NRAO NEWSLETTER

1 October 1998 No 77

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

GREEN BANK

Green Bank Telescope

Construction

The photograph on page 2, taken this September, shows that the Green Bank Telescope (GBT) is beginning to resemble its concept drawings now that the reflector backup structure (BUS) has been fully installed and the vertical feed arm started. The average time for installation of each of the 22 modules was two weeks.

Concurrent with the erection of the BUS modules, the 1,036 intermodule members were reinstalled and welded. The intermodule members are needed to give the BUS its integrity. Temporary walkways were put up along the perimeter top and bottom chords of the modules in order to properly position and weld the intermodule members.

Actuators

Most of the active surface actuators were installed on the front chords of the BUS modules prior to lifting Actuators which would interfere with the installation of the intermodule members or obstruct target areas were left off. These actuators were filled-in when the modules were in place atop the box structure. This fill-in operation started in April of 1998 and lasted until mid August. Today, all 2,209 of the active surface actuators are in place while more than 300 have been accurately positioned.

Permanent Supports

The permanent supports function to carry the live and dead loads incident upon the BUS back, or down, to the box girder structure and thereby to the elevation shaft which is supported by the alidade and the foundation/ground. There are sixteen joints welded to the back of the various BUS modules. Of these, thirteen had to be redesigned, either to reconfigure the joint to achieve greater stress path efficiency or to correct bad welding. The rework of the BUS joints began in May 1998 and is now 84 percent complete. There are also 20 welded joints on the box structure at various levels. The rework of these joints is 26 percent complete. Of the 30 permanent beams carrying loads between the BUS and box joints, two have been installed.

Surface — Actuator Cables

Actuator cable runs are currently being installed in the cable raceways, from the proximate vicinity of the actuators to the actuator control room. More than 50 percent have been installed. Installation is ahead of schedule.

Vertical Feed Arm

The vertical feed arm consists of 13 modules plus the feed/receiver room and upper feed arm. By the end of September 1998, the bottom two sections on each side of the 200-foot vertical feed arm will be in place on the outboard end of the horizontal feed arm. Two additional sections, and the platform which supports the feed/receiver room, have been assembled and await erection along with the upper feed arm and feed/receiver building. The upper 60-foot portion of the feed arm has been trial erected at the site including the deployable prime focus boom, the prime focus rotation mount, the subreflector, and the subreflector adjustment mechanism. The feed arm servo, which controls the above equipment had been installed and preliminary tests run. The feed/receiver room, which is located directly below the upper feed arm, has been located nearby with the secondary focus feed turret in its roof. In October-November 1998, the upper feed arm servo will be operated continuously for at least a month. Additional photogrammetric measurements will be made to allow final setting of the subreflector surface to a tolerance somewhat better than 0.004 inches RMS. The vertex platform has been installed on the telescope, and the access walkways to the vertical feed arm have been installed.

Recently, the Contractor sent 20 surface panels to the site to test shipping, handling, installation, and alignment procedures. The panels were unpainted so that they might be returned to the Contractor's plant for remeasurement on the contour measurement machine (CMM) This will provide an evaluation of the above procedures with respect to any deterioration of surface tolerances NRAO has provided a prototype panel corner setting tool which the Contractor is using to familiarize his personnel with its operation in anticipation of the panel installation work

R. D. Hall

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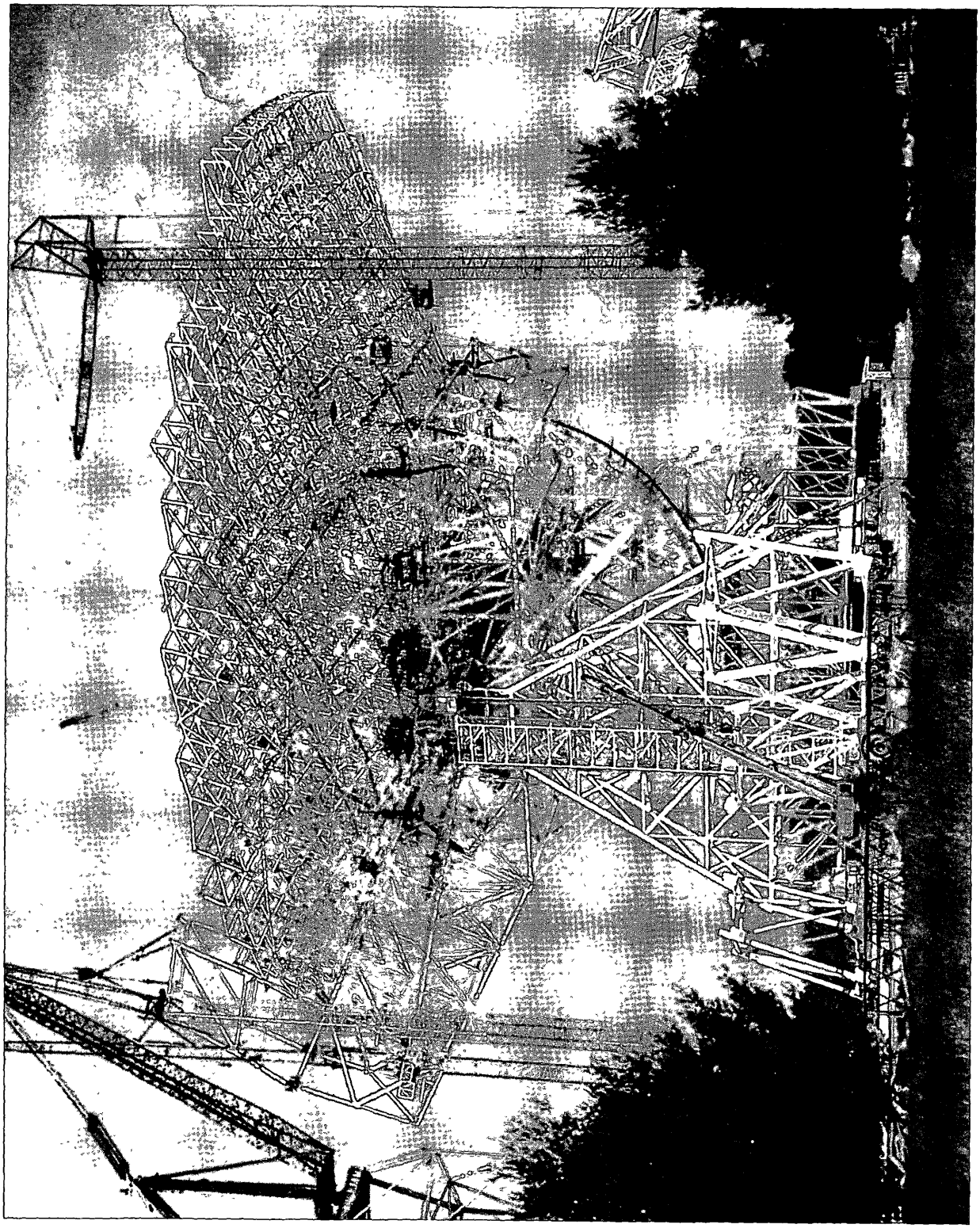


Phil Jewell Returns to NRAO

It is a pleasure to announce the appointment of Philip R. Jewell as Assistant Director - Green Bank Operations. Phil is returning to the NRAO after three years on the staff of the James Clerk Maxwell Telescope in Hawaii. He had been on the NRAO staff for twelve years prior to that, most recently serving as deputy site director in Tucson. We are delighted to welcome him back in his new capacity. He will assume responsibility for the Green Bank site on January 1, 1999.

Phil is replacing Jay Lockman as site director. After six years of service in this position Jay has asked to be relieved of his management responsibilities to allow him more time for his research. On behalf of the Observatory and its user community I want to thank Jay for the outstanding job he has done We are all pleased that Jay will remain in Green Bank and continue to provide leadership there as a senior member of the scientific staff.

P. A. Vanden Bout

Green Bank Computing Developments

As part of the observatory-wide computer upgrade, we upgraded only three of our older Suns One of these systems will replace the central server (sadira) later this year when the appropriate disks are delivered and configured. In line with the rest of the Observatory, several other Suns will be replaced by PCs running Linux. We have already procured two such systems to start the process of migration, and several others are planned for later in the year One of these was to enable the system administrator to develop the Linux installation and support procedures for the public systems and GBT control computers. This uses the NRAO Linux distribution maintained and distributed from Charlottesville. In addition, the GBT Monitor and Control system now completely supports communication between systems of different architecture (e.g , Suns and PCs); this will allow Linux PCs to control the GBT.

We have a need to track the component maintenance history on the GBT, so we are actively tracking the progress of the newly acquired product for this purpose on the VLA and VLBA in New Mexico. The support for the VLA and VLBA is expected early next year. Initially, we will use the product on the server in Socorro. If, as expected, we decide to adopt the package, a second copy will be purchased for the local Green Bank server.

At long last, we have a new PBX in Green Bank. You can now leave messages reliably using its voice mail service. The long distance service has been switched to FTS2000, which eliminates the long delays in placing calls, gives lower noise connections, and provides automatic billing. We also have a new terminal server with a new modem bank to provide modern dial-in capabilities up to 33.6 kbps.

G. C. Hunt

NSF Grant Award for Informal Science Education

The National Science Foundation's Informal Science Education Division recently awarded $1,089,873 to NRAO, Green Bank, for a project entitled "Catching the Wave Enhancing the NRAO Public Education Program."

The objective of the project is to design and implement an informal science education program that improves science literacy, instills appreciation for science and the work of scientists and engineers, and explores the relationship between science and technology

"Catching the Wave" is designed to be a series of interactive exhibits, data displays and programs that will bring visitors closer to the actual research being conducted with the telescopes. Exhibits will be designed around a set of questions or themes based on scientific ideas associated with radio astronomy. Staff at Green Bank will work with an advisory committee composed of museum educators and evaluators, teachers, and tourism personnel.

"Catching the Wave" will target rural Appalachian students who have limited access to informal science centers. Therefore, a critical component of the project will be programming for K–12 student visitors Here, Green Bank staff will seek the expertise of educators from West Virginia and the surrounding regions. Instructional programs will compliment local instructional goals and national goals as set forth in the National Science Education Standards.

The project will continue over the next three years, resulting in a robust public education program and increased tourism to the Green Bank site

S. A. Heatherly

A Workshop on the Square Kilometer Array

Green Bank is hosting a workshop on the Square Kilometer Array on October 9 and 10, 1998. The workshop will be an opportunity to address the desirability of the participation by the US in the Square Kilometer Array project, which at present is largely being investigated at Dwingeloo, Penticton, and CSIRO/ATNF. Several US centers have begun work as well, and the workshop will be a good opportunity to compare notes and to seek out wider US interest.

Two recent international workshops have been held: At Sydney in December 1997 and at Calgary in July 1998 (earlier workshops were held in the Netherlands at Leiden and Delft). These will be summarized for discussion.

There are six general topics on the agenda:

1. Summary of SKA activities and rationale to date
2. Summary of Calgary and Sydney science workshops
3. Current concepts
4. Technical issues
5. Strategic issues
6. General discussion

The workshop web page is: (http://www.gb.nrao.edu/~rfisher/SKAworkshop/skaworkshop.html).

J. R. Fisher

MILLIMETER ARRAY

Status of the Millimeter Array

The three months since the last NRAO Newsletter have been exceptionally busy for the staff involved with the MMA Project. Strong bonds have been established with the Republic of Chile; the first comprehensive review of the project led to revisions of the project emphasis; the NSF oversight committee made several suggestions that benefit the project and focus our efforts; and there have been important developments in Europe that are expected to lead to an enhanced project.

In July, Associated Universities, Inc., (AUI) received final approval from the Foreign Ministry of the Republic of Chile to establish and operate an observatory in Chile under the same terms and conditions that other foreign observatories operate there. We are grateful to our many colleagues in Chile for their support and encouragement in making this happen. We are committed to making the MMA of mutual benefit to both our communities through a continuing partnership.

Also in July the President of the Republic, with the approval of the Mining Ministry, declared the Chajnantor site to be a science preserve for the MMA and other scientific facilities requiring the exceptionally dry and transparent atmosphere that this site offers. In a separate declaration the Chilean science agency, CONICYT, was named to administer use of the preserve. These declarations were made in ceremony at La Moneda, the Presidential Palace, attended by representatives of the Republic of Chile, AUI, NSF, NRAO, and Chilean universities and observatories.

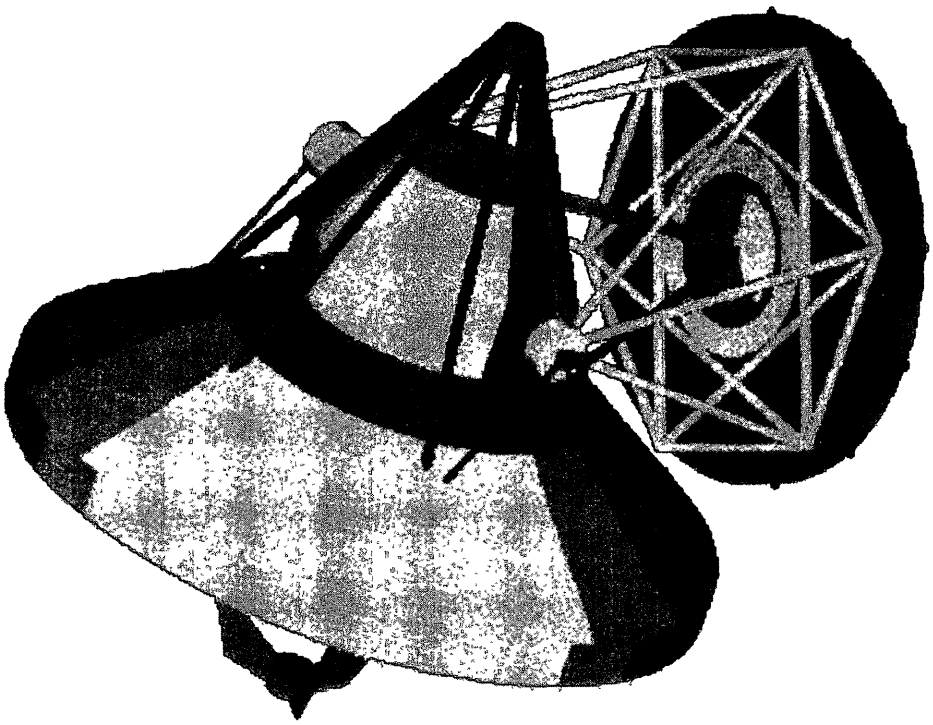
The month of July ended with an Internal Project Review. At this occasion all the people working on the MMA, together with the university-based MDC participants and representatives of the MAC, met to review the work planned in the MMA Design and Development phase. These plans were summarized for the group in the initial draft of the MMA Project Book. The purpose of the review was to identify issues that need resolution, issues either missing from the Project Book, or issues requiring a restructuring of the work presented in the Project Book. The Project Book and a summary of the issues raised at the Project Review can be found on the MMA web pages.

August began with the second review of the MMA project by the NSF MMA Oversight Committee (MMAOC). The MMAOC at an earlier meeting had made recommendations for an acceleration of the antenna procurement, a recommendation that the project implemented; the implementation was reviewed in August. One of the ramifications was the antenna vendor's meeting described in an accompanying article in this Newsletter. Other recommendations of this and the earlier meeting emphasize the need for comprehensive project management structures. This recommendation is also being implemented. The MMAOC reviews are archived and available via the MMA web pages.

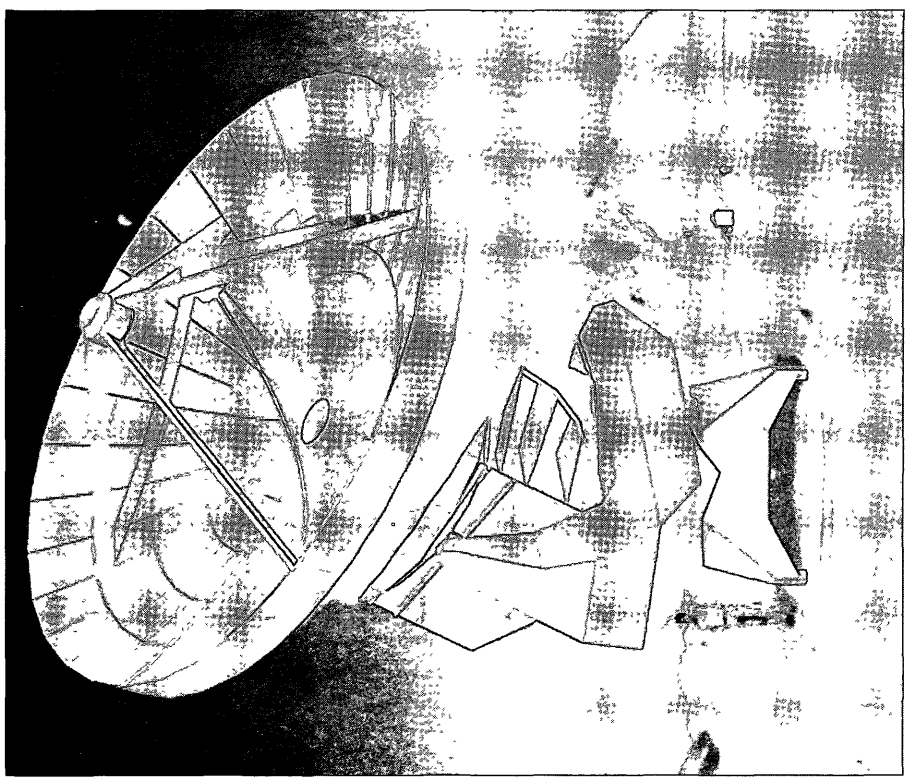
In September there were several gatherings of scientists and their science consortia and ministers interested in merging the European LSA project with the MMA Significant progress appears to have been made toward the definition of a common effort in Europe. There is every reason to be optimistic that such an LSA/MMA merger will in fact become a reality.

In October we will concentrate on getting the Work Breakdown Structure for the MMA complete and firmly in place for the D&D phase of the project. The project will be reviewed by the MAC at a meeting in Chicago November 21. If there are issues you would like to bring to the attention of the MAC, please contact one of the committee members. As you would expect, the MAC membership is also on the MMA web pages (click on library). In fact, the primary means of communication between the MMA and the community is electronic· The MMA e-news is circulated in e-mail at regular intervals; to subscribe contact Kate Weatherall (kweather@nrao.edu).

R L. Brown



OVRO 10-Meter Design
August 17, 1998



NRAO 10-Meter Design
August 17, 1998

Antenna Progress and Plans

The Antenna Group has just completed the Antenna Preliminary Design Review (PDR) that was held during an Internal Project Review in August. Antenna requirements are documented in the MMA Project Book in chapter 4 can be found at: (http://www.tuc.nrao.edu/~demerson/project_book/chap4/chap4.html). We held a Vendor Information Meeting in Tucson on September 22 to introduce vendors to the antenna designs and the planned procurement process. This meeting was advertised in the CBDNet (http://cbdnet.access.gpo.gov) on August 4, 1998, and published in the Commerce Business Daily on August 7, 1998 Twenty-five companies from the US and Europe attended the meeting. The antenna Critical Design Review (CDR) is planned for a date to be determined in November/December 1998. The RFP is planned to be issued in January 1999 with bid response in April 1999. Delivery of the antenna is scheduled for June 2001.

Two designs are being studied covering a wide parameter space in antenna design (see page 5). The NRAO Design (http://www.tuc.nrao.edu/~jkingsle/nraonl/nrao2.jpg) is based on the BIMA 6-meter antenna. This design has evolved from a millimeter wave 8-meter antenna into a high performance submillimeter 10-meter antenna. The OVRO design (http://www.tuc.nrao.edu/~jkingsle/nraonl/ovro2.jpg) is similar in some respects to the JCMT and OVRO antennas with a novel metrology system and a wheel and track base. Both designs have incorporated innovative ideas to meet the challenging specifications of the MMA. Currently, both groups are working on completing designs and issuing design reports. The next task will be to convert antenna requirements into RFP specifications.

J. S. Kingsley

VLA

VLA Upgrade Project Status

On June 29 and 30, approximately fifty scientists and engineers came to Socorro to discuss the VLA Upgrade Project with an approximately equal number of local staff. The goals of this meeting include a review of the project plans as developed so far by NRAO staff, discussion of the interaction of this project with the MMA, SKA, and other astronomy initiatives, and review of the key science benefits of the upgrade.

Work on the upgrade will now focus on preparing our presentation to the Decade Review Committee. The technical aspects of the plan will continue to be developed, and we will continue to add to the list of key science projects which would be benefitted by an upgrade. Readers of this newsletter who wish to contribute to this latter effort are invited to do so by contacting me at: rperley@nrao.edu. A summary of the upgrade's capabilities is also available by contacting me.

R. A. Perley

VLA-Pie Town Link

Construction and testing of hardware and software are continuing for the first fringe test of the fiberoptic link of the Pie Town VLBA antenna to the VLA These tests will involve the operation of Pie Town in conjunction with a 4-antenna subset of the VLA. This requires modification of two delay cards for the single IF of each antenna being used in the test. Modification of the cards for all antennas and all IFs will commence only after the first fringes are acquired, and the test results well understood.

Current plans are for initial testing of the Pie Town equipment to take place at the VLA during the first half of November, with a single VLA antenna being used to mimic Pie Town. After that time, the rack of equipment used to send the IF signal and the monitor/control information across the fiber link will be moved to Pie Town, and first tests will commence in late November

We note that November is a very busy time at the VLA and the VLBA, including a tight VLA schedule leading up to the configuration change in the middle of the month, as well as VLBA participation in the sessions of the Coordinated Millimeter VLBI Array and the Global VLBI network. In addition, a major modification of the VLA control room is expected to take place in November. Coordination of the tests of the VLA-Pie Town link with these activities, as well as normal scientific observing, is under way. In order to minimize the disruption to users caused by possible "on-the-fly" modifications to systems, tests will be scheduled only when the VLA can be devoted fully to those tests, rather than risking disruption of scientific observations by using a limited sub-array of the VLA. In addition, tests involving Pie Town will take place only when that antenna is not scheduled for VLBI observations.

For those interested in more information, minutes of the VLA-Pie Town meetings and past newsletter articles are now available on web at (http://www.nrao.edu/~julvesta/vla_pt.html).

J. S. Ulvestad

VLA Configuration Schedule

Configuration	Starting Date	Ending Date	Proposal Deadline
CnB	30 Oct 1998	16 Nov 1998	1 Jun 1998
C	20 Nov 1998	01 Feb 1999	1 Jun 1998
DnC	12 Feb 1999	01 Mar 1999	1 Oct 1998
D	05 Mar 1999	01 Jun 1999	1 Oct 1998
A	18 Jun 1999	27 Sep 1999	1 Feb 1999
BnA	08 Oct 1999	25 Oct 1999	1 Jun 1999
B	29 Oct 1999	14 Feb 2000	1 Jun 1999

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
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 C configuration daytime will be about 18^h RA and in 1999 the D configuration daytime will be about 2^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, Global astronomical VLBI with the EVN, and geodetic arrays coordinated by GSFC.

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 to both NRAO and 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

1612 MHz OH Observing at the VLA

Tests performed in August and September 1998, the start of full-time activation of the IRIDIUM constellation of communication satellites, show that a large fraction of data taken at 1612 MHz is severely corrupted This is likely due to saturation in the VLA electronics by the main downlink of the IRIDIUM satellites at 1621-1627 MHz These effects are more severe than anticipated and advertised in the previous newsletter. Further tests are underway

Note that any VLA or VLBA observation of OH at 1667 MHz redshifted into the main IRIDIUM space to Earth downlink between 1621 and 1627 MHz (8300 to 6800 km/s) will be severely compromised Observations of lines within ± 10 MHz (± 2000 km/s) of the main Iridium downlink frequencies may be corrupted.

G. B. Taylor and D. S. Bagri

New Mexico Computing Developments

At the Array Operations Center, we have recently begun official support and installation of Intel/Linux based PCs. The decision to begin support was based on several factors: performance versus Sparc/Solaris, an existing installed base which required more centralized support, and increased local Linux expertise as a result of recent changes in staffing.

Four new 400 MHz PCs were purchased with RedHat Linux 5.1 installed. With help from NRAO Charlottesville, we are now in a position to install Linux machines in a simple, consistent manner, making central administration feasible. For those who are interested in issues concerning centralized administration of Linux PCs, contact James Robnett, jrobnett@nrao.edu. Aipsmarks on the newest machines, 400 MHz Pentium-IIs with two 9GB Ultra-wide SCSI disks and 128 MB of memory, are slightly above 14. An effort is under way to add third-party software to eventually offer the same variety of choices as under Solaris. We expect to add more of these or similar machines in the fall of 1998.

The two remaining public Sparc-20 workstations were replaced with Ultra 10 machines. This means that all public machines at the AOC are Sun Ultras. We have no plans to move public workstations to the Intel platform until we have gained more experience with it.

An effort is well underway to select a new AOC server to replace arana, the Auspex server that has served us well for many years. We expect to finish the selection process in the second half of September and purchase and install the new machine in the following months. The fiber optic installation at the VLA site was completed, resulting in vastly enhanced computing connectivity to and from the various buildings at the site.

A reorganization in the Computer Division took place: the VLA and the VLBA online groups were merged into the Array Support Group, headed by Steve Blachman. The primary role of this group will be to provide software support to enable the successful operation of the VLA and VLBA. This merger will enable us to allocate the extensive expertise and resources, which until now were divided among two groups, to either instrument as needed. We believe a combined group will be in a much stronger position to tackle upcoming large projects.

A project was started to rewrite the VLA online system in order to make it less dependent on the Modcomp computers that currently are at the heart of the system The main reasons for this are that there are serious concerns about the continued long-term viability of the Modcomps and their maintenance; the software is over a decade old; and the operator interface imposes severe restrictions on the efficient operation of the instrument We intend to use the rebuild as the first part of a larger project to add new capabilities to the VLA and also to position ourselves for any future VLA upgrade. We have formed a formal project to be run by the Array Support Group of the Socorro Computer Division. The aim of the project will be to determine the requirements for the system rebuild, produce a formal written design document and, following a critical review of the design, implement the new system This must be done while still keeping the VLA fully operational.

G. A. van Moorsel

Calibrators

In keeping with the times, the VLA and VLBA have just adopted the N9806 radio reference frame source coordinates from the USNO. The VLA calibrator manual has been updated online, and the next release of OBSERVE will have the updated source coordinates. The positions of 500 sources (nearly half the number in the VLA calibrator manual) were updated. Of these, three sources which were thought to have positions with an accuracy of better than 10 mas had coordinates that shifted by greater than 25 mas. The VLBA, and in rare instances the VLA, can provide an absolute astrometry better than 25 mas.

If a project used one of the following calibrators:

J1001-446=B0959-443 (calcode B was off by 75.3 mas),

J1218-460=B1215-457 (calcode B was off by 114.4 mas),

J1820-254=B1817-254 (calcode A was off by 28.4 mas),

and the goal was a high precision astrometry, then it is possible that a correction needs to be made. For more information, contact Greg Taylor at gtaylor@nrao.edu.

G. B. Taylor

CS Replaces Upcoming C Configuration

The entirety of the upcoming (fall 1998) C configuration will be replaced by the CS (shortened C) configuration. It is probable that all future C configurations will be replaced by CS as well. This configuration will be formed by moving the antenna normally placed at an intermediate position along the north arm (N10) into a central location (N1) to help fill in the short-spacing hole (see Braun 1993, Holdaway 1994, and Rupen 1997). This significantly improves the array's sensitivity to large structures, at the expense of some intermediate baselines. The effects of the latter are quantified in a detailed study of the uv-coverage and simulated images resulting from both C and CS configurations (Rupen 1998, available from NRAO or over the web as VLA Scientific Memorandum No. 175, accessible from the web at (http. //www.aoc.nrao.edu/doc/vla/html/Memos/scimemolist. shtml). In accordance with this work several steps will be taken to ensure the advantages of the new short spacings without compromising the uv-coverage of the standard C configuration:

1- If the observer states EXPLICITLY in the OBSERVE file that the CS antenna at the central pad (N1) is critical to the science, the observer will be guaranteed the short-spacing coverage provided by that antenna There are two aspects to this guarantee. First, someone will be called in to fix this antenna when and if it fails, even if no other antennas are down. Maintenance will (insofar as possible) also be scheduled so as not to conflict with the observations Second, if the antenna **does** go down for more than an hour during a given observing run, this will be noted in the log. If the PI then requests it, NRAO will make every effort to schedule observing time on a roughly 1-for-4-hour basis in the next D configuration to fill in the missing short spacings.

Note that these special rules will not be in place, unless the observer specifically requests such special handling in the OBSERVE file

Note also that, even with such a request, the D configuration make-up time will not be granted automatically— the observer must explicitly request it, in response to NRAO's notification in the observing log that the CS antenna was not available Obviously this requires a timely response to that notification.

2- If the OBSERVE file does **not** explicitly designate the CS antenna at N1 as critical, those observations will be assumed to be standard C configuration observations. In this case the antennas at N8 and N12, the two positions surrounding the newly-vacated N10, will be designated as critical antennas. This means that (1) if either of these antennas goes down, every effort (including immediate call-out) will be made to bring it back in as soon as possible; and (2) maintenance will (insofar as possible) be scheduled so as not to conflict with these observations. There is no guaranteed make-up time however.

Note that, while CS does provide a few short baselines, detection experiments and observations of very low surface brightness features are still best carried out in D configuration

M. P. Rupen

VLBA/VLBI

ARISE Science Workshop

A science workshop for the proposed future Space VLBI mission, ARISE, was held in Green Bank on August 19 and 20. About 30 attendees gathered to discuss possible scientific goals of the mission, and to set the specific scientific priorities. There was a general consensus that the mission as currently envisioned, with a 25-meter class orbiting telescope that operates at frequencies up to 86 GHz, is both scientifically exciting and technically realizable. The consensus of the workshop attendees will be used to generate a more detailed science "white paper," which will be produced by the end of the year. The most important scientific goals, agreed on at the workshop, are listed below.

Primary Goals:
(1A) Black holes and other compact objects How are they fed and what do they do with the fuel?

(1B) Accretion disks: What is the physics, and the connection, of big disks, little disks, and compact central objects, both in active galaxies and in active binary stars and star-forming regions in our own Galaxy?

Secondary Goals:
(2A) Gravitational lenses. Explore the population of compact objects in the mass range less than a million solar masses, and use lenses as cosmic telescopes to enhance angular and linear resolution of distant objects.

(2B) Coronae in active stellar systems: Measure emission from stellar coronae on scales smaller than a stellar radius, and image highly polarized stellar flares to probe for coherent emission processes.

For more information about ARISE and related science and technology, please consult the new ARISE web site at (http.//arise.jpl nasa gov/)

J. S Ulvestad

VLBI Network Call For Proposals

Proposals for VLBI Global Network observing are handled by the NRAO. There are usually 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
11 Nov to 02 Dec 1998	5 cm, 6 cm, 18 cm, 3.6 cm	01 Jun 1998
11 Feb to 04 Mar 1999	6 cm, 18 cm, 0.7 cm?	01 Oct 1998
27 May to 17 Jun 1999	6 cm, 18 cm, 3.6 cm?	01 Oct 1998
09 Sep to 30 Sep 1999	6 cm, 18 cm, 1.3 cm?	01 Feb 1999
12 Nov to 03 Dec 1999	6 cm, 18 cm, 5 cm?	01 Jun 1999

Each session will probably comprise observations at three bands. First priority will be HALCA observations in the 6 cm and 18 cm bands. The third band for each session has not been finally chosen; the bands above marked with a question mark have been suggested, but the final choice of bands for sessions in 1999 has not yet been made

It is recommended that proposers use a standard coversheet for their VLBI proposals. Fill-in-the-blanks TeX files are available by anonymous ftp from ftp cv nrao.edu, directory proposal or via the VLBA home page on the 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's Schedulers on or before the proposal deadline date; allow sufficient time for mailing. In general, fax submissions of Global proposals will not be accepted. Proposals requesting use of the Socorro correlator must be sent to NRAO even if they do not request the use of NRAO antennas; proposals for the use of the Bonn correlator must be sent to the MPIfR if they do not request the use of any EVN antennas. For Global proposals, or those to the EVN alone, send proposals to:

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

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

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

Proposals may also 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

The Smooth October 1 VLA and VLBA Proposal Deadline

The October 1, 1998 VLA and VLBA proposal deadline went very smoothly, and we thank all of you for your cooperation. Of the 175 proposals submitted, about half arrived before the last submission day—a new record, and we extend our extra special thanks. About 85 percent of the proposals now are submitted by e-mail.

A few considerations to keep in mind for future deadlines:

(1) If your proposal is larger than 5 Mbytes, it will be automatically rejected, and you will receive detailed instructions on how to submit the proposal via ftp.

(2) Please remember proposals must be in "pure" postscript format No other forms will be accepted

(3) Submit a proposal only once. If there is a problem printing it, you will be informed as soon as possible. This may take several hours on the proposal deadline day. If you wish to submit a revised proposal, please indicate clearly in the subject line that this submission should take precedence over a clearly specified previous submission.

L. S. Appel and J. L. Nance

12 METER

Improvements to the 12 Meter Telescope

During the 1998 summer shutdown period, the following improvements were made to the 12 Meter Telescope system:

New digital correlator: See article below.

Filter bank adjustment: The filter bank spectrometers require adjustment and cleaning each summer shutdown. A number of bad channels were repaired and some faulty components were replaced.

Dome repair: The 12 Meter Telescope dome cover was last replaced in September 1980. Mainly due to an active repair and maintenance program developed by Jeff Kingsley, the current dome cover has lasted for approximately 18 years. Unfortunately, the dome fabric has been decaying for several years and is now badly in need of repair. During summer shutdown the dome repair activities consisted of re-stitching a number of seams in the fabric and patching a number of tears and holes in the material. In addition to the repair of the dome fabric, the track and wheels, door track and rollers, door arch beam, power track, and azimuth drive were inspected and repaired where necessary.

All of the 12 Meter front-end received their usual summer clean-up, The cryogenic systems were cleaned and repaired where necessary. A problem with the 3 mm LO channel 1 mixer-feed-lens assembly (called a "rocket") was discovered and repaired.

New IF cables: A section of the IF cable system of the telescope was replaced with new Heliax coaxial cable. This upgrade will improve the attenuation and frequency response slope of the IF signal distribution system

Central selection mirror: The central selection mirror friction drive bearings were replaced and the drive was precisely aligned. This should improve the repeatability of the system and remedy a problem with position drift in this system.

Prime focus rebuild. The focus-translation mount was outfitted with digital encoders in all three axes (radial, north-south, and east-west focus) with a resolution of ± 2 microns. This unit was also cleaned and lubricated. The existing LVDT analog drive system will be used until a new digital electronics drive system can be completed and tested. Much of this work was done by Paul Greve, a visiting engineering student from Grenoble.

NRAO Tucson home page: We have revised the NRAO Tucson home page. New and updated information has been added to this web site.

User's manual update: The 12 Meter User's Manual has been revised In addition to some minor rearranging, the continuum and spectral line observing sections have been rewritten and several new appendices have been added Comments on this document are appreciated.

J. G Mangum for the Tucson Staff

New Digital Correlator for the 12 Meter Telescope

A new digital auto correlator has been installed at the 12 Meter Telescope This new millimeter correlator (MAC) follows closely the GBT correlator design and uses the same type of correlator chip The MAC replaces the hybrid correlator which has been in use at the telescope for approximately ten years. The MAC will support the existing 1.3 mm and 3 mm, and any future, multi-beam systems on the telescope. The MAC has an instantaneous bandwidth of 950 MHz; the old hybrid correlator system only supported 300 MHz in 8-beam mode. 300 MHz is inadequate for some galactic observations at 1.3 mm, and inadequate for most extra-galactic observations. The MAC does not rely on hybrid technology, so it will avoid the platforming and ramping problems which existed in old hybrid correlator. Further information on the MAC can be found at (http //www.tuc.nrao.edu/news/new_correlator html).

J. G. Mangum for the Tucson Staff

IN GENERAL

Observatory-Wide Computing Developments

In recent months, much of the Observatory-wide computing effort has focused on the development of a status report and long-range plan for computing at NRAO. The intent is to cover all major aspects of computing at all sites. The document will be used primarily for internal planning purposes and will be updated annually.

One of the chronic problems in radio astronomy, which has been steadily worsening over the past few years, is the time required to load and back up large data sets (i.e., up to tens of gigabytes) As well as large overall size, we are beginning to see more VLBI experiments with individual files which, in FITS format, exceed the storage capacity of a single high-density Exabyte tape; these files therefore cannot be backed up on traditional tape media. NRAO already has two Digital Linear Tape (DLT) drives, one each in Socorro and Charlottesville. While the capacity and transfer rates of these drives have lived up to the claims for the technology, we have some concerns about the robustness of the hardware and the media for general use. There are now funds available to purchase several additional drives providing this capacity (minimum 20 GB per tape) and transfer speed (>3 MB/sec), and we have ordered two Exabyte Mammoth drives for evaluation. While these drives do not have quite the capacity or speed of DLT, the hardware and media are less expensive and may be more durable for use by many different people. Results of our tests will be reported in the next NRAO Newsletter.

Observatory-wide computing is also in the process of purchasing enough licenses of an anti-virus program to cover all PCs connected to our networks. One of the features of this program is that it can run continuously and scan all files downloaded from the Internet or transferred from removable media. While there has been no major virus propagation within NRAO, they do appear on small numbers of systems fairly regularly; this software should reduce the frequency and spread of viruses.

M. R. Milner

Charlottesville Computing Developments

As part of the Observatory-wide program to upgrade NRAO's rapidly aging workstations, Charlottesville took delivery of several Sparc Ultra 10 and Intel Pentium II 450 systems. At the time of writing, these are currently being deployed One of these Intel systems will replace a public IBM RS/6000 system which has reached the end of its useful life. The AIPS performance as measured on the Intel systems is better than expected; details will be made available on the AIPS web pages as time permits.

In cooperation with systems personnel at the other main sites, Charlottesville Computing staff has set up a Windows NT server which acts as a "domain controller" in conjunction with similar servers in Green Bank and Socorro. It is expected that this will greatly simplify the administration of our pool of Windows-based PC systems A personnel change occurred this quarter. Jeff Uphoff, who started out with the Computer Division almost five years ago and who was perhaps single-handedly behind the exploration, adoption and deployment of Linux within NRAO, has left us for greener pastures. He now works for a Silicon Valley start-up called TransMeta; this is the same company that hired Linus Torvalds. We wish Jeff the best with his new responsibilities

P. P. Murphy

AIPS++ Beta Release

The next AIPS++ beta release (our third) is planned for the week of October 12 This release has been long in the preparation but contains many, many changes from the previous release, ranging from improvements to the user interface to a number of new applications and capabilities.

Following this release, we will switch to a rapid-update approach whereby a new release of the latest stable version of AIPS++ will be made monthly. This will enable our beta-testers to receive bug fixes more quickly and will also enable us to release new functionality as it appears in the system This rapid-update approach will continue until our first public release, planned for Spring 1999.

Recent news on the developments in AIPS++ and on the various uses that AIPS++ is now being put to can be found in our very successful newsletter series, edited by Bob Hjellming and Kate Weatherall This, and other information about AIPS++, can be found from our new home page at (http //aips2.nrao edu)

T J Cornwell

1998 and 1999 Summer Students

The 1998 Research Experiences for Undergraduates at the NRAO has ended with the 19 undergraduate students and four graduate students heading for their colleges from the four NRAO sites. As examples of the sorts of research conducted by students and their advisers at the four NRAO sites, interested parties may find a short summary of the research accomplished by the students on the web at (http //www.cv.nrao edu/~awootten/reu98.html).

Information and application forms have been mailed soliciting applications for research assistantships next summer. The majority of the assistantships will be offered to undergraduate students who are currently enrolled in US undergraduate institutions and who will not receive their degrees before or during the summer of 1999. We currently anticipate that 15 positions will be available in 1999 A limited number of assistantships will be available for graduate students or students from non-US institutions.

The deadline for receipt of application materials will be January 20, 1999, notice of decisions will be sent by March 1, 1999. Forms are available from department heads, on the web: (http://www.cv.nrao.edu/~awootten/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

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