



NRAO NEWSLETTER

1981 November 1

No. 3

VLA

VLA CONFIGURATIONS FOR 1982

The dates for the VLA configurations for 1982 have now been fixed as follows:

<u>CONFIGURATION</u>	<u>QUARTER AVAILABLE</u>	<u>PROPOSAL DEADLINE</u>
C	Q 1 1982	October 15, 1981
A	Q 1 + Q 2 1982	October 15, 1981 and January 15, 1982
B	Q 3 + Q 4 1982	April 15, 1982 and July 15, 1982
D	Q 4 1982	July 15, 1982
C	Q 1 1983	October 15, 1982

Mixed configurations will be available for about one week between each configuration change. These will consist of either a longer North arm or a mixture of long and short spacings depending on demand.

R. D. Ekers and B. G. Clark

SUMMER SCHOOL ON RADIO INTERFEROMETRY

Discussion with VLA users on several occasions during the past year have suggested the desire for a school on interferometry and synthesis mapping techniques. Planning for such an event is just now starting. Initial ideas are for about 20 lectures, mainly by VLA staff, held during a one-week period in June or July, 1982. The location would probably be the campus of the New Mexico Tech in Socorro. NRAO cannot provide travel funds to Socorro, but every effort will be made to minimize costs of accommodation, etc.

The aim of the lectures is to give participants an introduction to the principles of synthesis mapping that underlie the operation of the VLA. The topics would be discussed rather broadly, and could be illustrated by considering applications to the VLA. Both elementary and advanced topics could be included. Each speaker would be asked to produce a few pages of summarizing notes for distribution to participants.

To aid in planning at this stage, we would like to hear from possible participants. Under separate cover we have mailed to all VLA users a questionnaire about their scientific interests and level of expertise with interferometry, as well as a list of possible lecture topics for their approval or suggestions. If you are not a VLA user, but may be interested in attending, please obtain these forms by contacting Dick Sramek, Dick Thompson, or Ron Ekers at the VLA: NRAO, VLA Program, P. O. Box 0, Socorro, NM 87801 (505-772-4011 or FTS 476-8011).

R. Sramek, A. R. Thompson, and R. D. Ekers

JPL WATER VAPOR RADIOMETERS

During the period June-August 1981 water vapor radiometers from the Jet Propulsion Laboratory were installed on two of the outermost antennas of the VLA. The radiometers were mounted at the secondary focus looking at the subreflector. The radiometer data were logged into the VLA Monitor Data Base. The data from several observing periods are now being analyzed, to test the feasibility of correcting the interferometer output for variations in the tropospheric path length. The radiometers have been returned to JPL, where they will be used in conjunction with VLBI observations.

Peter Napier and David Hogg

327 MHz SYSTEM FOR THE VLA

Work has begun to provide the VLA with decimetric wavelength (327 MHz) capability. The feed will consist of crossed dipoles in a cavity, mounted at prime focus, but offset from the electrical axis. The theoretical aperture efficiency, including the effect of radial defocusing, is about 38%. The receivers will employ room-temperature GASFET amplifiers which are being fabricated in Charlottesville. A system temperature of 70 K should be attainable.

Current work on the system includes studies of confusion and sensitivity, monitoring of the interference environment, and fabrication of a prototype feed. We hope to carry out single dish tests this fall, with interferometric tests beginning late in the year.

Steve Spangler and Peter Napier

THE MIPS PROJECT

An experimental project to produce a Microcomputer Image Processing System (M.I.P.S.) is well under way in Socorro. R. M. Hjellming, with occasional help from a student, is using a 16-bit microcomputer (with 128 KByte memory) called a Pascal Microengine as the basis of an experiment to see if significant scientific data processing can be accomplished with relatively cheap hardware. The principle basis for hope is performance on benchmark tests whereby the speed of this system is nearly that of a PDP 11/40.

Peripherals in this system include a Lear Siegler ADM3A+ terminal with a Retrographics board that allows 512 X 250 graphics (4010 simulation), an Anadex 9501 dot-matrix printer-plotter (75 dots/inch), a Houston Instruments DMP-7 pen plotter with 10" x 15" plotting area and 0.05 inch step size, two 1-MByte capacity (Remex) floppy disks, a 3M HCD-75 tape cartridge system with 67 MByte capacity, an Axium EX-850 video screen copier, and a yet to be ordered hard disk. The maximum budget for all the hardware in this project is \$20,000.

The software in the MIPS system is being developed as a stripped-down version of the VLA DEC-10 "standard commands" system. The immediate objective is to assess capabilities to do map display and analysis; however, general scientific computing, word processing, and mapping/cleaning/self-cal will be implemented and evaluated.

Periodic progress reports can be sent to anyone who will write or call R. M. Hjellming.

R. M. Hjellming

AIPS

AIPS is the acronym for the Astronomical Image Processing System. It is a collection of hardware and software developed at NRAO for the analysis and reduction of VLA and other data. AIPS is a stand-alone system which can be readily implemented on many modern mini-computers, such as a VAX or a MODCOMP. Several systems are now in use; one at the VLA, two in Charlottesville, and systems at Kitt Peak National Observatory, Smithsonian Astrophysical Observatory, Sandia National Labs, Dwingeloo, University College London, and the Universities of Toronto, Michigan, Minnesota. Software has been sent in addition to other institutions.

Input to the system is by magnetic tape containing calibrated and edited visibility data (Export tape) or maps on a FITS tape. Software is now being developed for a multitude of VLA map analyses as well as other astronomical imaging problems.

In the coming issues, two aspects of AIPS will be noted. First, general use and changes in AIPS at NRAO will be discussed (e.g., current software development, availability of systems, problems and bugs which might affect users, documentation). Secondly, information about the export of AIPS to non-NRAO facilities will be discussed (dates of workshops, procedures for exporting, hardware requirements, system update information, etc.).

We are presently planning a highly technical newsheet on the AIPS system, initially to be sent to those institutions with operating systems.

For further information about any aspect of AIPS contact Ed Fomalont (804-296-0345), or Eric Greisen (804-296-0262).

Ed Fomalont

ALLOCATION OF VSQ AND BUNKHOUSE ROOMS AT THE VLA

The accommodations at the VLA site have sometimes been strained beyond their limits. To make most efficient use of the room space the following priorities have been applied to VSQ occupancy.

1. One room is reserved for use by operators (when the VSQ is booked, the operators use the bunkhouse).
2. The current observers, up to a maximum of two per program, from two days before until three days after their observing run.
3. One staff scientist who wishes to stay overnight and is designated as duty scientist.
4. People staying on to reduce data after their run (maximum two persons per project).
5. People returning to reduce old data (maximum one per project).
6. Extra observers per project.
7. Visitors (at director's discretion).

When site capacity is exceeded, people will have to be booked into motels in Magdalena. People with priority lower than No. 5 on list who make advance bookings are not guaranteed a room on site. If people have to be moved, the above priorities again apply.

Carl Bignell

U-BAND FREQUENCIES FOR VLA SPECTRAL LINE SYSTEM

All spectral line users are warned that up until now, and until some time in the near future, spectra taken at U-band (2 cm) have frequency DECREASING with increasing channel number. The center of the band remains in the same channel number. The phases have always been corrected for lower side band.

Arnold Rots

Green Bank

NEW λ 18 cm RECEIVER

The retrofitted 18 cm cooled receiver is now completed and available for use on the 140 foot and 300 foot telescopes. Cooled FET amplifiers have replaced the paramps, providing instantaneous frequency coverage from 1566 MHz to 1766 MHz with no tuning required. The system is configured to receive orthogonal linear polarizations and provision is made to derive circular polarizations over reduced bandwidths. System temperatures measured on the 140 foot range from 50° K to 58° K at the zenith.

Roger Norrod

CLOSURE OF THE GREEN BANK AIRSTRIP

This is to inform you that the National Radio Astronomy Observatory airstrip, Green Bank, West Virginia, is permanently closed to all aircraft operations effective 1 October 1981.

For the time being the paved area will remain intact and could be used for an aircraft emergency landing. However, no patching of cracks, holes, mowing of grass or snow and ice removal will be performed by NRAO.

Affected agencies have been informed of this closing and notices for changes have been forwarded to appropriate Federal, State and Aircraft Owners and Pilots Association publications.

R. K. Moore

VISITING OBSERVER CHECK CASHING POLICY

While visiting the Green Bank site, the visiting observer may need to cash a personal check. Because of the lack of local banking facilities, the Observatory has established the following procedure:

1. Official visitors may cash personal checks of up to \$100.00 through the Petty Cash Fund. Checks over \$100.00 must be approved by any one of the following: Fiscal Officer or his Assistant, Site Business Manager, or a member of the Director's Office (Director, Associates, Assistants).
2. The Petty Cash Custodian will be available for check cashing Monday through Friday, 8:00 a.m. to 8:30 a.m., 11:00 a.m. to 12:00 noon, and 4:00 p.m. to 4:30 p.m.
3. The Petty Cash Custodian is Jamie Sheets. He is located in room 216A on the second floor of the Jansky Lab.

Martin P. McGreal

GREEN BANK SHIPPING AND RECEIVING

All shipping and receiving functions take place at the Green Bank warehouse facility which is the second building on the right after entering the main site entrance. Visitors may also obtain diesel fuel for their NRAO supplied vehicles at the warehouse building.

Visitors to the Green Bank site, upon completion of their stay, can make arrangements for NRAO to send their data or other related material to their university, college or scientific institution. Methods of shipping are postal service, UPS or truck (if you have been really productive!). To make arrangements for shipping something from Green Bank contact the warehouse (ext. 149) for details.

Richard Fleming

INSTRUMENTATION WORKSHOP

Green Bank hosted a three-day workshop on radio astronomy instrumentation September 21-23. Engineers from 20 different institutions, including those in seven foreign countries, discussed topics such as FET amplifiers, cryogenics, spectrometers, masers, time standards, millimeter receivers and antenna measurement and design. The workshop was aimed toward technical people who have had relatively little contact with their counterparts at other observatories, and as a result, I hope some fruitful and lasting contacts were established.

Rick Fisher

NATIONAL RADIO QUIET ZONE

The National Radio Quiet Zone, established in 1958, provides unique interference protection for the Green Bank site. All applications for new and modified licenses for Federal Government and non-government fixed transmitters are reviewed by NRAO and the Naval Research Laboratory (NRL) for acceptable signal levels at Green Bank and at Sugar Grove. In order to ease administration costs and to reflect more equitably the actual level of signals originating from outside the zone, NRAO modified the administrative procedures and the criteria for acceptable power density. Criteria for frequencies below 470 MHz were relaxed, i.e., acceptable power densities increased, except for the WARC 1979 radio astronomy bands. A revised NRQZ Fact Sheet is available.

W. D. Brundage

CONFERENCE ROOMS

NRAO Green Bank now has three conference rooms for group meetings. The smallest seats 8-10, the intermediate 16-20, and the largest, located in the auditorium, will comfortably seat 40-45.

All three conference rooms are air conditioned, have teleconference systems, and good acoustics. The largest two can be equipped with standard audio visual equipment.

The auditorium conference room is not available from mid-June through Labor Day when it is being used daily as the tour center. Scheduling of the smallest and largest conference rooms should be made with Wally Oref and the intermediate with Rich Lacasse.

Wally Oref

EMI AT 140-FOOT TELESCOPE

A source of EMI at the 140-foot telescope was found to be a bad contactor on the first floor air-conditioning controls. The contactor was causing detectable EMI through the 21 cm band.

The problem was cured by replacing the contactor. The EMI is now barely detectable at 10 MHz and should not cause any difficulty above 100 MHz.

R. D. Atkins

36-Foot

THE 12-METER TELESCOPE (RESURFACING PLANS, CONTINUED)

As noted in the first Newsletter, the 36-foot will become a 12-meter telescope when its new back-up structure (BUS) and surface are in place and working. So we shall describe progress under this title. The plan we are following is briefly as follows:

(a) Rebuild a new BUS to replace all of the present structure above the elevation bearings. Retain these bearings, the elevation wheel, brakes and drives and, of course, retain the azimuth tower, bearings, drives and brakes as at present. Bill Horne is the leader of the group doing the new BUS. Design work is going ahead (Lee King) and more details will be given later.

(b) Buy a new surface from ESSCO and set it on the BUS. Here we were fortunate that ESSCO has recently just completed a 13.7 meter (45-foot) precise radar. This dish has a focal length of 5.08 meters, so, if the same molds were used to make us a 12-meter surface, the resultant f/D would be 0.423. We asked several possible suppliers, but had no difficulty in choosing a good offer from ESSCO.

We shall pre-assemble the BUS in Green Bank and there put the surface in place, and measure and adjust it. We shall then repeat the task on the telescope on Kitt Peak. It is our intent to get an RMS value for the completed surface, in place, of 70 micrometers.

John Findlay is leading this part of the project--with help from several others.

(c) John Payne is the electronics chief, and his plan to carry front-ends in the new BUS will be described in a later issue.

(d) It is early yet for Tucson to do much, but work there will be considerable. Our 12-meter size means some small changes to the roof of the control building. We believe we must be very careful with the new surface (we plan not to walk on it), and we shall obviously have to erect it with care. As an insurance, which we hope is not needed, we are buying four spare panels from ESSCO. Our present plan shows 36-foot observing to end about June 1982, and the 12-meter to be in full use by the end of that year. Work at Tucson will fall mainly onto Paul Rhodes. Dale Webb has already worked on the ESSCO contract and administration will be done by him, J. Marymor and Ted Riffe. The whole task belongs to Hein Hvatum--we hope he doesn't get too many gray hairs!

John W. Findlay

VLBI

VLBI ABSENTEE OBSERVERS PLEASE NOTE

VLBI absentee observers are reminded that observing schedules and cards or floppy disks should be received by George Grove at least two weeks prior to the start of the VLBI network session (not just an observer's own session). Schedules can be changed later if absolutely necessary, but George does need time to organize the overall observing program as far in advance as possible.

Martha Haynes

IN-ABSENTIA VLBI DATA PROCESSING

We now support in-absentia processing for users who have the equipment to communicate with the IBM 360 by telephone or who can make one trip to Charlottesville to set up all the necessary PREP'S and DECODE'S. A program (LOGGER) is available to prepare the JCL for the PREP'S and DECODE'S from station logs and minimal additional information. The staff will process the video tapes and provide the user with DECODE output tapes which contain averaged data that can be analyzed using the NRAO-CFA spectral line programs or, after fringe fitting, the Caltech continuum programs. The DECODE data can be provided in a form that can be directly read by a VAX computer by some of the spectral-line programs and by the fringe fitting program. For details, including documentation on the software, contact John Benson (804-296-0276).

Craig Walker

In General

NEW FACES AT NRAO

The following scientists will be taking up Research Associate positions with the NRAO starting approximately fall of this year:

A. Lane	University of Massachusetts	VLBI observations of circumstellar masers; molecular studies in star formation regions.
D. Merritt	Princeton University	Dynamics and evolution of clusters of galaxies.
R. Newell	New Mexico Tech	Evolved stellar objects; VLA systems.
J. Ulvestad	University of Maryland	Seyfert and other active galaxies.
B. Williams	University of Maryland	Neutral hydrogen studies of galaxies.

R. J. Havlen

1981 JANSKY LECTURE

Professor Martin J. Rees, of the Institute of Astronomy in Cambridge, will deliver the 16th Jansky Lecture in Charlottesville on 8 December. His lecture is entitled "The Next Hundred Billion Years". Professor Rees will be visiting in Charlottesville for approximately one week.

The Editor

WORKSHOPS ANONYMOUS

The NRAO has hosted three very successful scientific Green Bank Workshops during the course of the past year: "Very Long Baseline Interferometry" organized by Ken Kellermann, "The Phases of the Interstellar Medium" organized by John Dickey, and "Radio Astronomy Instrumentation" arranged by Rick Fisher. A fourth workshop on Extragalactic Molecules will be held November 1-4. We would like to encourage the further use of Green Bank as an ideal setting for future two or three day workshops on specific research topics of current interest. Normally the NRAO provides room and board free of charge to all invited participants. Any astronomer willing to organize the scientific content of such a gathering should contact M. S. Roberts in Charlottesville with the suggestion of an appropriate topic.

R. J. Havlen

SCIENTIFIC VISITORS TO NRAO DURING 1981

G. Bath	Oxford University, England	5/81 - 6/81	CV
P. Palmer	University of Chicago	5/81 - 8/81	VLA
K. Prendergast	Columbia University	5/81	CV
R. Sancisi	Kapteyn Labs, Netherlands	10/81 -	CV
M. Sanroma	University of Barcelona, Spain	9/81 -	CV
C. Sarazin	University of Virginia	5/81 - 8/81	CV
A. Wolfe	University of Pittsburgh	6/81	CV
L. Zaninetti	University of Torino, Italy	6/81 - 9/81	CV

R. J. Havlen

THE WEAVER-WILLIAMS HI SURVEY IN TPOWER FORMAT

We have translated the Weaver and Williams survey of low latitude HI emission (Astronomy and Astrophysics Supplement No. 8) into standard TPOWER format. In this format these data can be loaded by the ModComp POPS-based spectral line analysis program in Charlottesville or by the Jansky Lab ModComp in Green Bank. All the features of the POPS spectral line reduction program--including, for example, CalComp plotting, velocity-longitude mapping, and DICOMED picture processing--are available for application to these data.

The survey consists of 38961 individual scans covering longitudes from 10° to 250° (increments of 0°5) and latitudes from -10° to +10° (increments of 0°25). In TPOWER format the entire survey requires 4 tapes (1600 bpi, 9-track).

Visitors to Charlottesville or Green Bank who wish to make use of the survey should contact George Martin (Charlottesville - (804-296-0373) for assistance.

We are grateful to the Berkeley Radio Astronomy Laboratory for making these data available to us.

R. L. Brown and G. Martin

 NRAO BUDGET FOR 1981

The total funding of NRAO in Fiscal 1981 is \$15308.0 K, which breaks down as follows:

General and Administrative:

- Director's Office	\$ 359.0 K	
- Fiscal Office	270.0 K	
- Business Office	207.0 K	total \$1022.0 K
- AUI Management Fee	235.0 K	
- Small Items	76.0 K	
- Special Insurance Credit	-125.0 K	

Research Support and Development:

- Basic Research (Staff and Visitors)	\$1442.0 K	
- Student Program	104.0 K	
- Library and Scientific Services	247.0 K	
- Equipment	1618.0 K	
- Central Laboratory	680.0 K	total \$5827.0 K
- Computer Division	715.0 K	
- Computer Rental	275.0 K	
- Engineering	321.0 K	
- Charlottesville Building Rent and Maintenance	215.0 K	
- Charlottesville Communications and Utilities	125.0 K	
- Small Items	85.0 K	

Green Bank Operations:

- 140 foot Telescope	\$1480.0 K	
- 300 foot Telescope	1040.0 K	
- Interferometer	404.0 K	total \$3389.0 K
- Off-site Projects	170.0 K	
- Other non-Green Bank Items	295.0 K	

Tucson Operations: \$ 980.0 K

VLA Operations: \$4090.0 K

Ted Riffe

 NEW STAFF MEMBERS

Martha Haynes and Riccardo Giovanelli joined the NRAO scientific staff on 1 October, and have taken up residence in Green Bank where Martha is the new Assistant Director in charge of Green Bank operations. Martha replaces Rick Fisher as Newsletter assistant editor for Green Bank affairs. Riccardo replaces Pat Crane (who has moved on to the VLA) as "friend" of the Green Bank telescopes.

The Editor



EDITOR NRAO NEWSLETTER
NATIONAL RADIO ASTRONOMY OBSERVATORY
EDGEMONT ROAD
CHARLOTTESVILLE, VIRGINIA 22901

FIRST CLASS MAIL

To: