



NRAO NEWSLETTER

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MILLIMETER ARRAY

Status of the Millimeter Array

In the first quarter of 1999 substantial progress has been made to secure the merger of the MMA project with the European LSA project. A Memorandum of Understanding (MOU) for the design and development phase of a joint US-European array has been agreed upon and initialed by both the NSF and a confederation of five European organizations. A joint MMA-LSA scientific and technical workshop was held to begin defining the specific division of tasks in the design and development phase. The MMA project released a request for proposals (RFP) for a prototype antenna and the LSA project released a statement of inquiry to antenna manufacturers in preparation for release of a request for tender for a second prototype antenna. A name was adopted by the NSF and European organizations for the joint array.

The third meeting of the NSF and representatives of the participating organizations in Europe collectively known as the European Negotiating Team, led to the initializing of a MOU for design and development of a joint, large millimeter/submillimeter array. The five (5) European organizations are: (1) the European Southern Observatory (ESO); (2) the French Centre National de la Recherche Scientifique (CNRS); (3) the German Max-Planck-Gesellschaft (MPG); (4) the Netherlands Foundation for Research in Astronomy (NFRA); and (5) the UK Particle Physics and Astronomy Research Council (PPARC). The MOU will take effect as soon as it is signed by all parties and it will expire on December 31, 1999, or on the date that an agreement for the construction phase of the joint project is signed. A joint project Coordination Committee will be established upon initiation of the MOU, the Coordination Committee is to be comprised of six representatives named by the NSF and six named by the European organizations. Management of the joint project is the responsibility of an Executive Committee made up of the MMA Project Director and Project Manager and the LSA Project Manager and Project Scientist. The Executive Committee is assigned the task of producing a Project Work Program and Management Plan in 120 days for approval by the Coordination Committee. Two joint advisory committees will be appointed by the Project Coordination Committee. These are a Science and Technical Advisory Committee and an Oversight Committee. The former is expected to subsume the present US MAC and European SAC.

In late February a meeting was held between the MMA Division Heads and counterpart representatives of the LSA project. The goal of the meeting was to identify ways in which the two groups could effectively collaborate on the tasks needing to be accomplished in the design and development phase of the joint project. Time was spent reviewing what is being done for the MMA project and reviewing resources and interest among the European groups in tasks to augment that effort. The report of this meeting is available on the MMA web pages. A highlight of the meeting was the desire of all the technical groups for access to a test interferometer to be made up of one antenna supplied by the US and the other supplied by Europe. The two antennas are to be prototypes from different contractors. Such an approach has the advantage of permitting a comparative evaluation of the two prototypes and of keeping competition in the antenna procurement process through the prototype phase.

The February meeting was very timely in that the US RFP for the prototype antenna was nearing the date of its release. The meeting allowed several remaining specifications to be established or refined. The US RFP was issued to contractors on March 30 with responses due in three months. The European request for tender, using the same technical specifications as are in the US RFP, is expected to be released approximately one month later. The US and European groups will collaborate on their respective bid evaluations so that the two prototypes come from different contractors.

Finally, the joint array project needed a name. Suggestions for a name were solicited via an emailing to all those receiving the MMA electronic newsletter and similar groups in Europe. A list of approximately 30 suggested names was circulated in the same manner as a straw ballot. An ordered list of the "top ten" names receiving votes was presented to the NSF and ENT groups at their March 30 meeting. These bodies agreed on the name Atacama Large Millimeter Array (ALMA) for the joint project. The acronym ALMA is a Spanish word meaning soul. Thanks to all who participated by means of their suggestions and votes.

The transition from MMA to ALMA has begun with every prospect that the remaining three quarters of 1999 will be as eventful as the first.

R. L. Brown

MMA Photonics Development in Tucson

Over the past year work under the direction of John Payne has continued on a program to demonstrate the feasibility of using commercially developed fiber optic components for various critical functions on the MMA. It has been demonstrated that the difference frequency between two infrared lasers may be phase locked to a microwave reference frequency with a spectral purity that will satisfy the local oscillator requirements of the MMA. The crucial component needed to generate sufficient local oscillator power, the photo-mixer, is not commercially available above 60 GHz. We have a research effort established with UCLA to produce high frequency photo-mixers.

The advent of high stability, long coherence length lasers has made possible a round trip correction system for the distribution of the local oscillator (or a reference signal) based on the actual wavelength of 1.5 microns. Such a system holds the promise of overcoming changes in the length of the fiber distribution system due to both thermal and mechanical effects. Engineers

W. Shillue and A. Viccari, have demonstrated such a system over a round-trip distance of 2 km over 1 km of fiber. A closed loop servo system is used to hold the path length constant to a few tens of nano-meters. This system uses all commercially available components and should completely compensate for all changes in fiber length.

The final application being investigated is the feasibility of injecting a photonically generated signal directly into the receiver at the signal frequency. This application requires orders of magnitude less power than the generation of the local oscillator and, when combined with the correction system mentioned above, raises the possibility of a complete instrumentation calibration.

J M Payne

MMA Cryogenics Development in Tucson

The MMA cryogenics development includes measurements to determine the required cooling capacity; evaluation of commercially available refrigerators; development of improved components for certain types of cryocoolers; and support for the development of advanced cryocooler types. During CY1998, one full-time engineer worked in Tucson on design and construction of a well-instrumented test system for cryocoolers and on initial measurements of radiation loading. In addition, a conceptual design of the MMA cooling system was developed, and an RFP was issued to industry for development of a pulse tube refrigerator for the first two of three cooling stages. All

responses to the RFP were too expensive to fund, but later negotiations led to an affordable plan and to the issuing of a contract. As of March 1999, work continues on measurement of IR blocking materials for windows, design and construction of an MMA receiver Thermal Mockup, and testing of improved components for Joule-Thompson coolers. The group doing this work consists of Jeff Clarke, George Behiens, and Larry D'Addario

L R. D'Addario

October Conference on "Science with a Large Millimeter Telescope Array"

"Science with a Large Millimeter Telescope Array" will be an international conference on the science which will be produced by a Large Millimeter Telescope Array which might combine North and South American, European, and Asian plans for construction of large arrays of millimeter telescopes into a single large project. It will be held October 6-8 in Washington, D.C.

The purpose of the conference will be to highlight the science that this powerful world array will accomplish, with a particular focus on:

- Investigation of galaxies near the time of their formation
- The formation of stars
- Detection and study of planets and disks forming them around nearby stars
- Study of the origin, distribution and evolution of the elements and their isotopes

It will begin with a reception and demonstration for members of Congress in the Capitol at 5:30 p.m. Wednesday, October 6, 1999.

Lectures and posters will be presented at the Carnegie Institution of Washington, 1600 P St. NW on October 7 and 8. Accommodations have been arranged at the nearby Omni Shoreham Hotel for the period including the nights of October 5 through October 9.

A press conference will begin the proceedings to explain the world collaboration to the media. This will be held in the Board Room of the Carnegie Institution of Washington at 8:00 a.m. on October 7.

The conference will be organized and hosted by Associated Universities, Inc., and the National Radio Astronomy Observatory. The Scientific Organizing Committee is composed of John Bieging, Geoff Blake, Roy Booth, Bob Brown, John Carlstrom, Ed Churchwell, Ewine van Dishoeck, Neal Erickson, Neal Evans, Yasuo Fukui, Stephane Guilloteau, Mark Gurwell, Tetsuo Hasegawa, Richard Hills, Masato Ishiguro, Ryohei Kawabe, Gill Knapp, Karl Menten, Jim Moran, Steve Myers, Naomasa Nakai, Luis Rodriguez, Larry Rudnick, Peter Schloerb,

Peter Shaver, Jean Turner, Malcolm Walmsley, Eric Wilcots, Al Wootten (Chair), and Satoshi Yamamoto.

“Science with a Large Millimeter Array” will be limited to 200 participants. Information will be posted on the Millimeter Array web site with the URL <http://www.mma.nrao.edu/science99.html>.

H A Wootten

GREEN BANK

The Green Bank Telescope

The photos on page 4 show the status of the GBT construction as of the end of March.

Connecting the Backup Structure (BUS) to the Box

The installation of the permanent supports on the BUS was completed in December, and the work is now focused on the BOX supports and connecting beams. As of mid-March the rework on all but two of the Box supports has been completed, and 26 of the 30 permanent support beams are in place. All of the materials necessary to complete the permanent support system have arrived in Green Bank from the fabricator in Texas. Inspection of the welding on the remaining Box supports will be completed by the end of March, after which the support beams will be installed. The permanent supports are scheduled to be completed by the middle of April.

The program of removal of the temporary supports has begun. The first temporary chosen is one in the center of the structure, surrounded by three installed permanent supports. Removal of most of the temporary supports must await completion of the permanent supports.

Installation of the Vertical Feed Arm & the Upper Feed Arm

COMSAT has continued to review the procedure for completing the installation of the Vertical Feed Arm (VFA), and has modified the order in which the tasks occur, so that more of the welding is done on the ground where it is easier and better controlled. The welding of the intermediate VFA modules K and L is now complete. Selected members of the transition module M will be fitted and bolted to the completed module L on the ground. Other members of M will be bolted to the Upper Feed Arm, and then the Upper Feed Arm will be trial-assembled to KL, again on the ground. Because the alignment of the Upper Feed Arm will be done under controlled conditions on the ground, rather than with the structures suspended from cranes in the air, it is anticipated that the process will proceed much more rapidly. Moreover, this modified procedure ensures that the Vertical Feed Arm will fit well, and will be properly aligned with respect to both the VFA and the vertex of the dish.

Installation of the Feed Arm will be completed by raising the welded modules KL and the bolted module components M, installing the transition module J between H and K, raising and attaching the Upper Feed Arm, and welding the members of module M. It is anticipated that the entire Feed Arm will be completed by the end of May.

Other Activities

Although the principal focus continues to be on the permanents and the Feed Arm, COMSAT is making progress in other significant areas. The effort to install shim packs and to align the elevation gear segments is about one-third complete. Servo engineers from Precision Control came in March and continued the installation of the permanent drive controls in both azimuth and elevation. And the long process of providing the electrical distribution on the structure is nearing completion.

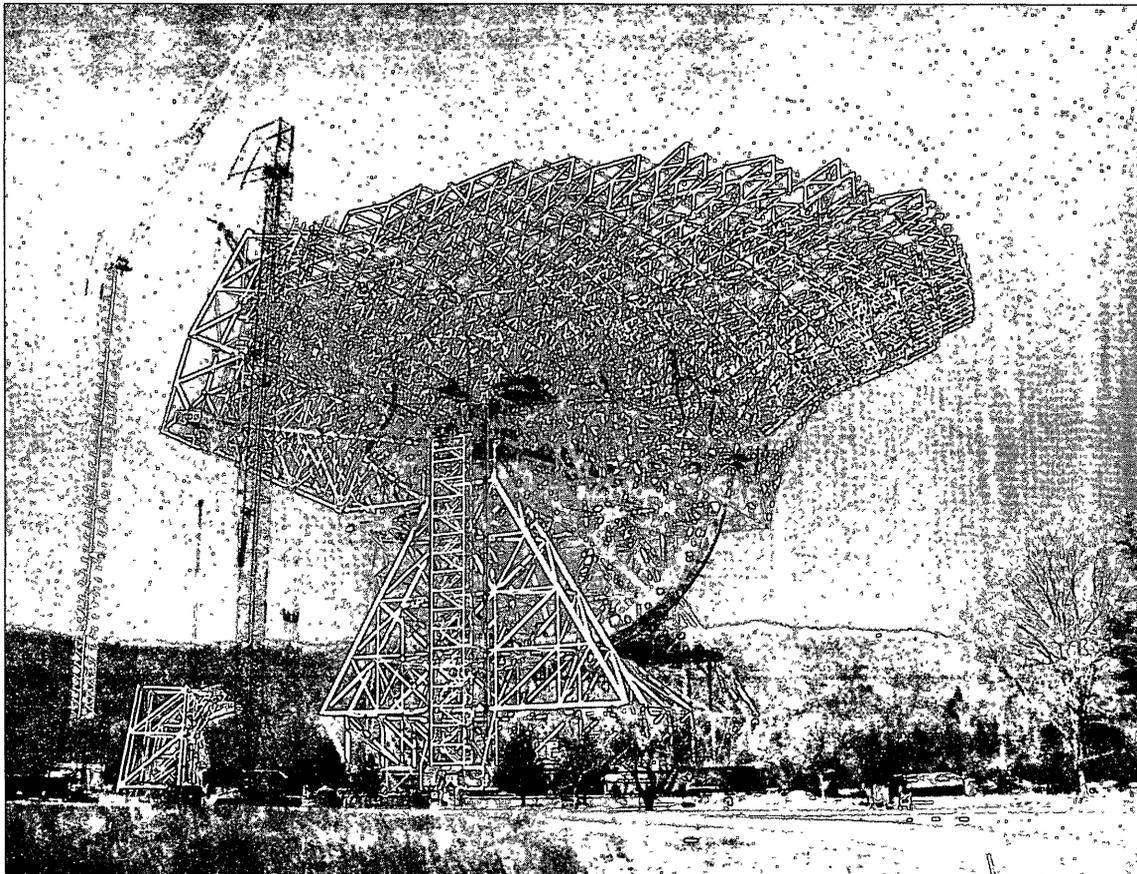
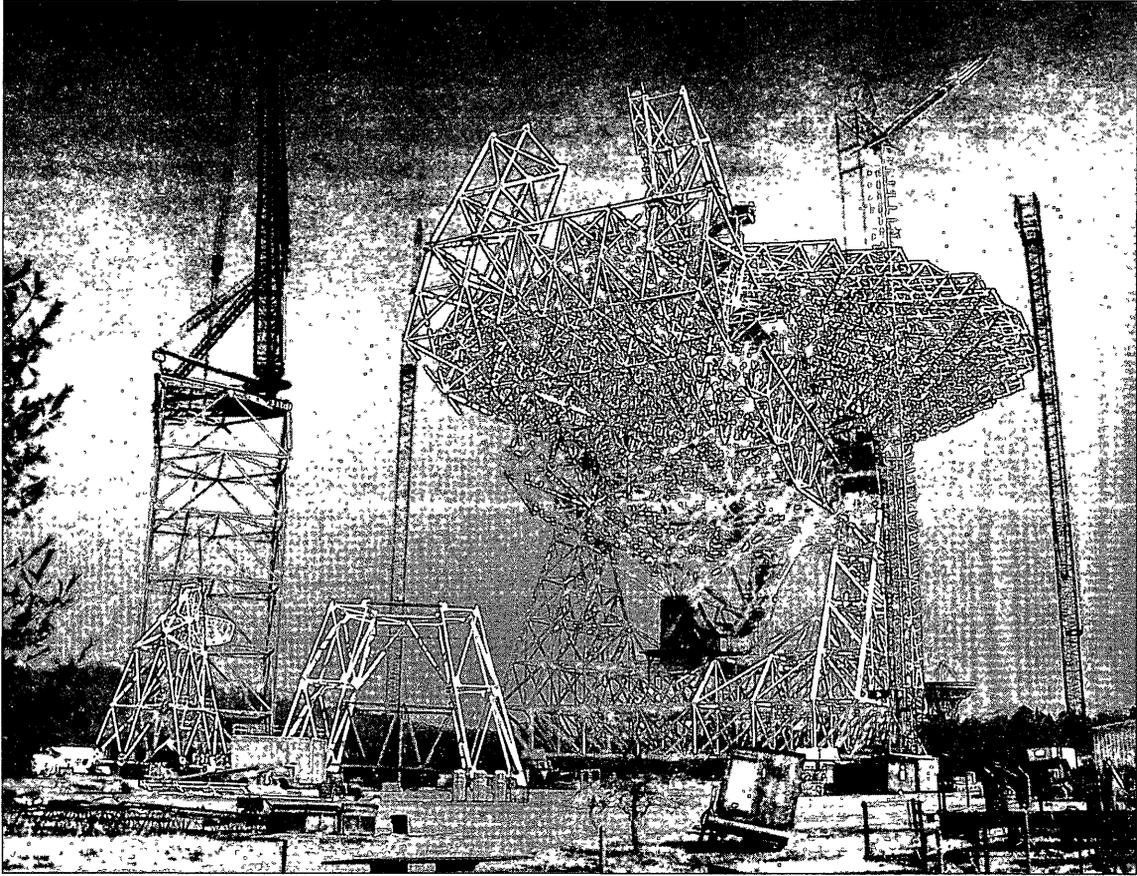
Major activities anticipated for the late spring are the resumption of the alignment of the actuators and the final installation of the actuator cables. The actuator alignment will begin after the load of the backup structure has been transferred to the permanent supports, and the work on the cables can begin shortly thereafter.

The Surface Panels

Work on the GBT panels is continuing at the RSI facility in Sterling, VA, with good progress. In March, 11 measurements of the panels from three more tiers were forwarded to NRAO for evaluation. The panels, 158 in number, are from tiers 22, 24, and 31. They were accepted in an inspection visit to Sterling, Virginia on March 19. At this time, 1683 panels have been assembled and 834 have been measured and accepted.

The installation of the robotic painter was completed after some delays, and the machine has been successfully checked out. Selected panels from tier 26 were painted with the new system and the paint coats passed the evaluations for uniformity, thickness, and adhesion. RSI reports that 98 panels have now been painted.

R. D. Hall and D. E. Hogg



140 Foot Telescope Closure

After 34 years of outstanding, and often historic service, the 140 Foot Telescope will cease observations on July 26. After conclusion of observations on this date, the operations and support staff of the 140 Foot will be able to focus their attention on urgently needed preparations for the GBT. The scientific capabilities of the GBT will greatly exceed those of the 140 Foot in all respects.

No further proposals for observing time on the 140 Foot, other than filler-time requests for blocks on the existing schedules, are

being accepted. The proposal queue will virtually be emptied by July 26 and will include the completion of some long-running survey projects.

A technical group within the Observatory is studying decommissioning options for the 140 Foot.

P. R. Jewell

Green Bank Computing Developments

As part of the Observatory-wide computer upgrade, we replaced the central server (sadira) in Green Bank. Several other Suns are still being replaced by PCs running Linux. A primary server for Linux applications including AIPS, AIPS++, and IDL, has been installed; another PC has been configured as a replacement public workstation for one of the older Suns. These public systems have sufficient memory and disk space to be used for data reduction in either AIPS or AIPS++. The computer environment is unfortunately in a state of flux, since our Unix system administrator left in November. We ask for patience from our users until after his replacement arrives in May.

For PC users, the Windows NT server in Green Bank is fully operational. It is used to serve common software packages to all users, including AutoCAD, the Corel suite, and MicroSoft Office. Public PCs served from this are available to visitors.

For low volume data, observers can now take their data away on CDs. We have re-writable CD drives installed on a public NT

computer and a public Linux system.

We hope to have a superior internal network in the Jansky Lab to support the GBT when it is operational. In particular, we need to be able to support 100 Mbps Ethernet between modern PCs and Suns. Rather than risking the unwanted radio emissions from twisted pairs, in 1998 we purchased fiber to replace the thinwire Ethernet in the old Jansky Lab. This will be installed when we purchase the associated Ethernet switches.

The Observatory submitted a successful proposal to the NSF Computer and Information Sciences and Engineering (CISE) directorate for an upgrade of the Intranet at the major four sites to full T1 (1.544 Mbps). This will provide a 3-4 fold improvement in access to the Internet from Green Bank. In addition, the grant will provide video conferencing capabilities between the sites and with the community.

G. C. Hunt

VLBA/VLBI

ARISE

A proposed future Space VLBI mission, ARISE (Advanced Radio Interferometry between Space and Earth), is a possible means of enhancing the resolution of the VLBA. In December 1998, representatives of NRAO and JPL met in Socorro to discuss closer collaboration on ARISE. As a result, several joint working groups were set up to address issues such as international collaboration and high-data-rate recording and correlation.

An ARISE information booth was set up at the American Astronomical Society meeting in January 1999, complete with scale models of an inflatable antenna and of an inflatable strut that would connect the antenna to the spacecraft. The executive summary of the ARISE science goals and the first version of the spacecraft and mission study were available at the booth. We anticipate that a more detailed science document, and a more

complete second edition of the mission design book, will be available some time in April 1999.

During February 1999, the ARISE mission concept was presented to the radio panel of the Astronomy and Astrophysics Survey Committee ("decade committee") and to the Structure and Evolution of the Universe Subcommittee (science advisory group to one of NASA's space science themes). Recommendations of the decade committee will be completed by early 2000, while the revision of the strategic plan for NASA's Office of Space Science is due in mid-2000. We hope that ARISE will figure prominently in both sets of recommendations.

Minutes of the NRAO/JPL meeting, or copies of any of the ARISE literature, are available from the undersigned.

J. S. Ulvestad

Space VLBI at the AOC

The VLBA continues as the major ground-array component of joint Space VLBI observations with the Japanese VSOP mission's HALCA spacecraft. VSOP observations resumed at the beginning of January, following a four-month hiatus initiated by an electronic failure on HALCA, and continued through a lengthy but successful recovery. A subsequent failure of the same type in late February was recovered significantly faster,

within three weeks, and the VLBA's first two VSOP observations following this second recovery appear to have been successful. Details on the HALCA recoveries are available in the VSOP mission's newsletter, see the web page at <http://www.vsop.isas.ac.jp/obs/Newsletters.html>.

J D Romney

VLBA Session at Chicago AAS

The NRAO is hosting a Topical Session entitled "High Angular Resolution Science with the NRAO Very Long Baseline Array" at the 1999 summer meeting of the American Astronomical Society in Chicago. The topical session consists of several invited speakers who will present their scientific research and experience using the VLBA. Also included will be speakers from NRAO who will describe the capabilities of the instrument and give tutorials on how best to take advantage of those capabilities. This topical session will be held on Wednesday, June 2. A contributed poster session on VLBA science will be

held the previous day, June 1. We encourage newsletter readers to attend the topical session and, in particular, invite their non-radio or non-VLBI colleagues to attend in order to learn how the VLBA could be used to advance their science. For more details about the invited speakers and topics, see the web page at http://www.nrao.edu/~mclausse/vlba_aas.html. Questions about the topical session should be addressed to mclausse@nrao.edu.

M. J. Claussen

VLBA Amplitude Calibration

We have recently become aware of two important issues regarding VLBA amplitude calibration that may affect observers. At North Liberty (NL), the 6 cm right-circularly polarized (RCP) channel contained a faulty amplifier from March 28, 1996, until December 3, 1998. Oscillations in this amplifier caused the effective RCP interferometer gain for NL to be about 25 percent lower than the tabulated single-dish gain. Since the default at 6 cm is LCP, this error affects only those programs that used dual polarization at 6 cm, roughly two to three per month. We recommend that observers with 6 cm RCP data from the affected period reduce the RCP gain at NL, either by modifying their a-priori gains file or by adjusting the data based on their amplitude-check observations.

Regular gain determinations of VLBA antennas are made only at standard frequencies in each band; these frequencies are listed in the `vlba_gains.key` file. Noise-diode strengths used to compute system temperatures and gains may not apply at other frequencies, which can affect the initial calibration at frequencies far from the standards. Particularly at risk are Faraday-rotation programs and VSOP observations, both of which often use frequencies far from the standards. Noise-diode strengths at 6 cm for Saint Croix (LCP) and Los Alamos (RCP and LCP) below 4900 MHz appear to have been far from the

assumed values since at least December 1997. Typical high-elevation system temperatures should be near 40 K, whereas the reported values for these antennas may be as low as 30 K or as high as 60 K.

We remind observers that the overall calibration should always be checked by observing an amplitude check source and assessing the consistency among antennas. If frequencies far from the standards are used, observations of a check source should be made at both the standard and non-standard frequencies, to detect any offsets in the calibration values. Many users have not been following the recommended procedure of including such calibration checks in their schedules, and therefore have not had the means to correct for offsets. For information on amplitude check sources, see the section on amplitude calibration in the VLBA Observational Status Summary, at <http://www.nrao.edu/vlba/obstatus/obssum.vlba/obssum.vlba.html>.

We currently are seeking better means of testing for calibration offsets and of warning users of non-standard frequencies much more forcefully. For further information about the calibration issues described above, please contact the undersigned at julvesta@nrao.edu.

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 |
|-----------------------|-----------------------------|---------------|
| 27 May to 17 Jun 1999 | 6 cm, 18/21 cm, 3.6/13 cm | 01 Oct 1998 |
| 09 Sep to 30 Sep 1999 | 6 cm?, 5 cm?, 18 cm, UHF | 01 Feb 1999 |
| 12 Nov to 03 Dec 1999 | 6 cm?, 5 cm?, 18 cm, 1.3 cm | 01 Jun 1999 |

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's 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 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

VLA

Renovation of the VLA Control Room

The VLA control room was renovated during January and February 1999. The old control console and its adjacent island, in place since the early 1980s, were removed and replaced with modern technical and office furniture. The room was painted, new carpet was installed, and more power connections were added. Underfloor cables no longer in use were removed and the remaining cables were organized. An adjacent room was also converted into a kitchen with modern appliances but, of course, no microwave oven! The renovation caused no VLA

downtime, as activities directly affecting operations were limited to double maintenance days. The orderly renovation was a credit to staff from all NRAO-NM divisions and from the furniture vendors.

Please visit our new control room in person, or view it on the VLA web page at, <http://www.nrao.edu/~lbrother/cru.html>,

P. D. Hicks

VLA Configuration Schedule

| Configuration | Starting Date | Ending Date | Proposal Deadline |
|---------------|---------------|-------------|-------------------|
| 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 |
| CnB | 25 Feb 2000 | 14 Mar 2000 | 1 Oct 1999 |
| C | 18 Mar 2000 | 30 May 2000 | 1 Oct 1999 |
| DnC | 09 Jun 2000 | 26 Jun 2000 | 1 Feb 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 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 1999, the B configuration daytime will be about 18^h RA and the C 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 both to NRAO and to the operating institution of the other antenna requested. Coordination of observations with non-NRAO antennas, other than members of the EVN and the DSN, is the responsibility of the proposer.

B. G. Clark

AOC Renovations

Nine additional offices at the AOC were made possible through MMA funding. The unfinished shell space, located on the main floor and at the west side of the AOC, was renovated. This project started in mid-December 1998, and was completed March 30, 1999.

With assistance from New Mexico Tech, the computer room located on the main floor of the AOC has also been renovated with partitions. This area will provide office space to students who work at the AOC, including students from New Mexico Tech and NRAO summer students.

J. F. Dowling

New Mexico Computing Developments

Excellent progress was made in the VLA re-archiving project. A serious bug in the translation problem, discovered early in 1998, and affecting some of the pre-1988 spectral line data, made it necessary to repeat the re-archiving process for those data. Correcting this problem added five months to the project. The next step, which does not involve format conversion or 9-track tapes anymore, is to merge the original archived data with the corrected data. At the same time, we will extract all header information and rebuild from scratch a new and improved version of the archive catalog. This will address a number of minor problems and omissions in the current catalog that were discovered since it was made available on the web. We expect to finish this in late summer 1999. In parallel, we are studying a state-of-the-art alternative to Exabyte as a storage medium.

The installation of the 14 Pentium II 400 PCs running the Linux operating system which were purchased in late 1998 is almost completed. Although most of the tools and applications available on Suns under Solaris have equivalent counterparts under Linux, there are still areas in which Linux is somewhat deficient. In such cases we are putting effort into finding workable alternatives.

The AOC computing department continued to phase out Arana, its aging Auspex file server. Arana has provided NFS service such as operating systems, home accounts and binaries for the AOC for the past eight years. Arana also acted as a mail hub, license server, YP server and administrative server. Arana is currently being replaced by a new Network Appliance Filer 720

called Filehost. Filehost will take over all NFS duties from Arana. To date Filehost has taken over all system level file systems including operating systems and binaries. By the end of March, home accounts and any remaining file systems should be moved to Filehost. Zia, a SPARC 20, will take over Arana's mail hub and administrative duties.

With the decommissioning of Arana, the AOC was recently able to complete the redesign of its network topology, making it far more flexible. This has made it possible to easily move machines, particularly laptops. Reconfiguration of the network or replacement of aging equipment is now a much simpler matter than before and requires virtually no rewiring.

It was decided that the scope of the new VLA online system should include the requirements of the upgraded VLA. Originally, this project was started with the aim of replacing the aging Modcomp computers with modern hardware. Now this has been considerably widened to include the upgraded VLA as well. This means the project will take longer: five-six years instead of the original three-four. We expect to have end user and high level systems requirements documents available later this year. We expect the Array Support Group to closely communicate and cooperate with their equivalent in the MMA project, which should lead to similar use of computer languages and operating systems, and sharing of code libraries wherever expedient.

G A van Moorsel

12 METER

Imaging at Radio through Submillimeter Wavelengths Symposium

A symposium on "Imaging at Radio through Submillimeter Wavelengths" will be held at the Ventana Canyon Resort in Tucson on June 6-9, 1999. This symposium will bring together scientists and engineers working in the rapidly developing field of astronomical imaging at radio through submillimeter wavelengths

Topics include:

- Single dish heterodyne imaging;
- Bolometric imaging;
- Techniques for acquiring and processing single dish images;
- Interferometric multi-field imaging;
- Phase and amplitude calibration techniques for interferometric imaging;

- Algorithms for processing interferometric multi-field images.

The conference will be organized and hosted by the National Radio Astronomy Observatory. The Organizing Committee is composed of Philippe Andre, Darrel Emerson, Mark Gordon, David Hogg, Phil Jewell, Harvey Liszt, Jeff Mangum (chair), Simon Radford, Goeran Sandell, and Al Wootten. The proceedings from this conference will be published in the Astronomical Society of the Pacific (ASP) Conference Series. For further information regarding registration and accommodations, see <http://www.tuc.nrao.edu/imaging99>.

J. G. Mangum

New 12 Meter Telescope Documentation

During the past several months a number of memos describing various aspects of the 12 Meter Telescope system have been produced:

- Pointing Equations for the 12 Meter Telescope
- The Relationship Between Flux and Brightness Temperature
- Temperature Scales and Telescope Efficiencies
- Spectral Resolution and Sensitivity Bandwidth in Spectrometers
- Walsh Function Modulation
- The Radiometer Equation for Position Switched Measurements
- The 12 Meter Telescope Primary Focus Plate Scale

- The Millimeter Autocorrelator (MAC) at the NRAO 12 Meter Telescope: Basic Properties and Initial Test Results
- Standing Wave Properties of the 2/3 mm Receiver at the 12 Meter Telescope
- Bad Filter Bank Channel Identification at the 12 Meter Telescope
- 12 Meter Telescope Dome Material Transmission Measurements
- The Accuracy of the 12 Meter Telescope Doppler Tracking

These documents can be accessed from the 12 Meter Telescope web page at <http://www.tuc.nrao.edu/otherdocs.html>.

J. G. Mangum for the Tucson Staff

12mnews E-mail List Server

In order to improve our ability to disseminate information regarding new features, changes, and other notes of interest to the 12 Meter Telescope user community, we have enabled an email list server called "12mnews." Notes sent to 12mnews subscribers will contain short articles which will usually contain links to web page documents containing further information. We anticipate that 12mnews notices will be distributed approximately every couple of months.

We invite all 12 Meter Telescope users to subscribe to this list server. To subscribe to 12mnews, send the following in the body (not the subject line) of an email message to "Majordomo@majordomo.cv.nrao.edu:"

subscribe 12mnews

This will subscribe the account from which you send the message to the 12mnews list.

If you wish to subscribe another address instead (such as a local redistribution list), you can use a command of the form:

subscribe 12mnews other-address@your_site.your_net

If you have questions or comments about 12mnews, please let me know.

J G Mangum

IN GENERAL

Tony Beasley Appointed Assistant Director - Program Development

Anthony (Tony) Beasley has been appointed as Assistant Director, Program Development effective March 1, 1999. Tony will have responsibility for the development of the annual Research Equipment Plan, the Charlottesville Computing and Scientific Services divisions, the student support program, and will continue to lead the AIPS Group. He will also coordinate an expansion of the Observatory's public relations program.

This appointment will make it possible for Bob Brown to focus all of his time on the Millimeter Array Project and the growing activity that accompanies the merger of the Millimeter Array with the Large Southern Array. I am delighted that Tony has accepted this appointment, and I look forward to working with him.

P. A. Vanden Bout

Observatory-Wide Computing Developments

Most of the recent activity in Observatory-wide computing has centered around networking. First, the Observatory submitted a successful proposal to the NSF Computer and Information Sciences and Engineering (CISE) directorate for an upgrade of our Intranet between the four major sites to full T1 (1.544 Mbps). The grant will permit video conferencing capabilities between the sites and with the astronomy community. In addition, since Green Bank is currently connected to the outside world via the Intranet link to Charlottesville, this upgrade will provide a 3-4 fold improvement in access to the Internet from Green Bank.

The Observatory is also taking steps which we hope will significantly improve our wide-area connectivity, probably via access to vBNS and/or Abilene ("Internet2"). To this end, we are exploring arrangements with the universities to which the major NRAO sites have, or can get, fiber connections, with a view to increasing the bandwidth of our WAN connections. Possible applications include real-time data transfers to other institutions on these high-speed networks from NRAO telescopes, including the 12 Meter, the VLA, and the GBT, as well as better access to archival data and to the high-performance computers at the NCSA.

M. R. Milner

A New JObserve Program

JObserve is the successor to Observe, the program used to generate VLA observe files. JObserve was designed and written by Bill Cotton in Charlottesville. It features a modern Graphical User Interface, and, being written in Java, should run on any operating system. JObserve has been tested by a handful of people during the past several months, and is now ready for wider use. Since we intend to replace old observe with JObserve within the next 12 months or so, we invite all NRAO scientific staff to start using this new program and give us feedback. This is the only way in which we can develop JObserve into a mature and robust system for generating VLA observe files.

and a window will appear that will bear some resemblance to the old observe layout. The major difference is that the key-bindings have been replaced by a point-and-click interface.

How to get help: From the help menu choose Help (or type Ctrl-H), and a help window will appear with a list of topics to choose from.

How to report problems: E-mail your problem report or any other kind of feedback to jobserve.

G A van Moorsel

How to run it: On any workstation running Solaris or Linux type:

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jobserve
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New AIPS Task FITAB

FITAB is a new AIPS task intended to replace FITTP (gradually). It has a number of advantages to FITTP and would replace it directly except that its output cannot be read by older versions of AIPS and by other software systems which do read AIPS random-groups uv-data format. The advantages of FITAB are:

1. For images, FITAB allows the specification of the value of the least bit. Integer and floating output FITS files are very much more compressible if the least bit is controlled to have a value related to the image's rms (e.g., rms/4). FITTP uses the full range of integer and floating output values and is, therefore, not particularly compressible. When shipping a FITS file over the Internet, it helps to make a smaller file via Gnu or Unix compression. FITAB will use the integer format appropriate to the selected least bit and image range when FORMAT 1 or 2 is requested.
2. For UV data, FITAB writes out the data in a binary-tables form rather than in a random-groups form. This has the advantage that the data may be written in "compressed" format identical to that used on disk inside AIPS. FITS files that take advantage of this option can be as much as three times smaller than those written by FITTP. Non-AIPS software is much more likely to understand binary tables rather than random groups, although some (i.e. difmap) are able to read FITTP's random groups.
3. For UV data, FITAB is able to break up the output into multiple files, each containing a "piece" of the AIPS file. Each of these files contain the full contents of many of the descriptive files (source, flag, index, antenna) as well as the corresponding time range for any calibration files (CL, SN, IM, TY, etc.). These tables appear in the files before the uv data. Each piece

of an AIPS data set can be read and used individually or together with some or all of the other pieces. If parity error, or other problems like end of tape, affect the writing of a large file, recovery of some or all of the information is simplified with the new capability. FITAB can write multiple disk files for the multiple pieces and all FITS readers (FITLD, UVLOD, PRTP) can read and understand multiple-piece disk and tape structures.

The main disadvantages of FITAB are:

- For UV data, FITAB's output is not understood by 15OCT98 and earlier versions of AIPS. It is also not understood so far by other software packages such as aips++, difmap, et al.
- For image data, a poor choice of least bit in FITAB can lead to a serious degradation in image quality.

I encourage people to use the task and let me know if there are problems.

E. W. Greisen

Press Releases, Embargoes, and Publicity for Scientific Results

When your observations with NRAO instruments produce results that you feel may be of interest to the news media, please consult with Dave Finley in Socorro (dfinley@nrao.edu) well in advance of the date on which your result will become public, through either publication or presentation at a professional meeting.

Press releases generally need to be prepared and distributed some time prior to publication or presentation of the research result. This is done even when journals, such as Nature and Science, have strict policies about advance publicity. In these cases, the press release is distributed to journalists under a publication embargo, meaning that they cannot publish or broadcast a story until the time specified on the release. This arrangement allows journalists to interview the researchers and prepare their stories in advance. When an embargoed press release about your work has been distributed, it is perfectly all right to talk with journalists who have received it. It is wise, however, to remind them of the embargo at the beginning of the conversation.

A press release can be issued by NRAO, by the observer's home institution, if not NRAO, or by both. Generally, the press officers of both the Observatory and the observer's home

institution should be notified of upcoming newsworthy publications. Many professional journals issue advance notices to the media, often under embargo, promoting interesting papers in upcoming issues. We routinely coordinate advance press releases with these journals.

Usually, the time to start talking to your press officer, whether at NRAO or another institution, is at least as soon as your paper is accepted. When representatives of journals or professional meetings warn you against advance publicity, they do not mean that you should not talk to institutional press officers. Preparing a press release and distributing it so as to maximize the media exposure for your research requires substantial lead time.

Finally, please remember to give credit to NRAO and the NSF for results of research on NRAO instruments, both in your paper and when talking to journalists. The official credit statement for acknowledgment in papers is: "The National Radio Astronomy Observatory is a facility of the National Science Foundation, operated under cooperative agreement by Associated Universities, Inc."

D. G. Finley



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