



NRAO NEWSLETTER

1 April 1997

No. 71

IN GENERAL

THE MILLIMETER ARRAY

In February, we were very pleased to learn that the National Science Foundation (NSF) plans for FY1998 include funding for the Design and Development phase of the Millimeter Array (MMA). The D&D work is a three-year program addressed to the detailed design and prototype of major MMA subsystems. At the conclusion of this phase we expect to be able to demonstrate the technical performance of the critical MMA instrumentation and to use the experience to anchor the construction cost estimate for the array. The NSF FY98 plan requires Congressional approval and the funds for the MMA and other NSF programs will have to be appropriated by Congress. The Congressional authorization and appropriation process will occur over the next six months.

The MMA construction itself, a project that will require an additional six years, will need separate approval both by the NSF and through Congressional appropriation.

It is interesting to consider what we are trying to design: it is an array to be complete in the three years of the D&D phase plus the six years of actual construction; together this brings the

completion date to 2006. This time scale makes the project very much like a space project with the same potential liability, namely that if one designs an instrument at the state-of-the-art today it might be well behind the state-of-the-art by the time it is complete. We don't want that to happen. The alternative is to be aggressive with the technical design and build in some well defined fallbacks. We will adopt the latter approach which we believe can lead us to a state-of-the-art instrument in 2006.

The hallmark of an innovative design is the sound ideas of creative people and to this end we hope to recruit to the MMA D&D project the participation of many experienced people in the U.S. millimeter-wave community. A vital aspect of this is a broadening of the involvement of the MMA Development Consortium, both through the MDC working groups and via specific design tasks done on the existing arrays and later on the merged university array. In the next several months the details of this collaboration will be defined in a way that we anticipate will strengthen all of U.S. astronomy.

R.L. Brown

ATACAMA ARRAY WORKSHOP

On March 16-19 a joint Japan-U.S. workshop was held in Tokyo to discuss the scientific opportunities that would arise should it be possible to combine the capabilities of the MMA with those of the similar Japanese project called the Large Millimeter and Submillimeter Array (LMSA). Sites being studied in Chile for both the MMA and the LMSA are large enough in principle to accommodate both arrays and, were the two instruments to co-locate, one could construct for little incremental cost a combined array configuration 10-15 km in extent that would permit observations at ~10 milli-arcsecond resolution at millimeter and submillimeter wavelengths. The combined instrument is referred to as the Atacama Array (named after the Atacama desert that dominates northern Chile west of the array sites being studied in the Altiplano of the Andes). The Atacama Array is very much a "virtual"

instrument because neither one of its constituent parts, the MMA and LMSA, yet exist. Nevertheless, should it become a reality it is in the interest of both the Japanese and the U.S. groups to provide a means to exploit the capabilities inherent in the Atacama Array concept in a way that extends the scientific program presently forecast for the MMA and LMSA alone. This requires planning; hence the need for the joint workshop.

Nearly 120 scientists attended the Atacama Array Workshop. The meeting was hosted by the National Astronomy Observatory of Japan and the Nobeyama Radio Observatory. The meeting venue was the National Olympics Memorial Youth Center south of the Shinjuku area of Tokyo. Invited and contributed papers were presented by more than 50 speakers on

very high resolution millimeter and submillimeter observational opportunities that the Atacama Array would support on objects from those in the solar system, to those in protostellar and protoplanetary disks, and those in forming galaxies at cosmological distance. Poster papers provided an interesting supplement to the oral presentations. A lively discussion of the technical compatibility issues that need to be addressed followed the scientific sessions.

As a purely practical matter having both arrays occupy sites in proximity to each other, and for that matter in proximity to other observatories existing or planned in northern Chile, provides an opportunity for substantial cost savings in items related to capital infrastructure, staffing, and common facilities. For this reason alone collaborative discussions are useful and indeed it is considerations such as this that have led to a series of MMA/LMSA meetings dating back three years. The

Atacama Array science workshop is an extension of this effort; we are grateful to all the participants and especially to the NAOJ/NRO local organizing committee for a very stimulating meeting. We are grateful also to the International Division of the National Science Foundation and the Japan Society for the Promotion of Science, agencies that co-sponsored the workshop.

The Atacama Array Workshop provided an important perspective into the science goals that could be done with ~10 milli-arcsecond angular resolution and the priorities for such research. The next step is to use this perspective to examine carefully the technical compatibility of the MMA and LMSA planning. A meeting on this topic will be held around the first of the year.

R. L. Brown

AIPS++

AIPS++ has passed an important milestone with the beta release made on February 26. This version (0.8) of AIPS++ has been installed at all NRAO and other AIPS++ consortium sites and a few external sites, and is now being tested. Anyone interested in acting as a beta tester is invited to contact Tim Cornwell (tcornwel@nrao.edu). The release is patched for minor upgrades every few weeks, and two more major beta releases are planned before a general open release of the system in the fall.

AIPS++ is now being used for real-time reduction of observations from the Australia Telescope Parkes Observatory 21 cm Multibeam Receiver System. To see a display of results and for more on the multi-beam project, see:

http://www.pkts.atnf.csiro.au/people/multi/public_html/live/multibeam_live.html.

T.J. Cornwell

COMPUTING FACILITIES IN CHARLOTTESVILLE AND ELSEWHERE

As part of the computer procurement at the end of 1996, there are now several powerful computers for general use in Charlottesville.

- 2 DEC Alpha 500
- 1 DEC Alpha 3000
- 2 IBM RS/6000
- 1 Sun Ultra2 (dual processor)
- 1 Sun SPARCStation20

The new machines (DEC Alpha 500/400 and Sun Ultra2) have more than 20 GB of user disk space available.

Visitors who would like to reserve one of these should consult Jim Condon <jcondon@nrao.edu> or Gareth Hunt <ghunt@nrao.edu>.

As mentioned in the previous issue (No. 70, 1 January 1997), new public workstations were acquired in 1996 and are now available for use. Two of these are in Tucson, one in Green Bank, two in Charlottesville, and six in Socorro. All except the Dec Alpha 500 in Charlottesville are Sun Ultra computers.

The cost of these acquisitions was covered partially by removing the old public IBM RS/6000 computers in Socorro and Charlottesville from their maintenance contract. Most of the IBMs are still available for use, but will not be repaired when they break. In the case of CPU failure, data on disk can be recovered (with difficulty). They will obviously be phased out gradually.

G.C. Hunt

THE VLA FIRST SURVEY RESULTS ON-LINE

Faint Images of the Radio Sky at Twenty-cm are now available on-line at the FIRST Survey's URL: <http://sundog.stsci.edu>. The complete set of 9735 coadded images covering the 3000 square degrees observed in the B-configurations of 1993, 1994, and 1995/6 are served at full resolution (and unmodified for compression) from a machine at the Institute for Geophysics and Planetary Physics at Livermore. Thus, a user can specify a sky position, an image size from arcseconds to degrees, an image display scaling factor, and whether the image is desired as a GIF image on the screen, a FITS image loaded automatically into a pop-up SAOimage window, or a FITS file for off-line analysis. This capability has also been integrated into the FIRST catalog search engine. This powerful browser now allows the user to enter a sky position and search radius to obtain a complete listing of FIRST radio sources within a given region. In addition to the line of catalog information on each source are three buttons: "NED" performs an on-the-fly search

of the current NED database (in which FIRST sources are now the most common entry), "DSS" pops up the Digitized Sky Survey optical image of the region requested, and "FIMG" retrieves the full-resolution radio image as described above. The catalog now contains over a quarter of a million radio sources with subarcsecond positions down to the survey threshold of 1.0 mJy. For those requiring large quantities of image data, the archives of the NRAO, the STScI, the Canadian Astronomy Data Center, and Mullard Radio Observatory at Cambridge all have the survey database online and available for downloading.

We welcome suggestions from users for improvements we could make in the utility of the FIRST data products.

D.J. Helfand

1997 JANSKY LECTURER

It is a pleasure to announce the selection of Professor James Peebles of Princeton University as this year's Jansky Lecturer. Professor Peebles is well known for his seminal work in many areas of Physical Cosmology like the determination of the primeval abundance of ^4He , the formation of structure in the universe, the genesis of anisotropies in the cosmic microwave background, and his proposal that searches should be made for primeval galaxies. He pioneered the use of statistical tools to

describe the large-scale structure of the universe introducing the two-point correlation function as well as higher-order estimators. His influence has shaped research in cosmology over the last 30 years through his numerous articles and well-known books. The Jansky Lecture will be given in Charlottesville on October 28 and in Socorro on October 31, the topic to be announced at a later date.

P.A. Vanden Bout

IAU COLLOQUIUM 164: RADIO EMISSION FROM GALACTIC AND EXTRAGALACTIC COMPACT SOURCES

This international meeting will be held in Socorro, 1997 April 21-26. Preparations for the meeting are well advanced. About 200 visiting participants are expected from about 20 countries. Many NRAO staff will participate as well.

This meeting marks the 30th anniversary of the first successful experiments in Very Long Baseline Interferometry (VLBI). The meeting's scientific program reflects the rapid maturing of VLBI as an astronomical research tool, and covers topics as diverse as gamma-ray blazars, molecules and atoms in active galaxies, intraday variability, gravitational lenses, black holes in nearby galaxies, astrometry of pulsars and stellar companions, supernova evolution, and magnetic fields in stellar atmospheres. A special session is also planned for users of the first space VLBI mission (VSOP/HALCA).

Lists of oral and poster papers, plus abstracts of all papers, are available from the IAU164 web page. That page can be reached by selecting "Meetings & Workshops" from the NRAO home page at <http://www.nrao.edu/>. The conference proceedings are scheduled for completion this summer. Preprints will be made available on the WWW.

If you have further questions regarding this meeting, please send email to iau164@nrao.edu.

The meeting organizers wish to acknowledge the sponsorship of IAU commissions 28 (Galaxies) and 40 (Radio Astronomy), URSI (commission J), NRAO/AUI, and the New Mexico Institute of Mining and Technology.

J.M. Wrobel and J.A. Zensus

NRAO POLICY REGARDING PROPOSALS FOR UNUSUALLY LARGE AMOUNTS OF OBSERVING TIME

A committee consisting of Alan Bridle (chair), Don Backer, Ed Churchwell, Martha Haynes, Jackie Hewitt, Dave Hogg, and Fred Lo was asked to consider whether or not the NRAO should have a policy for the consideration of unusually large observing proposals. If so, what should the policy be?

Their report can be found at the NRAO URL: <http://www.cv.nrao.edu/~abridle/lpc/lpc.html>. The report recommends that there be a policy for the treatment of large proposals and the committee's recommendations for that policy have been adopted. The following is a summary of the policy.

Expanded "Skeptical Review." All proposals that ask for more observing time than a (telescope-specific) threshold, and, at the NRAO Director's discretion, some proposals requesting less time than this, will initially be evaluated by an expanded "skeptical review" panel of five or more referees.

The panel will be drawn from the normal pool of proposal referees for the telescope, augmented if necessary by others who have recently been proposal referees. The panel will be roughly balanced between "experts" in the astronomical sub-discipline addressed by the large proposal, and cross-disciplinary "skeptics."

The panel will assess: the scientific priority for the proposal in competition with all other astronomy that is being done at the telescope; whether the telescope is well suited to the proposal; whether the total duration proposed for the project is well-defined and commensurate with the scientific priority; whether there should be any proprietary holding time for the data, and if so, for how long; whether the proposal is suitable for use as a back-up project in a dynamic scheduling strategy for the telescope. The panel will provide the Director with a recommended course of action and a summary of its deliberations.

Thresholds. For the VLA and VLBA, the threshold for skeptical review is around 300 hours of observing time. For the 12 Meter Telescope it is around 1000 hours. For the GBT, the threshold will change as new instruments and higher-frequency capabilities are commissioned, and will need continual review. In all cases, these thresholds are explicitly

fuzzy and the Director has the option to send some proposals below these thresholds for expanded "skeptical review."

Volunteering for Skeptical Review. Proposers of moderate-sized (below-threshold) projects may also volunteer for expanded "skeptical review" of their proposals. This option provides a way to obtain a stronger guarantee of observing time for moderate-sized projects whose science could clearly be advanced by receiving such guarantees, in return for submitting them to a more demanding initial review. This option is expected to be used rarely, and only in exceptional cases where the science would suffer if the project was done piecemeal through the regular proposal process.

Ongoing "Expert Review." The skeptical review panel for a large proposal will also advise the Director whether any further "expert review" of the proposal is needed in four main areas: scientific issues of observing strategy; technical issues of observing strategy and data acquisition; ongoing review of project progress; and public availability of the data products.

Not all large proposals will require further review in all of these areas, and many may not require further review at all. If a highly-rated large proposal is of sufficient scope or technical complexity to warrant ongoing review, the NRAO will make every effort to achieve this without over-burdening either the proposers or the expert referees. The arrangements for any ongoing "expert review" would be made at the discretion of the Director on a case-by-case basis.

Upper Limits to the Total Time for Large Proposals. If several large proposals for a given telescope are highly rated by the skeptical review panels, the Director will seek advice from a cross-disciplinary subset of the regular proposal referees about upper limits to the fraction of all observing time that should be devoted to them. Such upper limits are not to be interpreted as "quotas" to be filled with large projects.

No Announcements of Opportunity. The NRAO will not make "announcements of opportunity" for the submission of large proposals. Large proposals should be submitted at the normal proposal deadlines, without special solicitation by the Observatory.

GREEN BANK

GREEN BANK TELESCOPE

Thanks to a mild Green Bank winter (the mildest on record by some accounts), work on the GBT has progressed well since the last report. The site is a busy place with close to 100 workers engaged in the construction, including ironworkers, operating engineers, painters, electricians and management staff. The accompanying photographs depict the structure status in mid-February. Additional progress has been made since the photos were taken. For example, on the antenna the horizontal feed arm is now complete with the exception of four small (a relative term) cubes which tie the two ends together. In addition, all counterweight boxes are now in place and welded, and the actuator room and access walkway are in position. Electricians are wiring the three remaining servo control cabinets in the equipment room on Level One.

On the ground, the backup structure (BUS) is approximately 90 percent complete. All BUS parts are on site and of the 6,652 pieces in the BUS, about 6,000 are in place in the trial erection. Truss assembly is continuing and all the trusses should be made within two months. In addition, some of the

large weldments which make up the permanent BUS supports are being added to the structure. Walkways to facilitate the installation of the over 2,200 active surface actuators also are being built. The upper feed arm with all of its mechanisms and the feed room are nearly ready for testing.

Work through the spring will consist mainly of completing the BUS on the ground and preparing to separate it into the 22 modules for lifting onto the structure. The first module is scheduled to go up in June with additional modules following weekly through the summer, fall, and early winter. The lower vertical feed arm will begin its upward growth on the end of the horizontal feed arm later in the summer. That season will also see construction of a heavy lifter crane necessary for part of the BUS erection, as well as the smaller, but no less necessary, jobs such as installation of access walkways, cable trays, actuators, continuance of the necessary HVAC and electrical work, and cable pulling.

W.H. Porter

NRAO SYSTEMS FOR THE GBT

In January, the GBT Electronics and Monitor/Control groups began to assemble and interconnect most of the GBT electronics and monitor/control hardware in the basement of the Jansky Lab. This facility will allow us to test the entire receiving chain (including cryogenic front-ends, local oscillators, IF systems, and certain backends) with the controlling computer hardware and software. Currently, most of the initial set of hardware is in place and system debugging has begun. Development of the computer screens for user interfaces is underway. These will be evaluated and improved in conjunction with the system mockup.

Construction of the new GBT spectrometer is nearing completion and debugging is underway. Software for the spectrometer is now under development, and our goal is to move the spectrometer to Green Bank this fall for integration with the IF system and with the GBT monitor/control software.

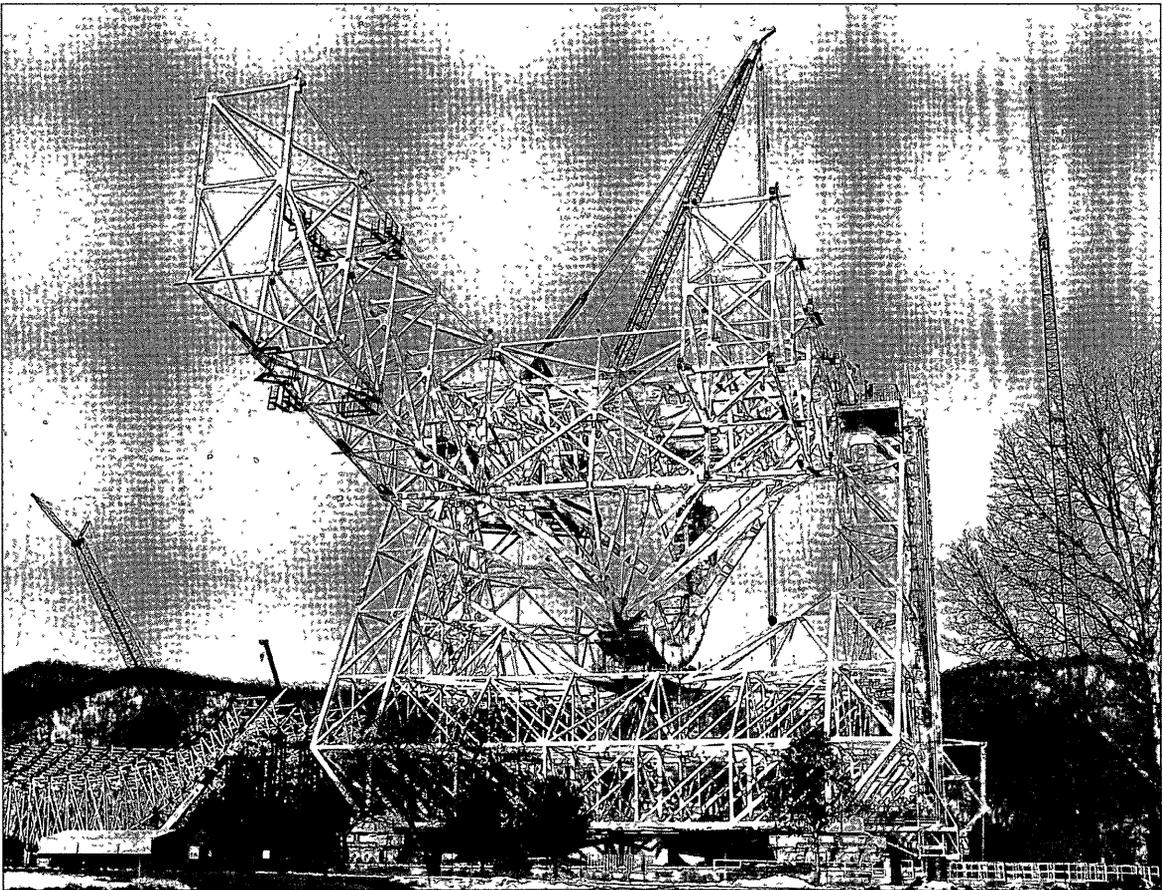
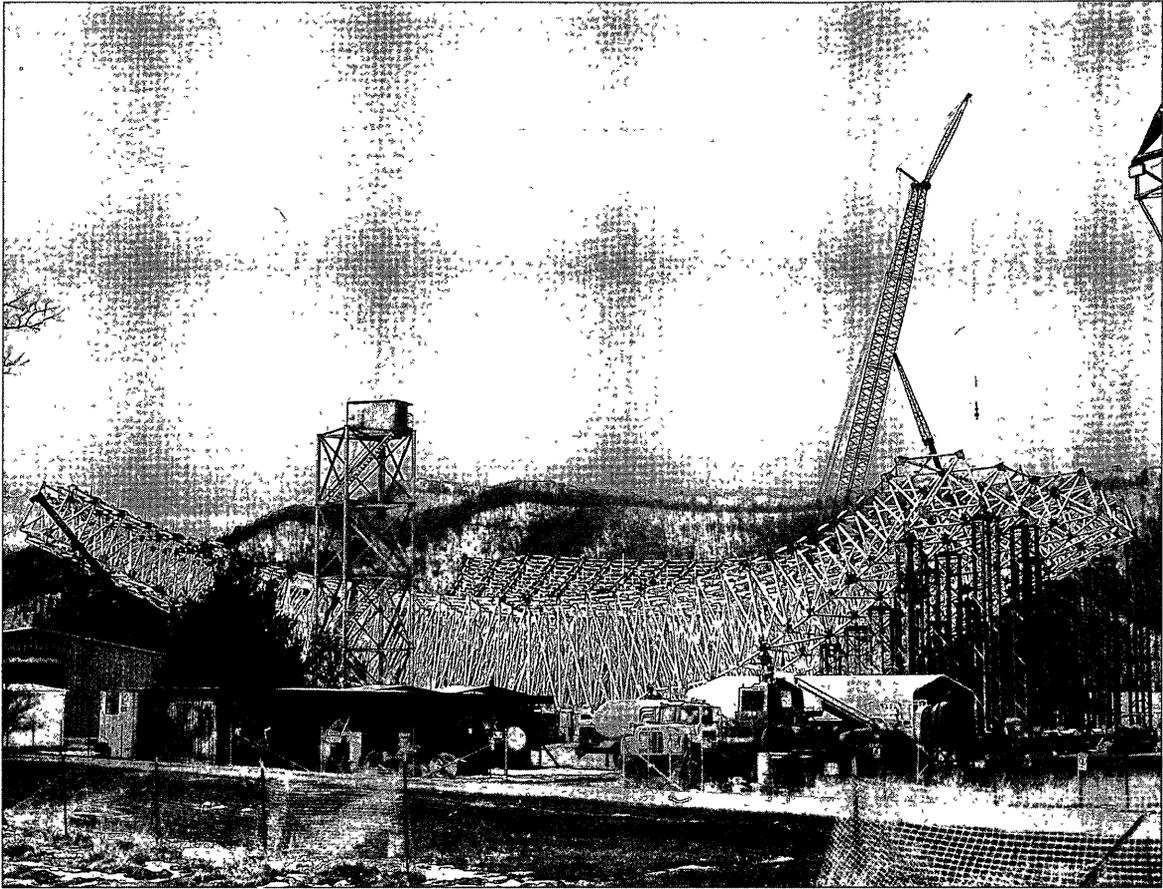
The NRAO team that is responsible for monitoring the contractor's antenna servo development, and for the NRAO software that interacts with these servos, are looking forward to the start of field tests of the contractor's feedarm servo systems. These systems control the subreflector positioner and other feedarm mechanisms. Field tests will begin in April and will be the first opportunity to evaluate the servo performance while attached to the actual mechanisms. Software interfaces and portions of the NRAO control software will also be tested with the servo systems.

This past winter concrete was poured for nine of the twelve laser rangefinder ground monuments planned around the perimeter of the GBT site. Underground cable conduits for seven of these are now in place, and we are preparing to outfit these monuments this spring and summer. Production continues on the twenty rangefinders required to measure the surface and pointing, and is scheduled for completion by this fall. This summer, the laser testbed facility around the base of the 140 Foot Telescope will demonstrate tracking of multiple targets on the moving antenna and an attempt will be made to correlate the laser ranging data with 140 Foot pointing measurements. This experiment is a major step toward development of the GBT precision pointing strategy.

It is expected that this summer the contractor will begin installation of surface actuators on the backup structure. The NRAO Open-loop Surface group has completed virtually all the hardware development associated with the surface actuators and the associated software is scheduled for completion by this winter. Over 2000 surface retroreflector assemblies have been completed.

Within a few weeks, we will go out for bids for the construction of a control building at the GBT site. Construction drawings and plans are now being completed, and we hope to begin construction this summer.

R.D. Norrod



CONSTRUCTION PROGRESS OF THE GREEN BANK TELESCOPE (GBT)

GREEN BANK BEGINS REGULAR SUPPORT OF THE VSOP PROGRAM

The Green Bank Earth Station support of the Japanese Space Agency VLBI Space Observing Platform (VSOP) began on 1997 March 21. The VSOP satellite was acquired shortly after satellite rise and downlink data were recorded until scheduled satellite hand off. The station real-time logs indicate downlink from the satellite was un-broken the entire tracking pass.

During the tracking pass, wide-band data were written to VLBA tapes. Satellite Telemetry header data were successfully extracted, and this data was made available in near real time. Calibration tones injected into the spacecraft RF system were extracted at the tracking station. The calibration tones were confirmed to be present in both C and L bands at

approximately the expected signal level.

Electronics and software systems testing will continue throughout the In-Orbit-Checkout phase.

Also during the week, Max Avruch and Fronney Crawford, two graduate students from MIT, came to Green Bank to make the first interface tests of the MIT Near Real Time Correlator. The interface to the 140 Foot Telescope was successfully checked. The interface to the tracking station antenna was not checked, but will be checked in early April 1997.

G.I. Langston

140 FOOT NEWS

A number of proposals have been received in response to the final call for 140 Foot proposals given in the last issue of the Newsletter. These are now being refereed. All observers who have a proposal in the 140 Foot queue will be informed in May of the status of their project.

An S2 VLBI recording system has been received from the Canadian Space Agency and has been installed at the telescope. It will be used for experiments in conjunction with

VSOP. The GBT C band receiver is nearing completion and will be installed at the 140 Foot Cassegrain focus sometime this summer. This will allow rapid switching between C, X, and K band experiments. When these systems are operating we will try some experiments in contingency scheduling that should give us experience that will be relevant to the GBT.

F.J. Lockman

INTERFERENCE MONITORING AT GREEN BANK

An interference monitoring program was conducted with the NRAO 140 Foot Telescope from May 1995 to July 1996. The sky frequencies monitored during the program ranged from 50 MHz to 3.4 GHz. The monitoring data were analyzed by Samantha Fore, an undergraduate at Virginia Tech, who has worked at NRAO through a student cooperative work program. Ms. Fore's results can be found at <http://www.gb.nrao.edu/~sfore>. The results are presented as spectra of interference

amplitude and frequency of occurrence. With these spectra, one can estimate to what degree interference may adversely impact spectral line observations. Additionally, the spectra can be used to identify relatively clean observing bands for continuum observations.

M.M. McKinnon

12 METER

NEW DIGITAL CORRELATOR FOR THE 12 METER TELESCOPE

Work has begun on a new digital correlator for the 12 Meter Telescope. This new correlator will follow closely the GBT correlator design, will use correlator chips already owned by NRAO, and will be a replacement for the hybrid correlator now in use at the telescope. It will support the existing 1.3 mm and 3 mm, and any future, multi-beam systems on the telescope. The new correlator will have an instantaneous bandwidth of 950 MHz; the current hybrid correlator system only supports

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 new system will not rely on hybrid technology, so avoiding the platforming and ramping problems which exist in the existing hybrid correlator. We hope to complete the project in two years.

D.T. Emerson

1 mm ARRAY RECEIVER STATUS

The 8-beam 1 mm array receiver has been in routine use on the telescope since late January. The 4x2 beam cluster can map in both (RA,Dec) and (lII,bII) coordinates while tracking parallactic angle with an arbitrary position angle offset. The current performance of the receiver represents a substantial gain over the existing dual-beam system for making narrow-bandwidth maps of extended regions. We are currently

working on solving an instability in the system which can adversely affect baseline stability for wide-bandwidth measurements. Several observing teams will be using this system over the next several months.

J.G. Mangum for the Tucson Group

RECENT CHANGES TO THE 12 METER TELESCOPE HOME PAGE

Some recent changes to the 12 Meter Telescope home page (<http://www.tuc.nrao.edu/12meter.html>) have improved the information we provide to prospective observers. We have added a page which contains information on the current status of all of the telescope systems. We update this status page approximately every week so that observers with impending observing sessions can better plan their observations. We are

also working to supply html-format versions of many of the documents for prospective observers as a supplement to the existing postscript-format versions. Comments regarding the 12 Meter home page are encouraged and appreciated.

J.G. Mangum

NOTE TO 12 METER TELESCOPE OBSERVERS

In order to make the best use of the telescope, prospective and scheduled observers are strongly encouraged to contact the Friend of the Telescope, Jeff Mangum, for advice regarding their proposed experiments. This is of particular importance for observers conducting 8-Beam and on-the-fly experiments

given the complexity of these observing modes. Send questions via email to jmangum@nrao.edu or by voice to 520-882-8250 x113.

J.G. Mangum and D.T. Emerson

VLBI/VLBA

SPACE VLBI

The orbiting element of the Japanese Space VLBI mission, VSOP, was launched successfully by the Institute for Space and Astronautical Science (ISAS) on 1997 February 12. This spacecraft, originally known as Muses-B and renamed HALCA after launch, has subsequently deployed its 8-m effective diameter radio astronomy antenna, and has begun an extensive in-orbit checkout program. The first Space VLBI observations are scheduled for the nominal issue date of this Newsletter; the first to be correlated at the AOC will be observed a few days later, on 1997 April 4.

All tests of the VLBA correlator's Space VLBI capabilities that could be performed in advance of receiving these data have been completed successfully. Many of these tests were described in NRAO Newsletter No. 70.

A correlator software release brought several new Space VLBI features into the standard operational code. Increased aggregate output data rates, to reach finally the correlator's original specification of 500 KB/s, are now available for VSOP

as well as for general VLBI observations. Deformatting of the Mark 4 data format, written by new or upgraded equipment at EVN and DSN stations, is essential for the 16-MHz bandwidths of the VSOP/VLBA compatible mode. (Pending further tests, however, we are not yet accepting Mark 4 format for ground-based observations.) Enhanced fringe-rotation rate computations perform better in the presence of high geometric rates and LO offsets. New tables attached to the correlator's FITS output describe more completely the orbit used in generating the spacecraft's wavefront model.

AOC personnel involved in Space VLBI have been participating actively in planning and scheduling the in-orbit checkout and early scientific observations. Development of local operational procedures has continued.

The forthcoming AIPS APAR release emphasizes various specialized Space VLBI tasks. AIPS users analyzing VSOP observations must use this or a later version. A first draft of an AIPS Cookbook chapter on Space VLBI data reduction has

been completed. Testing of AIPS's Space VLBI capabilities using simulated data, primarily in the areas of fringe-fitting and model-fitting, has continued.

As part of our user-support program, we have purchased a high-performance Silicon Graphics computing facility, consisting of an Origin 200 compute server and two model O2 visualization workstations. NRAO personnel tested such a configuration at the SGI location in Albuquerque, and measured an AIPSm⁽⁹³⁾ of 13.7 in simultaneous dual-user mode. Selected primarily to support the demands of Space

VLBI fringe-fitting and imaging, this system will be available on the usual sign-up basis for users coming to Socorro to analyze VSOP observations.

An AOC Space VLBI web page has been created, reachable via the NRAO or the NRAO/Socorro home pages. In addition to general information on the NRAO Space VLBI project, we will post updates on our correlation of in-orbit checkout observations on this site.

J.D. Romney

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
21 May to 15 Jun 1997	1.3 cm, 6 cm, 18 cm *	01 Oct 1996
08 Sep to 01 Oct 1997	1.3 cm, 6 cm, 18 cm, 3.6/13 cm	03 Feb 1997
03 Nov to 27 Nov 1997	1.3 cm, 6 cm, 18 cm, 3.6/13 cm	02 Jun 1997

* On the EVN, also includes 5 cm line observations

It is expected that European VLBI observing during the next 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 proposals, send proposals to:

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

B.G. Clark

OPPORTUNITY TO REQUEST ACCURATE SOURCE POSITIONS

NASA, the USNO, and NRAO have a joint geodetic/astrometric project on the VLBA which uses 24 hour observations approximately every 2 months. This project serves multiple purposes including measuring VLBA baselines, tying the VLBA to the geodetic reference frames, supporting the celestial radio reference frame, and advancing the techniques of geodetic and astrometric VLBI. It is possible to insert a small number of extra sources into these observations to obtain positions with milliarcsecond accuracy. These

positions are determined during the normal reduction of the whole observing session.

NRAO hereby offers a service to the community to provide high accuracy positions of small numbers of sources. The sources must be sufficiently compact to be seen with VLBI at 2.3 and 8.4 GHz and should have flux densities in the compact components of more than 0.2 Jy. At least initially, the program

will be administered informally. Please send requests by email to cwalker@nrao.edu and include the following information:

1. A short scientific justification.
2. Source names.
3. Source coordinates good to at least 0.5 arcseconds.
4. The expected flux densities at 2.3 and 8.4 GHz.
5. Evidence that there will be compact structure.

Requests for positions of more than 10 sources will not be considered. The requested sources will be compared with objects in recent and proposed VLA and VLBA proposals so that conflicts are avoided. Accepted sources will be observed as soon as possible and positions will be returned by email. The results will be public domain immediately and will probably be included in the source lists associated with the geodetic/astrometric programs.

R.C. Walker

VLA

AOC COMPUTING STATUS

In the VLA archive project, significant progress was made in fixing the "antenna file" problem associated with the VLA archive data from 1976 through 1982. Soon we expect to be able to resume the copying and reformatting of the remaining old nine track tapes to exabyte tapes. We expect to conclude this project in the course of 1998.

The IBM RS/6000 workstations, for many years the fastest workstations that NRAO had to offer to its visitors, were retired from active service as public machines. They have been replaced with six dual-processor Sparc Ultra 2 workstations, each with 384 MB of memory and 25 GB of fast disk for data. All of these systems, as well as our two existing Ultra 1/170's, have been connected to Uninterruptible Power Supplies (UPS) so they can continue running through most power failures. The savings from the canceled IBM maintenance contract funded much of the cost of the new workstations. The new systems will be the core of our computing power reservable by visiting observers and in-house staff. Prospective users of these machines are encouraged to browse our Web site for information about booking these workstations. All IBMs except zuni will continue to be in use by local staff until the machines become unmaintainable. The name zuni lives on as one of the new Ultras.

Some changes have been made to the Visitor's Registration form on our web page. Section A has been modified so that scientists or others traveling to the AOC for reasons other than observing or processing data, only need to fill out this part before submitting the form to the NM Reservationist electronically.

Since the new Ultra systems require Solaris 2.5.1, that will become the standard revision of the operating system on Suns

at the AOC. Systems currently running 2.4 will be upgraded during the next few months, as will all but one or two of the remaining SunOS 4 systems.

Three Silicon Graphics workstations, including a powerful four-CPU Origin 200, have been ordered for Space VLBI processing and are expected to be installed by early April. The Origin 200 holds the current AIPSm^{ark}⁽⁹³⁾ record with an impressive 13.7 per processor! In addition, the USNO has purchased an HP 9000/C110 for handling geodesy data, which is now in operation at the AOC.

The upgrade of networking within the AOC to switched Ethernet is in progress, but will take some time to complete. As part of the upgrade, most Suns in the building will be given a dedicated 10Mbps Ethernet link. The new equipment has also allowed us to provide 100Mbps (FastEthernet) networking capability for all of our Ultras.

We have plans for improvements to some services, including dedicating a SPARCstation IPC as our WWW and anonymous ftp server. This should be installed during the spring. The move will be transparent if you use the "www.nrao.edu" and "ftp.aoc.nrao.edu" addresses. Currently both of these services are provided by systems that have a very heavy load from their other required uses.

IDL is now available observatory-wide. The terms of our agreement with Research Systems Inc. require us to remove PV-Wave, so it will shortly disappear. Thanks to the Intranet, a pool of 10 "floating" licenses is being shared among the four major NRAO sites and the VLA.

G.A. van Moorsel

VLA CONFIGURATION SCHEDULE

Configuration	Starting Date	Ending Date	Proposal Deadline
B	14 Feb 1997	27 May 1997	1 Oct 1996
CnB	06 Jun 1997	23 Jun 1997	3 Feb 1997
C	27 Jun 1997	15 Sep 1997	3 Feb 1997
DnC	26 Sep 1997	13 Oct 1997	2 Jun 1997 5 p.m. EDT
D	17 Oct 1997	12 Jan 1998	2 Jun 1997 5 p.m. EDT
A	30 Jan 1998	18 May 1998	1 Oct 1997 5 p.m. EDT
BnA	29 May 1998	15 Jun 1998	2 Feb 1997 5 p.m. EST

The maximum antenna separations for the four VLA configurations are: A-36 km, B-11 km, C-3 km, D-1 km. The BnA, CnB, and DnC configurations are the hybrid

configurations with the long north arm, which produce a round beam for southern sources (south of about -15 degrees declination).

Approximate Long-Term Schedule

	Q1	Q2	Q3	Q4
1997	B	B,C	C	D
1998	A	A,B	B	C
1999	D	D,A	A,B	B
2000	C	C,D	D	A
2001	B	B,C	C,D	D

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 1997, the D configuration daytime will be about 16^h RA, and in 1998 the A configuration daytime will be about 0^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 first observations with the VLBA and the

HALCA long-baseline interferometry satellite will be done in April, and increasing amounts of observing time will be devoted to this through the summer, approaching a long term average of about 30 percent of VLBA observations devoted to space VLBI.

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

NEW FLUX DENSITY MEASUREMENTS OF VLA CALIBRATORS

On December 5, 1996 we implemented a system to automatically measure the flux density of any recognized calibrator as it is observed with the VLA. These flux densities are entered each week into a database accessible via a simple graphical interface on the WWW. Given the highly variable nature of many of the VLA calibrators, this utility should give a much improved estimate of a given calibrator's current flux density compared to the outdated values given in the VLA calibrator manual. This is especially true in the intermediate frequency bands (L, C, X, and U bands), where the accuracy of

the automatic measuring system is typically less than ten percent. At the more extreme P, K, and Q bands the accuracy is more like 30%. For more information see the full description on the VLA calibrator manual web page (<http://www.nrao.edu/~gtaylor/calib.html>). To explore the database, point your Java enabled browser at <http://aips2.nrao.edu/vla/calflux.html>, or access it from the VLA calibrator manual web page.

G.B. Taylor

MINIMUM INTEGRATION TIMES FOR VLA SPECTRAL LINE OBSERVING

Recently, a few spectral line observers have lost data because the integration time they had chosen was too short for the particular combination of number of IFs and number of channels. For various reasons, it is not possible to give exact minimum integration times for each particular observation. Among other things, this depends on the number of subarrays, which usually is not known at the time the observe file is received. More information on this including a table containing conservative estimates for two cases of subarrays is

available on the WWW (http://www.nrao.edu/vla/html/vla_integ.shtml). The same table values are available to the "observe" program which will issue a warning, if appropriate. We are currently investigating methods in which we can detect the occurrence of missing integrations while the observation is ongoing, and switch to a longer integration time if needed.

G.A. van Moorsel

VLA SUMMER MAINTENANCE SCHEDULE

During the time March 31 - September 26, the VLA will employ temporary extra workers to help paint antennas, level track, and replace deteriorating waveguide access ports. The plan calls for painting three VLA antennas plus quadropods as time allows. An antenna being painted will be removed from use while it is being actively worked on, which means that one antenna will be out of the array for painting during the hours 6:30 a.m. - 4:30 p.m., Monday - Friday for much of the seasonal work schedule. Some work in the area of the feeds and the subreflector needs careful masking. It may be necessary to remove an antenna from use around the clock for

up to a couple of days while painting these critical areas. Only one antenna at a time will be removed from use for painting. For specific information on the effect of painting on your observing schedule, contact Gene Cole at the VLA before your run. The track and access port work is not expected to impact the observing schedule.

Maintenance and painting work at several VLBA sites also will interrupt observing but only on a scheduled basis.

E. Cole

AOC VOICE MAIL

The Array Operations Center will begin using a voicemail feature on its telephone system over the next few months. It is currently in use on the main number (505-835-7000) to announce holiday or other unexpected closings of the offices. The Reservations Office (505-835-7357) and Assistant Director's Office (505-835-7300) will accept voicemail

messages. Eventually, most extensions will be on the system and have the ability to receive voicemail.

J.P. Lagoyda



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