufficient to cover only the cost of the meeting and a copy of the recently published ASP Vol. 180 on Synthesis Imaging from the 1998 summer school. We are unable to provide financial support for attendees. Lodging for participants will be at local motels.

G. B. Taylor and J. M. Wrobel

VLBA/VLBI

SPACE VLBI

As announced in VSOP Newsletter No. 103, a new Announcement of Opportunity (AO3) was released by the Institute of Space and Astronautical Science (ISAS) in Japan, soliciting new proposals for the VSOP mission. Proposals were due October 1, 1999.

AO3 changed several aspects of scientific access to the mission, while many others remained unchanged. This note is to clarify, for future proposals submitted by the VLBA user community, the requirements for submission of proposals and for requesting ground resources, and the mechanisms for proposal review and time allocation.

Although VSOP proposal opportunities will now be synchronized with the four-month "trimester" deadlines used by the VLBA and the EVN, these proposals will nevertheless continue to be submitted only to mission headquarters at ISAS. A subset of these proposals (described below) will be forwarded to NRAO, in time to be distributed to the VLBA referees without delaying their review process.

As indicated in my article in NRAO Newsletter No. 80, these and all other proposals requesting the use of VLBA resources will be reviewed jointly. For VSOP proposals, this review will lead only to an overall time allocation for VSOP observations in

the following trimester. The selection of proposals actually observed by the mission within this allocation will be made by the VSOP Scheduler, based on the evaluations of the VSOP Science Review Committee.

AO3 proposals may, but need not, specify a preferred ground array. Since the VLBA correlator will continue to process all VSOP observations recorded in (or translated to) both VLBA and Mark 4 tape formats for the foreseeable future, NRAO will review all proposals which specify any NRAO or EVN telescope as part of the ground array, and all proposals which do not specify a ground array at all.

Information about AO3 is available on the web at URL http://www.vsop.isas.ac.jp/obs/AO.html, and via a help desk at vsop_help@vsop.isas.ac.jp

Please contact me regarding any difficulties which cannot be resolved through those resources, or for clarification of any of the above information.

J. D. Romney

VLBI Network Call For Proposals

Proposals for VLBI Global Network observing are handled by the NRAO. There usually are four Global Network sessions per year, with up to three weeks allowed per session. The Global Network sessions currently planned are:

Date	Bands	Proposals Due
12 Nov to 03 Dec 1999	6cm?, 5cm?, 18cm, 1.3cm	01 Jun 1999
10 Feb to 02 Mar 2000	6cm, 18cm, other?	01 Oct 1999
25 May to 15 Jun 2000	6cm, 18cm, other?	01 Feb 2000

The bands above marked with a question mark have been suggested, but the final choice has not yet been made.

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 web. Printed forms, for filling in by typewriter, are available on request from Lori Appel, 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 Schedulers on or before the proposal deadline date; allow sufficient of time for mailing. In general, fax submissions of global proposals will not be accepted. The Socorro correlator will be used for some EVN only observations unsuitable for the Bonn correlator until such time that they can be processed with the JIVE correlator. Other proposals, not in EVN sessions, requesting use of the Socorro correlator must be sent to NRAO even if they do not request the use of NRAO antennas; proposals for the use of the Bonn correlator must be sent to the MPIfR if they do not request the use of any EVN antennas.

For Global proposals, or those to the EVN alone, send proposals to:

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

For proposals to the VLBA, or Global 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

VLBA Long-Term Proposals

The VLBA, as the first instrument built for full-time VLBI observation, is an ideal instrument for monitoring changes in compact radio sources with intervals of days, weeks or months, and project durations of months or years. A classic example is the evolution of the masers in the atmosphere of the supergiant star TX Camelopardis, which has been imaged by Diamond and Kemball every two weeks for a full pulsation cycle of more than a year and a half.

The traditional NRAO policy of committing time only for the upcoming four-month trimester leaves observers on such long-term projects without a firm commitment that their project will be completed. For projects that need a more formal commitment, NRAO will institute a class of "long-term acceptances," whereby proposals are accepted for a period longer than one trimester. Proposers will be permitted to append a "Request for Long-Term Acceptance," of no more than 500 words' length, to their observing proposal. Proposers are cautioned that requests for more than about 300 hours of total time, even over the long term, may trigger the "Skeptical proposal review for large projects," described in NRAO Newsletter No. 71 (1 April 1997).

Students planning to use the VLBA for their Ph.D. dissertation may have an additional problem, in that such dissertations are frequently composed of pieces of several short proposals which may not be suitable for combining into a single proposal for refereeing purposes. In this case, we shall accept, one per student, a "Plan of Dissertation Research," of no more than 1000 words, to be appended to the first proposal of the series, and which can be referred to in later proposals. This provides some assurance against a dissertation being seriously damaged by adverse referee comments on one component proposal, when the referees may not see the whole picture. This facility is offered to students for which VLBA observations, VLA observations, or both are the most important component of their planned dissertations.

Please contact the undersigned for further information about these long-term proposal issues.

W. M. Goss and J. S. Ulvestad

IN GENERAL

Observatory-Wide Computing Developments

Security - The Computing Council and a group of NRAO technical staff are examining ways to improve the security of the computers and networking without compromising services that are fundamental to our role as a user facility. As part of this effort, key computing staff are receiving training in computer security issues, to make sure that we understand the options available to us and their impact, before changes are actually put in place. Since computer security affects and involves all of us, in the near future we will also be increasing efforts to educate our computer users on this subject.

To reduce the risks associated with remote access, we continue to recommend, and may eventually require, the use of the secure shell ("ssh") package to replace the more common "telnet," "rlogin," and "rsh" connections between the NRAO and your home system. ssh encrypts the transmitted data, including your password, and thus hides account information from "sniffer" programs. ssh is supported at all NRAO sites. Software to make ssh connections is available for UNIX and Windows, in both free and commercial versions. We urge all NRAO users to install ssh on the computers that they will use to connect to our systems.

Networking - The installation of video conferencing capability, which is funded by a special grant from the NSF, is well underway at all four major NRAO sites (Charlottesville, Green Bank, Socorro, and Tucson). Increases in the networking bandwidth between the sites have been implemented in Charlottesville, Green Bank, and Tucson, and should be in place in Socorro by the end of September. Orders have been placed for some of the equipment, and we are in the process of obtaining quotes for much of the rest. The systems should be installed at all sites by the end of 1999 and available for general use early in 2000.

For those of you with video conferencing facilities, the NRAO equipment will use H.323 protocol, with a gateway to H.320 (ISDN). Because we are using common standards, we expect our facilities to interoperate well with most popular video conferencing equipment. More details will be forthcoming when the installations are closer to being operational.

Y2K - Following many months of preparation, we believe that the NRAO is in very good shape for the Y2K rollover (note that this is the last issue of the NRAO Newsletter before the turn of the century). The NRAO has tested its mission-critical computing systems and software and shown them to be Y2K-ready. Some business applications are outsourced to vendors whose Y2K readiness has been certified by the ITAA. All sites are addressing their few remaining, less-critical, Y2K compliance issues. For computing, this primarily involves completing operating system and other software upgrades which are well understood, and finally retiring some obsolete systems. In addition, all sites are making contingency plans for operations during and immediately after the century rollover.

M. R. Milner

Charlottesville Computing Developments

Linux News - Based on over subscription to our existing public Linux system from both local staff and visitors, we have ordered a second such system to replace one of our aging Digital (now Compaq) Alpha systems. Compared to the system it will replace, the new computer will have six times the memory, and about nine times as much disk space. Delivery is expected in October.

The Year 2000 (Y2K) - The upgrade of Charlottesville's Sun systems to a Y2K compliant version of Solaris has been completed. All systems (except one targeted for decommissioning in December) are now running Solaris 2.6 with appropriate patches for Y2K compliance. In addition, a final review of the Unix infrastructure—cron jobs, automated shell scripts, etc.—has been undertaken to ensure that all date-related functionality is impervious to the double-zero rollover in a year. This review is about 60 percent complete and has thus far not turned up anything of concern. Finally, all our Wintel systems are being checked to check for noncompliant or problematic dynamic libraries (DLL's); we expect to have this review complete by press time.

In addition, a Y2K operations plan for Charlottesville Computing has been established, one that both ties in with similar plans at other sites and integrates with the non-computer contingency plans for NRAO/Charlottesville in general.

P. P. Murphy

AIPS++ First Release Issued

The first public release of AIPS++ was issued on October 4. This follows many months of testing and defect fixing by the project staff. In addition, we have had some feedback from scientists testing the system.

There is a binary release that can be run from the CDROM, or installed to a local disk and run from there. Installation is very straightforward and requires no special access. The operating systems supported are Linux (RedHat 5.1, 5.2, and 6.0, SuSE 5.2, 6.0, 6.1, and 6.2), and Solaris (2.5.2 and 2.6). If you would like a copy of the CDROMs, please send your name, mailing address, email address, and operating system information to aips2-request@nrao.edu.

This version of AIPS++ offers the scripting environment Glish, a graphical user interface, a wide range of general purpose and astronomical tools, extensive capabilities for synthesis imaging, straightforward calibration of VLA data, image analysis and display, extensive web-based help and documentation. The next release is planned for April 2000, and will expand on these capabilities, particularly in the areas of mosaicing, and synthesis calibration.

Further information about the release can be found from the AIPS++ home page: http://aips2.nrao.edu.

T. J. Cornwell

1999 and 2000 Summer Students

The 1999 Research Experiences for Undergraduates at NRAO has ended with the fifteen undergraduate students and eight graduate students heading for their colleges from the four NRAO sites. This has been the fortieth year of the NRAO summer student program. As examples of the sorts of research students and their advisers undertake at the four NRAO sites, we give a short summary of the research accomplished by the students at http://www.cv.nrao.edu/~awootten/reu99.html.

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 2000. A limited number of assitantships will be available for graduate students, graduating seniors 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, 2000; notice of decisions will be sent by March 1, 2000. Forms are available from Department Heads, on the web at http://www.cv.nrao.edu/html/headquarters/summer-students.html or by writing to:

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

H. A. Wootten

Jansky Research Associates

The National Radio Astronomy Observatory (NRAO) awards Jansky postdoctoral appointments which provide outstanding opportunities for research in radio astronomy. Jansky Research Associates formulate and carry out investigations either independently or in collaboration with others within the wide framework of interests of the Observatory. Current areas of research include: cosmology; galaxy formation and galactic dynamics; gravitational lenses; theoretical and observational studies of active galaxies and radio sources; the interstellar medium, molecular clouds and star formation; stellar evolution and circumstellar shells; comets and solar system bodies; and astrometry. The research staff is also involved in instrumentation development and image processing; applicants in these areas are encouraged.

Appointments, which are available at any of the major NRAO sites, are made for a term of two years and may be renewed for a third year. The full NRAO observing, computational, and support facilities are made available to Jansky Research Associates. The appointment also includes a travel budget and scientific page charge support, as well as vacation accrual, health insurance, a moving allowance, and other benefits. Successful applicants must have received their Ph.D. prior to beginning the appointment and normally within the past four years.

Application may be made to:
Director
National Radio Astronomy Observatory
520 Edgemont Road
Charlottesville, VA 22903-2475

The application should include a curriculum vitae and a brief statement of the type of research activity to be undertaken at the NRAO. (Do not staple or duplex application materials.) The applicant should have three letters of recommendation sent directly to the NRAO.

The deadline for applications and letters of reference is December 1, 1999. The announcement of Jansky Research Associate appointments will be made in compliance with the AAS resolution on uniform notification dates for postdoctoral appointments.

A. J. Beasley

Editorial

We have decided that the time has come to modernize and expand the scope of the NRAO Newsletter. This will be the last issue of the newsletter in its present form, a form which has endured since its inaugural issue of July 1, 1981. We plan changes in three areas. First, the content will be expanded. The main goal of the Newsletter over the last 18 years has been to disseminate to the user community important technical information and management policy which has potential impact on the planning and execution of observations. This function will be preserved in the new Newsletter. Also important in these times is the publicizing of the science carried out on our facilities. We plan to include brief accounts of selected science projects using NRAO instruments, much as is done in other prominent observatory newsletters. We will consider both solicited and unsolicited contributions. John Hibbard will join the newsletter as Associate Editor and will be mainly responsible for collecting and editing the science section. He will have help from Dave Finley and Jeff Mangum. Please contact one of these people if you have recent results that you might like to see reported in the newsletter. Finally, the new Newsletter will have an entirely different look. Content and formatting will be done by Rebecca Johnson, Sheila Marks, and Pat Smiley. The Editor will continue to handle the articles on technical and management issues.

B. E. Turner

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