Funding for the design and development of the VLB Array has been included in the proposed 1984 NRAO budget recently submitted to Congress. If the NSF budget is approved in its present form, 2.5 million dollars is expected to be available by the end of 1984 for the engineering design of the antenna elements and the design and prototyping of the various electronic subsystems. By this time we expect to have specified the array configuration and the design of the antenna elements, as well as the recorder, processor, front-end, control and computer systems. More than 60 people from 15 different institutions are participating in this preliminary design effort.

A Memorandum of Understanding has been signed with Caltech and with MIT to provide a framework for the future collaboration of these institutions in the design and development of the Array.

Discussions are also continuing with Canadian radio astronomers to explore the various methods by which the VLBA program can be effectively coordinated with the Canadian Long Baseline Array (CLBA) plans.

K. I. Kellermann

When you read this the new 12-m telescope should be in operation and producing great science. After the first tuning of the surface by John Findlay and company, the observed aperture efficiency at 1.3 mm was 19%, compared to 5% for the old, tired 36-foot telescope. During the next few months we hope to learn a lot about the general behavior of the 12-m telescope, such as its performance in various temperature and wind conditions. During the summer shutdown we intend to carefully fine-tune the surface and hopefully improve the performance further. We already know that there are areas of the surface near the outer parts of the inner panels where improvements should be possible.

The figure on page 2 shows performance curves derived from prime-focus measurements. The middle curve (rms = 105 μm) represents the performance now and for the upcoming observing quarter. The new surface is not only larger and more efficient but also more stable than the old 36-foot surface, represented as variable between 130 and 150 μm accuracy.

Hein Hvatum and Mark Gordon
Receivers

The observing season will begin with the old 3 mm receiver. This receiver retains the old (4750 MHz) IF but is mounted in a smaller box. New optical components include Fabry-Perot single-sideband filters and a new path-length modulator to suppress standing waves. The planned new beam-switcher (which directs the beam past the subreflector by use of a mirror-switched at 30-50 Hz) will not be ready immediately. Polarimeters may be ready for the beginning of observing.
The new λ1.2 mm receiver is essentially complete. It will be tested in late April and is anticipated to be ready for observations shortly thereafter.

The bolometer has had its components internal to the dewar realigned to improve performance in the 1 mm window. Performance has been satisfactory at 2 and 3 mm. Owing to continuous bad weather at Kitt Peak during late winter, the bolometer has not yet been checked out at 1 mm, but this is planned as soon as conditions allow. It is hoped to schedule the bolometer for observing, starting early to mid-April.

Sunscreen

Bill Horne and the Tucson group are designing a new sunscreen which will not be attached to the telescope like the old sunscreen, but which will run up and down in the slit of the astrodome on guided ways. Material for the new sunscreen has not been selected as yet, but it is planned to try a light material like Griffolyn T55 (identical to the old sunscreen material). If this material fails to stand up to wind loading, a heavier material will be necessary.

The new sunscreen will be installed in the coming summer. Until then there will be no sunscreen. The old one cannot be mounted because the space between it and the new telescope surface cannot be pressurized, owing to the gaps between the surface plates.

Encoders

The old Baldwin optical shaft encoders (20-bit, 360°) will be replaced this coming summer by new 22-bit (360°) inductosyns. There has been a delay in the delivery of the required special bearing.

Mark Gordon and the Editor

PROPOSAL STATISTICS, SECOND QUARTER 1983

Shown below are two separate breakdowns of the proposals received for the 12-meter telescope for the period 21 March to summer shutdown 1983. The sum of spectroscopic and bolometric proposals in the second table exceeds the total number of proposals in the first table because some proposals request more than one atmospheric window.

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Proposals</th>
<th>Days Requested</th>
<th>Per Cent Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar System</td>
<td>4</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>Stellar</td>
<td>19</td>
<td>114</td>
<td>23</td>
</tr>
<tr>
<td>Galactic</td>
<td>42</td>
<td>202</td>
<td>42</td>
</tr>
<tr>
<td>Extragalactic</td>
<td>27</td>
<td>149</td>
<td>31</td>
</tr>
<tr>
<td>Summary</td>
<td>92</td>
<td>483</td>
<td>100</td>
</tr>
</tbody>
</table>

Atmospheric Window

<table>
<thead>
<tr>
<th>Atmospheric Window</th>
<th>Spectroscopic</th>
<th>Bolometer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 mm</td>
<td>35</td>
<td>18</td>
<td>53</td>
</tr>
<tr>
<td>2.0 mm</td>
<td>11</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>3.0 mm</td>
<td>35</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>Totals</td>
<td>81</td>
<td>29</td>
<td>110</td>
</tr>
</tbody>
</table>

Mark Gordon
Green Bank

1300-1800 MHz RECEIVER

A new receiver for use on the 140-foot and 300-foot telescopes is now under construction. The receiver uses cooled FET amplifiers and a cooled orthomode transducer to cover the frequency range 1300-1800 MHz instantaneously. However, the high efficiency, hybrid mode feeds are limited to approximately 5% bandwidths. The following feeds are currently planned:

<table>
<thead>
<tr>
<th>$f_0$ (MHz)</th>
<th>$f_1$ to $f_2$ (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1333</td>
<td>1300-1365</td>
</tr>
<tr>
<td>1395</td>
<td>1360-1430</td>
</tr>
<tr>
<td>1665</td>
<td>1612-1720</td>
</tr>
</tbody>
</table>

Additional feeds will be constructed as proposal demand warrants. Feed changes will take about two hours.

We plan to do test observations on the 140-foot in July or August. The receiver should be ready for use by observers shortly thereafter. We expect the system temperature on the 140-foot to be approximately 30 K.

Roger D. Norrod

NEW 4-FEED 21-cm RECEIVER

A new 4-feed 21-cm survey receiver covering the 1.3-1.5 GHz range, with significant improvements in sensitivity, stability, bandwidth, and reliability, is now available. It replaces a 4-feed 21-cm receiver built in the late sixties.

Tested on the 300-foot telescope last October, the new receiver performed very well. The "on telescope" system noise temperature for all channels was less than 90 K (the old system was 150 K). Peak-to-peak noise fluctuations are very close or equal to theoretical values for time constants less than 1 second.

An RF filtering feature allows the user to narrow remotely the front-end RF bandwidth to minimize interference effects. A choice of four different filter bandwidths for each channel is available.

The noise calibration system is arranged to allow the receiver to function as either a total power or noise adding radiometer.

George Behrens

JANSKY WORKSHOP

Reminder: Those interested in attending the Jansky Workshop on Serendipitous Discussions in R.A. (see NRAO Newsletter No. 9) should contact Becky Warner in Green Bank immediately at 304-456-2227.

Ken Kellermann
"INTERFERENCE IDENTIFICATION AND EXCISION": WORKSHOP NOTES

The lecture notes from the Workshop on Interference Identification and Excision held in Green Bank in 1982 are now available in the form of a report. Copies can be obtained on request from:

National Radio Astronomy Observatory
P. O. Box 2
Green Bank, WV 24944
Attention: Berdeen O'Brien

Rick Fisher

VLA

327 MHz INTERFEROMETER

First fringes with a prototype 327 MHz interferometer were obtained on 9 March 1983. A third antenna will be outfitted with a 327 MHz receiver by the end of March, giving a three-baseline test array which will be used to conduct extensive tests of the antenna and interferometer performance over the next few months.

Equipping the remaining 25 antennas with 327 MHz receivers will not begin until the 3rd or 4th quarter of this year, and it is anticipated that at least a year will be required to complete the installation.

Rick Perley

VLA ANTENNA WRAPS

All VLA antennas now have the same azimuth wrap limits independent of the arms on which the antennas are located.

R. C. Bignell

VLA REMOTE OBSERVING

We are now up to full capacity in the VLA Remote Observing Program. For continuum observing, if you want any observing files prepared, data calibrated and edited, export tapes prepared, or if you have any questions about any of the above services, contact Peggy Perley or Rick Perley. For spectral-line observations, we will support the same tasks in general, although there may be some limitations when the program is highly complex or manpower is limited.

If there are any questions regarding assistance for VLBI observing, contact Pat Crane.

R. C. Bignell

A COMPILATION OF VLA OBSERVATIONS

A list of VLA observations (with snapshots deleted) has been compiled, which is nearly complete since June, 1982, and with sporadic entries since March, 1982. A copy may be obtained by writing to Alison Patrick at the VLA, or, for those with access to the VLA computer system, a machine readable version is present as file 1982.SRT[13,542].

Barry Clark
NEW INSTRUCTIONS FOR TRAVEL TO THE VLA SITE

Effective March 14, 1983, the arrangements for traveling between the Albuquerque airport and the VLA site have been revised. NRAO is leasing a pool of GSA cars which will be operated in conjunction with Dollar Rent-A-Car to supply transportation to and from the site. The procedure is as follows:

Reservations

1. Reservations for a car may be made by calling the VLA site on FTS 476-8357 or commercial (505) 772-4357. To book transportation for your arrival and departure, please provide your arrival date and time, airline and flight number, and your departure date and time.

2. No pool cars will be dispatched without a prior reservation made through NRAO. If no reservation is made, you will be responsible for your own transportation arrangements.

Arriving at the Albuquerque Airport

1. Upon arrival, go to the Dollar Rent-A-Car desk in the airport terminal (opposite the Continental Airlines counter). Dollar is open seven days a week from 7:00 a.m. to 11:00 p.m. (to 10:30 p.m. on Saturdays). You will receive either a GSA car or a Dollar car rented by NRAO.

2. In the case of receiving a Dollar car, you will also be given a rental contract. This contract serves as the vehicle registration and should be kept with the car while you are driving it.

3. All extra insurance on the rental contract should be declined.

4. A valid drivers license is required.

5. If your flight is going to be delayed beyond the normal hours for Dollar, call 505-842-4224 and arrangements can be made for you to pick up your keys elsewhere.

At the VLA Site

1. Give the car keys and any rental contract to the receptionist as soon as possible after your arrival.

2. You will have a vehicle reserved for your return to Albuquerque and may pick up the keys from the receptionist between the hours of 8:30 a.m. and 4:00 p.m. Monday through Friday on the day of your departure. For weekend and holiday departures you may pick up keys on the workday that is immediately preceding.

3. If you are returning a Dollar car, you will be given the rental contract.

4. In order to have cars where they are needed, you may be asked to drive a vehicle to the airport even though it might be possible to share a ride.

Return to Albuquerque Airport

1. Return the car to the Dollar Rent-A-Car parking space at the east end of the terminal. Record the mileage if it is a Dollar car and return the keys with rental contract to the Dollar desk. If it is a GSA car merely return the keys to the Dollar desk.

2. You will not need to retain a copy of the rental contract.

Visitors Not Reimbursed for Travel

There will be a fixed round-trip charge of $75 for a car. This charge will be included on your lodging bill and may be paid prior to departure.

Bob Dorr
In General

**REMINDER OF PROPOSAL DEADLINES AND VLA CONFIGURATION CHANGES (PRELIMINARY)**

*See also Newsletter No. 9--Page 4*

<table>
<thead>
<tr>
<th>Deadline</th>
<th>Observing Quarter</th>
<th>Telescope + Configuration (preliminary)</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 15, 1983</td>
<td>Q3</td>
<td>12 meter (except summer shutdown) VLA - D, A</td>
</tr>
<tr>
<td>July 15, 1983</td>
<td>Q4</td>
<td>12 meter VLA - A, A/B hybrid, B</td>
</tr>
<tr>
<td>October 15, 1983</td>
<td>Q1</td>
<td>12 meter VLA - B</td>
</tr>
<tr>
<td>January 15, 1984</td>
<td>Q2</td>
<td>12 meter VLA - B/C hybrid, C</td>
</tr>
</tbody>
</table>

Actual VLA configuration availability depends to a certain extent on proposal pressure.

No proposal deadlines are in force for either the 140-foot or 300-foot telescopes in Green Bank. Currently the proposal backlog is about 9 months, but the interval between proposal submission and scheduling largely depends on the receivers that are required.

R. J. Havlen

**TARGET-OF-OPPORTUNITY PROPOSALS**

The NRAO is prepared to respond in a timely fashion to proposals for telescope time which aim to take advantage of unusual observing circumstances that occasionally arise. Such programs may be the result of extensive advance planning (i.e., Halley's Comet, periodic phenomena) or in response to unforeseen unusual occurrences (i.e., supernovae, flaring sources). Where there is sufficient time, the advice of NRAO's external reviewers will be sought. When that is impossible, the NRAO scheduling committee will judge the program's merits and its impact on the observing scheduled if time is assigned.

R. J. Havlen

**FOREIGN TELESCOPE REMINDER**

The NSF continues to sponsor a program to encourage the use of available observing time on foreign telescopes. The "Visitor Program: Foreign Telescopes," which is administered for travel to radio facilities by the NRAO, has to date supported more than fifteen trips during the past two years. Available resources are far from exhausted, however, and hopefully observers are not overlooking this potential source of travel funds when deciding whether or not to apply for observing time on large foreign telescopes. Only round-trip airfare of the Principal Investigator (PI) is reimbursable under the program and only if the presence of the PI is essential for the success of the research program. The most effective use of NSF funds dictates that they should generally not support the travel of scientists who can be presumed to have their own funds for such travel (e.g., employees of federal agencies and federally-funded research centers).

R. J. Havlen
During 1982 the number of scientists using the NRAO observing facilities continued to increase as many non-traditional radio astronomers from other wavelength regimes swelled the ranks of VLA users. To some extent, each of the NRAO telescopes has seen more and more usage by "problem-oriented" researchers other than wavelength-oriented ones. In the tally below all co-authors of successful proposals are counted only once for a specific telescope even though they may have appeared on more than one successful proposal:

<table>
<thead>
<tr>
<th></th>
<th>36-ft</th>
<th>140-ft</th>
<th>300-ft</th>
<th>VLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visitors</td>
<td>81</td>
<td>151</td>
<td>36</td>
<td>349</td>
</tr>
<tr>
<td>Students</td>
<td>11</td>
<td>25</td>
<td>15</td>
<td>71</td>
</tr>
<tr>
<td>NRAO Postdocs</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>NRAO Permanent Staff</td>
<td>4</td>
<td>14</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>Total Observers</td>
<td>96</td>
<td>191</td>
<td>63</td>
<td>452</td>
</tr>
<tr>
<td>Institutions</td>
<td>43</td>
<td>55</td>
<td>23</td>
<td>111</td>
</tr>
</tbody>
</table>

When the statistics from each telescope are combined and corrected for multiple telescope users, 567 visitors from 135 institutions made use of NRAO telescopes during the year (including 97 students). This compares with 509 visitors (93 of whom were students) from 120 institutions during the preceding year (1981). Meliora!

R. J. Havlen

DISTRIBUTION OF 1982 SCHEDULED OBSERVING PROGRAMS IN VARIOUS RESEARCH AREAS, BY PERCENT

<table>
<thead>
<tr>
<th></th>
<th>36-ft</th>
<th>140-ft</th>
<th>300-ft</th>
<th>VLA</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. SOLAR SYSTEM --</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun, Planets, Satellites, and Comets</td>
<td>6%</td>
<td>-</td>
<td>-</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>II. STELLAR SYSTEM --</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulsars, X-ray Sources, Planetary Nebulae, Circumstellar Shells, Supernova Remnants, Masers, Novae, Supernovae, and Stars</td>
<td>7%</td>
<td>9%</td>
<td>17%</td>
<td>21%</td>
<td>17%</td>
</tr>
<tr>
<td>III. GALACTIC --</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Galactic Structure, Center, Molecular Clouds, HII Regions, Star Formation, Molecules, and Interstellar Medium</td>
<td>72%</td>
<td>34%</td>
<td>9%</td>
<td>18%</td>
<td>26%</td>
</tr>
<tr>
<td>IV. EXTRAGALACTIC --</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal and Active Galaxies, Radio Galaxies, Clusters, Quasars, VLB Studies, Extragalactic Molecules, and Cosmology</td>
<td>15%</td>
<td>57%</td>
<td>74%</td>
<td>57%</td>
<td>54%</td>
</tr>
</tbody>
</table>

R. J. Havlen
STUDENT PROGRAMS AT THE NRAO

Most members of the radio astronomy community are familiar with the NRAO Summer Student Program which has operated successfully in all but one year (1982) of the past twenty-four years. Many of today's practicing radio astronomers got their first real exposure to the field of radio astronomy through their summer research opportunities in Green Bank, Charlottesville, Tucson, or at the VLA.

Less well known, perhaps, is the NRAO Ph.D. Student Program, which, in cooperation with the student's home university, provides up to two years of financial support for thesis students only. Individual NRAO staff scientists accept a major responsibility for directing the student's thesis work either in cooperation with or in lieu of a thesis advisor at the student's home university. Normally students enter this program after they or their university advisor have had interaction with an NRAO scientist and the nature of the thesis project is fairly well defined. Nominal support ($100 per month) from the university is required during the academic years while the student is in residence at the NRAO.

The NRAO is also initiating a more general program for students who are at any stage in their graduate education and who wish to gain first-hand experience in the techniques of radio astronomy or the related disciplines of electronics and computer sciences. Students with their own financial support are encouraged to spend up to six months in residence at one of the four NRAO locations under the general guidance of an NRAO staff member. In the past, students at the University of Virginia and New Mexico Tech have informally benefitted in this manner as a result of their proximity to the NRAO. We would like to promote this program on a much broader scale in recognition of NRAO's unique facilities, which are generally unavailable at many university astronomy departments, and of NRAO's responsibility to contribute to the education and training of the future generation of radio astronomers. Students or faculty who are interested in a program of this type should contact the Director's office in Charlottesville.

R. J. Havlen

ON-SITE ROOM AND BOARD CHARGES

In Newsletter No. 6 we pointed out that redundant and inefficient operations are involved in keeping the NRAO travel reimbursement procedure independent of the procedure for billing and collecting board and room charges from visiting observers. Reimbursement for air fare minus the applicable deductible has always been made directly to the visitor's institution, whereas board and room charges have been settled with the observer. Henceforth, this policy will be maintained only for those visiting observers who settle their board and room accounts prior to departing from an observing site. Failure to do so will no longer result in receipt of a bill by mail. Rather, outstanding board and room charges will automatically be deducted from the travel reimbursement to the visitor's home institution. Recognizing that some investigators could be severely handicapped with bureaucratic tieups at home by this procedure, we now encourage all visitors to settle up their on-site expenses before leaving the NRAO. We realize that weekends, travel schedules, forgetfulness, and the like make it difficult to wait until after every last charge has been incurred before paying. Therefore, each of the sites is prepared to accept payment in advance at the visitor's convenience. The NRAO will take the responsibility for preparing bills in advance for observers wishing to pay in this manner. Since the vast majority of visitors have specific preplanned travel itineraries, advance charges and payments can be quite accurately computed.

R. J. Havlen