



NRAO NEWSLETTER

1983 August 1

No. 13

Green Bank

A NEW SITE DIRECTOR AT GREEN BANK

I am pleased to announce the appointment of Dr. George A. Seielstad as Assistant Director for Green Bank Operations and as a member of the scientific staff. Dr. Seielstad is currently Assistant Director at the Owens Valley Radio Observatory of the California Institute of Technology where he has been a member of the staff since 1964. At various times he has held concurrent positions at Dartmouth, Chalmers, and Illinois.

He is a graduate of Dartmouth and of Caltech and has published extensively on a wide variety of topics within radio astronomy. His book, Cosmic Evolution, was published earlier this year by the University of California Press. He has held a Guggenheim Fellowship and is currently on the Board of Editors of the Publications of the Astronomical Society of the Pacific.

Dr. Seielstad will assume his position at Green Bank in January, 1984.

Morton S. Roberts

Editor's Note - Martha Haynes, who has so ably served the Observatory as Green Bank Site Director for the past two years, has accepted a faculty appointment in the Department of Astronomy at Cornell University. Her new position is associated with the Arecibo Observatory and the National Astronomy and Ionosphere Center, which is operated by Cornell. She will be leaving Green Bank to take up her new duties by September 30, 1983.

We all wish Martha the best of success in her new job. She will be missed by all, not least the Editor whom she has assisted most energetically, as the rest of this section on Green Bank serves to illustrate.

SECOND CHANNEL OF UPCONVERTER/MASER

The second front-end of the 5-26 GHz upconverter/maser receiver will be installed on the 140-foot during the week of September 19. All tests indicate that the second channel will perform as well as does the first. However, the reflector/feed system is still being designed, and the two channels will not be simultaneously available until March 1984. K-band proposals requiring two channels will therefore not be scheduled in the winter of 1983/1984 but will be held over until the May-June 1.3 cm observing period.

Martha Haynes

NEW L-BAND RECEIVER

The L-band receiver being constructed by Roger Norrod is scheduled to be installed on the 140-foot on August 19 for extensive testing at 18 cm. The system temperature is expected to be lower than 35 K (on sky). This system replaces the old 18-cm receiver and will be used for the October VLBI network session. Observers may wish to contact Roger Norrod and Harry Payne to check on receiver performance, calibration and pointing after their tests are concluded.

The low-redshift (1360-1430 MHz) 21-cm feed is to be finished in early September, and installation for testing is scheduled for the 140-foot on September 14 and on the 300-foot on September 21.

Martha Haynes

SOFTWARE TROUBLE REPORT

Forms are now available for users to report computer software problems to the appropriate programmers. Please provide as much information as possible on the nature and occurrence of the difficulty. Completed forms should be returned to Dick Hiner in Telescope Operations, Room 214, Jansky Lab.

Martha Haynes

USE OF JANSKY LAB MODCOMP

Because of increased usage on the Modcomp, a sign-up sheet is now posted on the Computer Division bulletin board just outside the RJE/Modcomp room. Users should not sign up for more than three consecutive hours. Modcomp maintenance occurs between 0800-1000 each Friday.

Martha Haynes

12-Meter

FURTHER IMPROVEMENTS TO THE TELESCOPE SURFACE

Although our limited experience with the new 12-m surface shows it to be stable and to point predictably, the entire system is not quite ready for "production astronomy." We plan to devote this summer and, if necessary, one or two months this fall to make the final adjustment of the surface and to make ready our stable of receivers.

The telescope surface presently has an RMS error of about 100 micrometers with respect to a perfect paraboloid. Observing experience in April, May, and June confirms that the back structure is stable enough to carry a surface of much higher accuracy.

In late July and early August, the NRAO will attempt to make a radiometric map of the surface to compare with the mechanical measurements obtained with our jig and template. This technique, often referred to as a "holographic" measurement, consists of comparing the phase of wavefronts impinging upon the surface with the phase of these wavefronts arriving at the focus of the telescope. The radio source used for these measurements can be a ground-based transmitter (used at the University of Texas), a distant point radio source such as a quasar (at the VLA), or a satellite transmitter (at UMASS). We plan to use the beacon on board the satellite LES-8.

A holographic measurement of our surface figure is complicated for us by the restrictions of our computer system. The data-taking computer has to be reprogrammed to track the satellite over its "Figure 8" orbit projected on the sky and to record data at a much higher rate than is usual for astronomical observations. Because of the small size of the Tucson computers, the data must be sent to the VLA site to be turned into a map and then returned to us in Tucson.

Our goal is to obtain an accurate map of the antenna surface before touching any of the surface adjustment bolts. An improvement in surface accuracy from 100 to, say, 75 micrometers is difficult to achieve. We could easily worsen rather than improve the existing figure. A great deal of caution is prudent.

M. A. Gordon

RECEIVERS

Because of our intensive involvement with the telescope surface, and because of the comparatively small staff of the Arizona Operations, our panoply of receivers is not yet in the condition we'd like. Let me list receivers according to their present condition.

9-mm Continuum Receiver. Because of its long wavelength, this receiver uniquely needs an oversized mirror to couple it to the new telescope optics.

3-mm Receiver. Although comparatively unchanged except for repackaging, this receiver now lacks the fast beam-switcher necessary to filter red noise required for sensitive continuum measurements. The new telescope optics requires a different concept for a switcher. The NRAO plans to build an extremely low-noise version in early 1984, primarily for extragalactic CO work.

2-mm Receiver. This receiver has not yet been repackaged into a mount compatible with the new surface.

1.2-mm Mixer Receiver. Eventually this receiver will cover the range 200 - 345 GHz by means of a number of mixers, each mounted in its own dewar. Presently this receiver contains mixers covering the range 200 - 235 GHz. We hope that mixers for frequencies up to 280 GHz will be on the telescope by the end of the year or early 1984.

The IF frequency of this receiver is 1.5 GHz rather than the 5 GHz which we have used for many years. Its design is the prototype for the next generation of our spectral-line receivers. It uses the new, low-noise FET amplifiers developed by NRAO's Central Development Laboratory in Charlottesville. Also, the new IF frequency brings the image and signal bands of the mixer closer together, making the compensation for atmosphere absorption somewhat more straightforward. The receiver noise temperature is approximately 200 K at 230 GHz, double side band.

Unfortunately, we've discovered a military radar operating within the 500-MHz wide IF band. We hope that the installation of filter circuits and shielding will allow us to realize the full sensitivity of this receiver.

Bolometer. The new bolometer now can detect 6 Janskys in 1 second if the atmospheric transparency is high. By changing the illumination taper of its lens and by improving the telescope surface, we expect a substantial improvement can be made.

While all of us are anxious to put the new 12-m surface to good astronomical use as soon as possible, we also believe we should continue to try to adjust the surface while we have momentum. Accordingly, the NRAO will continue to work on both the surface and the receivers until nearly everything is complete.

It is difficult to estimate how long this will take. The entire system could be ready for astronomical use in mid-September if everything proceeds smoothly. Or, the system might not be ready until November. We believe that a possible delay for two months, from September to November, will be unimportant in the useful life of the new telescope system.

M. A. Gordon

SUNSHIELD

To make maximum use of the millimeter-wave telescope around the clock, we need to protect the telescope surface from the heating effects of the sun during the day. Particularly important for the all-aluminum 36-foot surface, this protection formerly was a pressurized "teepee" erected around the feed-support legs. While initial experiments show the 12-m surface to be less sun-sensitive than the old 36-foot surface, something will be required.

The "teepee" solution is inappropriate for the 12-m surface because its surface is made of individual panels rather than solid sheet, i.e., the pressure would escape through the spaces between the panels.

We plan to erect a "window shade" in the slit of the astrodome. This approach will shield the telescope from pointing errors due to wind-induced torques, but also will expose the material itself to the full force of the wind. We'll begin by trying different types of fabrics until we find a compromise between high RF transmission and resistance to tearing.

M. A. Gordon

MILLIMETER-WAVE PROPOSALS

Because of the delay in getting the 12-m telescope system into operation in 1983, the NRAO has acquired a large backlog of proposals. We will be unable to schedule many of these proposals because the rate of new proposals is greater than the rate at which we can discharge proposals on hand.

To reduce this backlog and to insure that proposals in hand are as up-to-date as possible, we plan to return proposals received prior to January 14, 1983, having grades of 2.75 or lower. (Priority = 4; Good = 3; Fair = 2; Average = 2; Poor = 1, etc.). This pruning should reduce the proposal queue to about 50 proposals and 200 days, about half the size of the existing queue for the next quarter. Those proposers who feel that their proposals are timely should resubmit them to us, taking advantage of the referees' comments, of course.

M. A. Gordon

VLA

VLA CONFIGURATIONS 1983 - 1984

<u>Quarter</u>	<u>Configuration</u>	<u>Proposal Deadline</u>
1983 Q3	D, D/A, A	April 15, 1983
1983 Q4	A, A/B, B	July 15, 1983
1984 Q1	B, B/C ?	October 15, 1983
1984 Q2	B/C, C	January 15, 1984
1984 Q3	C, C/D, D	April 15, 1984

R. D. Ekers

B AND D IFs

On June 8, 1983, the second pair of IFs (B and D) were turned on. The immediate result is a doubling of the amount of data collected for continuum programs (there is no change in the amount of spectral line capacity). Continuum observers must plan what two frequencies to set AC and BD IF pairs to.

Carl Bignell

REMOTE OBSERVING

Data reduction requests will be satisfied at a slower rate this fall. The principal reason is that Peggy Perley is going on maternity leave in the fall. Another reason is our load has increased because of the increase of data when the B and D IFs were turned on. We plan to carry out all calibration requests; however, the response may be slow. Priority will be given to the preparation of OBSERV files.

Carl Bignell

ACCESS TO VLA ARCHIVE DATA

Raw data for all VLA observations are routinely archived; we have some requests for the use of this data. Although we normally try to channel such requests through the original observing team, this is not always practical. Consequently, we have defined an NRAO policy on the extent to which an observing team has exclusive use of the raw data obtained as part of their VLA observation.

Eighteen months after the end of a VLA observation the raw (uncalibrated visibility) data will be made available to other users on request. The end of an observation is defined to be after the last VLA configuration requested, either in the original proposal or in a direct extension of the original proposal.

M. S. Roberts

VLA ROOM RATES AND MEAL CHARGES

Starting August 15, 1983, there will be a variety of frozen entrees available from the freezer adjacent to the observers' kitchen in the cafeteria building. There will also be sandwich makings and fresh fruit set out in the observers kitchen each evening. The cost for this service is included in the new room rate charges. The new room charges (which include both the observers' kitchen charge and room rate increase) are:

\$14.50/night for single occupancy
\$10.00/night for double occupancy
or for a bunkhouse room.

Lunch and breakfast can still be obtained directly from the regular cafeteria kitchen and must be paid to the cashier on duty.

Robert E. Dorr

In General

ANNOUNCEMENT

Sarah Stevens-Rayburn has accepted an appointment as Head of the Research Library at the Space Telescope Science Institute effective August 1, 1983. Sarah resigns her post with the NRAO after eight years of service.

We are all greatly indebted to Sarah for the care, concern, and expertise with which she has nurtured and managed the extended NRAO library facilities. We wish her success as she faces the challenges and responsibilities of her new position.

At the same time, we are very happy to announce that Ellen Bouton will take over the direction of the NRAO libraries. Ellen has been assisting in the NRAO library for the past eight years.

R. J. Havlen

VISITING SCIENTISTS AT THE NRAO

During the summer months the following scientists are paying extended visits to the NRAO:

Patrick Palmer - University of Chicago	(Socorro)
Robert Sanders - Groningen University	(Charlottesville)
Willem Baan - Penn State University	(Charlottesville)

Upcoming in later weeks we are expecting extended visits from

W. Miller Goss - Groningen University	(Socorro)
Peter and Althea Wilkinson - Jodrell Bank	(Charlottesville)
Ian Browne - Cambridge University	(Socorro)

R. J. Havlen

OBSERVATORY COMPUTER PLAN

Although it has taken longer than originally expected, work has been progressing on the NRAO's computer plan. All site plans are now near completion and some joint discussion between sites has begun. We are trying to get some consensus as to what computer should be used at a given place, where new equipment should be placed, and on what time scale, etc. By the next newsletter we should be in a position to give some specifics.

Bob Burns

SUMMER STUDENT PROGRAM

Our summer student intern program is in full swing again after a one-year hiatus. This year we have 22 students from about as many institutions. Three are in residence at Green Bank, eight at Socorro, and eleven in Charlottesville divided between Edgemont Road and the Central Development Lab. There was some confusion about application deadlines this year, and we were receiving inquiries about the program long after the student selection was made. For next year's program we will be advertising more heavily, and further in advance, in this newsletter and through the AAS. The formal announcements will be mailed in November. We continue to rely on departmental offices rather than on individual faculty to distribute the application forms and information. We urge you to bring the program to the attention of interested students and ask you to check that your department does not file the announcement in an inappropriate location.

F. J. Lockman



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