NRAO NEWSLETTER

1 January 1992 No. 50

GREEN BANK

GREEN BANK TELESCOPE CONSTRUCTION ACTIVITIES

On-site construction will slow during January, February, and March 1992 in deference to the winter weather. When the Green Bank shutdown begins, all of the azimuth wall, the pintle bearing housing, and one grade beam connecting them will have been completed. The major portion of the dirt recompaction around the foundation will also be completed. Left to complete when construction activity resumes in the spring are: three more grade beams, the top layers of dirt compaction, a foundation for the crane, and an erection pad on which subassemblies can be built.

In January 1992 an engineering firm will carefully survey the locations of the 288 bolts anchored in the azimuth wall. This step will be in preparation for the accurate placement of the azimuth rail, an activity that will take place in spring 1992 at the same time as the events mentioned in the first paragraph.

Although activity in Green Bank will slow, construction elsewhere continues. Fabrication of box beams is underway at the Mexia, Texas, plant of Radiation Systems, Inc. In addition, work on the actuator units for the adjustable surface will begin at Industrial Devices Corporation, a contractor to NRAO.

The Project remains on schedule. 1991 was a productive year for the Green Bank Telescope.

G. A. SEIELSTAD

NEW JOINT OPERATIONS CENTER FOR GREEN BANK

A new Operations Center for Green Bank has been funded by a Military Construction Appropriation. The source of funding, unusual for NRAO, is a consequence of the Observatory's operation of services requested by the Naval Observatory. The building will contain approximately 25,000 square feet, enough to serve as a common center for operating the following activities: the Green Bank Telescope, the VLBI antenna and other services operated for the Naval Observatory, the Orbiting VLBI Communications Station, and the 140 Foot Telescope when its computer control is updated in preparation for SETI observations. The building will be unified with the Jansky Laboratory. Operational efficiencies should result from the consolidation of all Green Bank activities and most personnel into a single center.

The Atlantic Division of the Naval Facilities Engineering Command has assigned a Project Manager, Debra L. Riddle, who is working closely with NRAO and USNO. She has solicited bids from architectural and engineering firms, with a closing bid date of January 9, 1992. Design will occupy all of 1992 and part of 1993. A construction firm could be selected by summer 1993, with construction expected to take 14-16 months.

When the building is completed, it will be the center of all operations and the scientific support for them. Ample office space is being planned for visiting scientists. An auditorium will better enable Green Bank to serve as a center for workshops and meetings. The Jansky Lab will be devoted to electronics engineering and to business services.

G. A. SEIELSTAD

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GREEN BANK TELESCOPE PROJECT SCIENTIST

I am pleased to announce the appointment of Felix J. Lockman as Project Scientist for the Green Bank Telescope. As Project Scientist, Jay will be responsible for providing advice to the GBT Project on scientific issues, addressing the scientific concerns raised by external advisory bodies such as the GBT Advisory Committee and the GBT Science Working Group (chaired by G. A. Seielstad), and maintaining a continuous review of the GBT Project with respect to the scientific capability of the telescope.

Jay has recruited the following staff members to work with him: J. Condon, J. R. Fisher, D. Hogg, K. Kellermann, and H. A. Wootten.

P. A. VANDEN BOUT

VLA

VLA CONFIGURATION SCHEDULE

Please disregard the incorrect version of this schedule that appeared in the December issue of the AAS Newsletter.

Configuration	Starting date	Ending date	Proposal Deadline
CnB	31 Jan 1992	17 Feb 1992	15 Jun 1991
C	21 Feb 1992	25 May 1992	15 Oct 1991
DnC	05 Jun 1992	22 Jun 1992	1 Feb 1992
D	26 Jun 1992	21 Sep 1992	1 Feb 1992
A	16 Oct 1992	04 Jan 1993	1 Jun 1992
BnA	15 Jan 1993	01 Feb 1993	1 Oct 1992
B	05 Feb 1993	19 Apr 1993	1 Oct 1992

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).

The DnC configuration was originally planned to be scheduled from proposals received for the 15 October 1991 deadline. The schedule slippage has made it possible to also consider proposals received up to 1 February 1992.

Note, also, that the next proposal deadline is 1 February 1992, instead of 15 February. This change is being made to align with U.S. and European VLBI network proposal deadlines.

APPROXIMATE LONG-TERM SCHEDULE

	Q1	Q2	Q3	Q4
1992	B,C	C	D	A
1993	B	B,C	C	D
1994	A	B	B,C	C
1995	D	A	B	B,C
1996	C	D	A	B

Observers should note that in these years of sunspot maximum, daytime observations at 327 MHz are unlikely to be successful in the smaller configurations because of solar interference and in the larger configurations because of a disturbed ionosphere. In particular, only the most urgent D configuration observations near 09^h RA should be considered, and A configuration observations near 16^h RA will also be difficult.

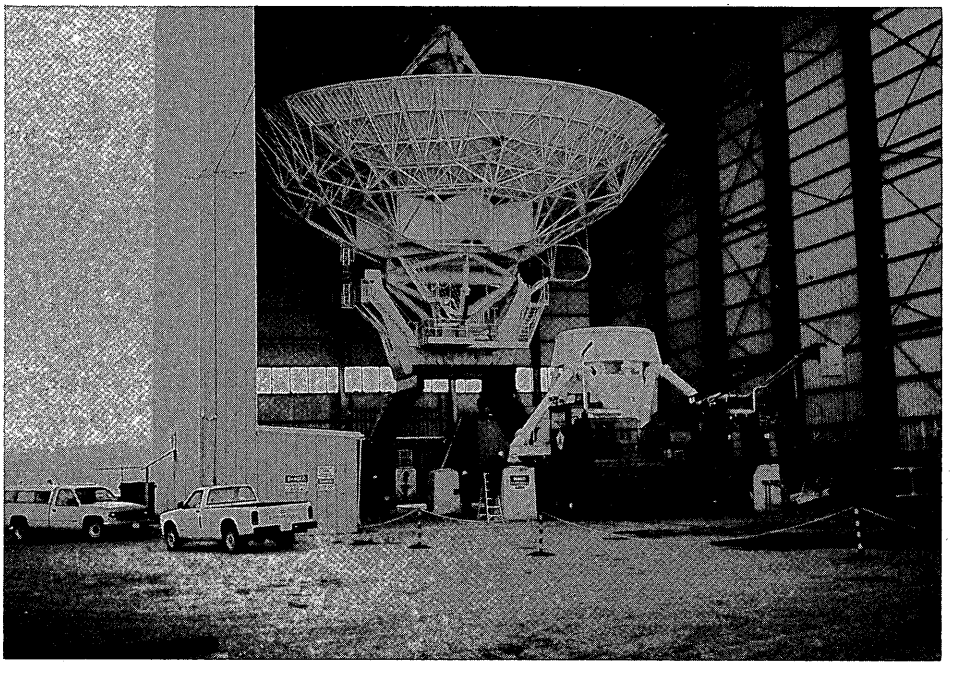
B. G. CLARK

VLA AZIMUTH BEARING AND TRANSPORTER PROBLEMS

The defective azimuth bearing on antenna 21 was successfully replaced on November 21 and 22, 1991. By November 20, the antenna yoke stand was erected in the Antenna Assembly Building and a trial run was held. The transporter positioned the antenna with the yoke above the stand. The antenna was lowered until strain gauges on the stand and the antenna pedestal showed that the stand was holding most of the weight of the moving structure of the antenna. The next day, this procedure was repeated, but then the yoke was unbolted and the antenna separated. All went very smoothly; the old bearing was removed, the new one installed, and by the afternoon of November 22 antenna 21 was bolted together again. This was the culmination of many months of preparation and planning by the engineering Services Division, and the successful completion of the task is to their great credit.

The replacement of the axles on VLA transporter #2 is nearing completion. After an axle broke on each of the transporters and an inspection showed cracks in other transporter axles, it was decided to replace all 12 axles on transporter #2. The replacement axles incorporate design and material changes. Meanwhile, transporter #1 is limited to light duty (level travel) until its axles can be inspected. One result is that antenna #7 has been stranded at the far end of the east arm since October, while the rest of the array was moved to the B-configuration. The movement from AE9 requires a pull up a hill, which will not be attempted until transporter #2 is ready for service in early 1992.

R. A. SRAMEK



Shown is antenna 21 on November 21 with the pedestal separated from the antenna yoke and super structure, which are resting on the yoke stand.

REAL-TIME DATA PROCESSING FOR THE VLA

A system is under development that will permit nearly real-time examination and processing of data during observing with the VLA. A SparcStation 2 workstation (MIRANDA) is being networked by Ethernet to the on-line Modcomp computers. During the early part of 1992 the real-time FILLM (for AIPS) and DBFILL (for other programs) will be tested for use in AIPS and other programs. Expert users who would like to help with testing nearly real-time data reduction are invited to discuss the possibilities with Wes Young (505-835-7337). The system should be available for general use by the summer of 1992.

R. M. HJELLMING, R. A. PERLEY

COMPUTING AT NRAO-NM

Two new Computer Division positions, funded from VLBA Operations, have been filled. One is a Systems Administration position, needed to handle the increased workload from the influx of new equipment. Mike Prewitt began work on December 2. Questions about the status of your computer account, and other problems related to the systems at the AOC, should be addressed to him (mprewitt@nrao.edu). The second position is that of Network Analyst. Phil Green will be responsible for the day-to-day operations of the VLBA telescope site connections and the local networking in New Mexico. One of his first tasks, which was successfully accomplished on December 14, was the migration of all AOC computers to a new Internet network number. This move was necessary because of the quantity of new systems arriving during the next several months (see below). Key new addresses are:

zia.aoc.nrao.edu 146.88.1.4
uvax1.aoc.nrao.edu 146.88.1.6

In addition, offers were made and accepted on two of the three vacant programming positions. This will help to relieve the backlog of programming projects.

During the past few months, responses to the first two Array Computing Plan procurement Request For Proposal documents were received and evaluated. This has resulted in two separate orders, both subject to formal acceptance by AUI/NRAO. The first is for 45 Sun Microsystems IPX workstations, of which approximately 32 will come to the AOC. These will be used for data reduction by visitors and in-house staff. During the past year, a number of visitors have had the opportunity to reduce data using a workstation reserved for them during their stay, and the response has been extremely favorable. Currently we have only two such stations, but the number will increase as a result of this procurement.

The second order is for an Auspex NS/5000 computer, a high-performance NFS server, which is needed to supply operating system support and disk space to both the new and existing workstations. We anticipate that this system will be installed in early February 1992.

R. MILNER

FLUX DENSITIES OF VLA CALIBRATORS AT 1.3 CM

The flux densities at 1.3 cm of selected VLA calibrators have been determined from VLA measurements taken on 29-30 December 1989. The results are summarized in the table along with the values from Baars et al. (1977) and the earlier measurements from 28-29 December 1985.

3C 84 is the only source whose flux density changed significantly between 1985 and 1989. Full details are given in VLA Test Memorandum No. 159, including new determinations of the gain-correction curves of the VLA antennas.

Flux Densities at 1.3 cm

Source	BAARS Flux	Err	1985 VLA		1989 VLA	
3C 48	1.10	0.04	1.28	0.01	1.24	0.02
3C 84			41.32	0.25	36.77	0.35
3C 138			1.17	0.01	1.14	0.02
3C 147	1.68	0.06	1.83	0.01	1.80	0.02
3C 286	2.53	0.09	2.52	0.01	2.52	0.03
NGC 7027	5.85	0.56	5.67	0.02	5.58	0.02

The observing run of 29-30 December 1989 determined the flux densities of all standard sources at all standard VLA observing bands. A summary of the final results will appear in the 1992 edition of the VLA Status Report.

P. C. CRANE, R. A. PERLEY

VLA PRODUCTIVITY

As reported in the July 1 Newsletter, a comprehensive survey was undertaken of 185 randomly scheduled proposals that were awarded VLA time in 1986. Information on the analysis and publication histories of each of those proposals has finally been assembled (either directly or indirectly) from the investigators.

A total of 101 of the 185 projects (55%) have thus far resulted in publications (or pending publications). There have been 170 papers, of which 133 are in major journals, 23 are in conference proceedings, and the rest are in lesser known journals or are in press. The median length of time between observation and publication was 25 months. In addition, the investigators in 41 more projects are still actively pursuing the publication of their data. If optimistic projections are believed, 77 percent of the scheduled VLA programs will eventually result in at least one publication.

Only 43 out of the 185 projects (23%) are without publication prospects for a variety of reasons, which include: negative results, data superceded by recent results, or support observations only (22 projects, 12%); corrupted data (8, 4%); procrastination, research dropped, etc. (13, 7%).

Very few of the investigators had not completed some analysis of their data beyond the imaging stage of reduction (26 or 14%). Only 30 percent of the respondents commented on any details of the reduction procedure. Most reported that they were able to calibrate their data and produce images within a few months.

Students at all levels were heavily involved in the acquisition and analysis of VLA data. Forty-nine percent of the projects involved student participation and 26 percent were directly in support of dissertation research--leading to 32 published and 16 unpublished theses.

R. J. HAVLEN

OBTAINING COPIES OF ARCHIVED SPECTRAL LINE DATA

In the course of the past several months considerable effort has gone into testing the archive tape copying program for spectral line data. At present we are confident that data taken after 16 February 1984 can be translated to the current tape format. This means that this data can be read into AIPS using the standard FILLM and calibrated as usual. There are a few caveats:

- The tape copying program runs on the Modcomp on-line system at the VLA site only. A Unix based version which will run on a dedicated workstation is planned for the future. Until that system becomes available, archive tape copying is laborious. Consequently, requests for copies of old data will be done on a time-available basis.

- Although we have tested many correlator configurations, it is simply impossible to verify the correctness of each and every correlator mode. To help us in further checking the integrity of the archive copies, we will require that users who obtain a tape copy in this interim period give us feedback, expecting them to be more alert than usual to possible problems with their copied data.

Requests for copies should be addressed to Peggy Perley. She should also be contacted in case of problems; she will be the clearing house for feedback. In the next few months we hope to be able to test the copying program for line data taken between 1979 and 1983. As was mentioned in a previous Newsletter (No. 46; 1 January 1991), old continuum data from 1976 can be handled both at the VLA site and at the AOC. Requests for copies of continuum data should also be addressed to Peggy.

E. BRINKS, P. PERLEY

VLA DISSERTATION OBSERVATIONS

This is a reminder to all dissertation students and their faculty advisors who plan to make extensive and/or critical use of VLA/VLBA observations in a dissertation. Submit the observing proposal well in advance of the desired VLA configuration if at all possible and with a clear statement that it forms a major/critical portion of a student dissertation. Proposals are normally reviewed three times per year by configuration, but dissertation proposals (and others as well) will benefit from an out-of-sequence review to avoid delaying dissertation time scales if resubmission is recommended.

Students who are first time users of the VLA and/or the AOC data reduction facilities are also reminded that they must be accompanied by a senior researcher when they travel to the VLA/AOC to prepare observations or to reduce data. Two weeks advance notification is required of all visitors.

R. J. HAVLEN

OBSERVE PREPARATION

Remote observing with the VLA has become very popular in the last few years. Nevertheless, the convenience and privilege of remote observing carries with it a heavy responsibility for the observer. The timely and accurate preparation of your observe file is absolutely critical to the success of your run and should certainly not be left to the last minute. Computer systems and/or communication links can (and do) fail at inopportune moments, and it would be very prudent to allow for such occurrences. At the very least you should submit your observe files 48 hours in advance. If you need assistance with preparation or submission, please contact Peggy Perley or Dave Wunker at analysts@nrao.edu or (505) 835-5359.

R. J. HAVLEN

RECENT VLA MEMORANDA

The AIPS++ User Specifications Memoranda:
No. 101 - "The AIPS++ User Specifications Memo Series," R.M. Hjellming (8/91)
No. 102 - "Final Report from the Software Advisory Group (SWAG)," T. Cornwell (9/90)
No. 103 - "AIPS++ Requirements," R. Fisher (9/91)
No. 104 - "The AIPS++ User Interface," D.O.S. Wood (12/91)
No. 105 - "An Initial NRAO-Oriented Version," R.M. Hjellming et al. (12/91)
No. 106 - "ATNF AIPS++ User Specifications," ATNF Staff and Users (12/91)
No. 107 - "Miscellaneous Suggestions for AIPS++," R.M. Hjellming et al. (12/91)
No. 108 - "AIPS++ User Specifications: BIMA Version" (12/91)
No. 109 - "An Approach Towards Scientific Specifications for AIPS++," D. Westpfahl (1/92)

Electronics Memoranda:
No. 217 - "The Master Rack System Dataset Eprom Upgrade," W. Koski (10/91)
No. 218 - "The Antenna System Dataset Eprom Upgrade," W. Koski (10/91)
No. 219 - "New Dewpoint/Ambient Temperature System for VLA," R. Weimer (11/91)

VLA Test Memoranda:
No. 158 - "Spectral Dynamic Range at the VLA: The 3 MHz Ripple," C. Carilli (10/91)
No. 159 - "Measurements of Flux Densities and Gain Corrections at 22460.1 MHz on 29-30 December 1989," P. Crane (11/91)
No. 160 - "VLA and VLBA Antenna Temperature Measurements," C. Janes (12/91)

Millimeter Array Memoranda
No. 68 - "A Millimeter î Phase Stability Analysis of the South Baldy and Springerville Sites," M.A. Holdaway (11/91)
No. 69 - "SIS Mixer & LO Options for the Millimeter Array," A.R. Kerr (12/91)
No. 70 - "Image Frequency Suppression on the MMA," A.R. Kerr (12/91)
No. 71 - "MMA Systems Engineering Questions and Comments," A.R. Thompson (12/91)

Copies of any VLA numbered memorandum or a copy of the listings of all VLA numbered memoranda are available from Meri Stanley, P. O. Box O, Socorro, NM 87801 (or 505-835-7310).

M. STANLEY

12-METER

GENERAL NEWS

Twelve meter telescope observers are reaping the rewards of the many development and upgrade projects of the past two years. The new 3 mm SIS receiver, which tunes in two bands from 68 to 116 GHz, is giving excellent performance. T_R^* system temperatures as low as 175 K have been observed at 97 GHz with this receiver. The new control system has stabilized and is now faster and more efficient than when first introduced a year ago. The pointing accuracy of the telescope is better than last year, although there is room for further improvement. As a result of the new capabilities of the 12 m, the proposal subscription rate has increased. In the last two scheduling periods, the telescope has been over-subscribed by more than 2:1.

We are working on the following projects for the 12 m this spring: installation of a single-sideband quasi-optics filter for the 1 mm SIS receiver; completion of the 2 mm SIS receiver; continued work on the 8-beam receiver upgrade to SIS mixers; a tunable IF processor for the hybrid spectrometer; upgrade of the control system computers to Sun Sparc-2 processors; upgrade of the control system user interface to X-Windows; and an improved FITS data-export system for observers. We will give a progress report on these projects in the next Newsletter.

P. R. JEWELL, D. T. EMERSON

VLBA

VLBA SELECTED CONSTRUCTION ITEMS

STATIONS STILL UNDER CONSTRUCTION

Hancock, NH - Antenna erection was completed in July 1991. Electronic outfitting was completed in November 1991. However, there is a temporary "hold" in operability at Hancock caused by a defective azimuth wheel/axle assembly, which required its return to the antenna manufacturer for correction.

St. Croix, VI - Antenna erection is complete. Outfitting is scheduled to start in January 1992. Operability is scheduled for June 1992.

Mauna Kea, HI - The antenna foundation is complete, and the control building is scheduled for completion in April 1992. Antenna erection started in November 1991, and outfitting should be completed before the end of 1992.

MONITOR AND CONTROL - Work continues on making the hardware checking algorithm produce more meaningful information about equipment not performing as specified. A general-purpose listing/plotting program is being written to display the engineering data for benefit of engineers and technicians. The Internet connection to the Hancock, NH site has been completed, and groundwork for the St Croix, VI link is underway. A network communications backup plan is also under development.

CORRELATOR - Integration and testing of hardware and software elements dominated the entire correlator group's effort during the previous calendar quarter. The inner speed control servo loop between playback interfaces and their associated playback drives and the passing of control between the playback interfaces and the software outer loop in the real-time system became sufficiently robust such that a first "station spectrum" could be obtained from recorded test observations. This process required an onerous degree of manual intervention, however, to activate and load all the requisite firmware and control tables. A high-priority effort continues to complete the integration of all aspects of correlation before further testing becomes practical.

The data path from the correlator into the VLBA post-processing system was completed and debugged on both ends. A rudimentary fringe-finding task, operating in the correlator's control computer directly from the standard FITS output format, also was written.

A survey of prospective VLBA users to determine priorities for data distribution media was completed. DAT and "Exabyte" media were the clear preference. These outputs will be provided in roughly equal numbers for the initial distribution subsystem. Occasional user requests for distribution of data on other media can be satisfied using existing drives on other computers in the Array Operations Center.

K. J. STETTEN

VLBI NETWORK PROPOSALS

Beginning with the June 1 deadline, proposals for VLBI network observing will be handled by the NRAO. Prior to that time network proposals will be handled as previously. In particular, for the proposal deadline of February 1, for the following sessions, send proposals to: C. J. Lonsdale, Haystack Observatory, Off Route 40, Westford, MA 01886.

1992 Session 2, 03 Jun to 24 Jun, at 1.3, 6 and 18 cm
1992 Session 3, 09 Sep to 30 Sep, at 3.6/13 and 6 cm
1992 Session 4, 04 Nov to 19 Nov, at 90, 18, and 1.3 cm

Any proposal requesting two or more antennas in the European VLBI network constitutes a Global Proposal. Global proposals MUST reach both Networks' Schedulers on or before February 1; allow plenty of time for mailing. For Global Proposals, or those to the EVN alone, send proposals to: R. Schwartz, Max Planck Institut fur Radioastronomie, Auf dem Hugel 69, D 5300 Bonn 1, Germany.

For proposals submitted after February 1, 1992, send proposals to: Director, NRAO, 520 Edgemont Road, Charlottesville, VA 22903-2475.

B. G. CLARK

IN GENERAL

WORKSHOP ON REMOTE OBSERVING

A workshop on **REMOTE OBSERVING** is to be held at NRAO in Tucson from April 21 to April 23, 1992. It is being organized jointly by the NRAO in Tucson and the Royal Observatory Edonburgh in the U.K. The purpose of this workshop is to exchange views and experiences on existing and planned remote observing capabilities and to discuss future possibilities. The workshop will be relevant to both single dish and array radio telescopes, but is not limited to radio wavelengths. A computer lab with terminals, workstations, and network access will be available during the workshop for demonstrations of existing remote observing capabilities at various telescopes around the world.

If you would like to attend this workshop, please fill in the attached form and return it to Jennifer Neighbours at NRAO in Tucson. Further information may be obtained from the same address.

D. T. EMERSON

POSPIESZALSKI HONORED BY IEEE

It is a pleasure to note that Marian Pospieszalski has been elected a Fellow of the IEEE, an honor reserved for only one electrical engineer in one thousand. Marian was recognized for his contributions to the development of ultra-low-noise microwave amplifiers for radio astronomy and deep space applications, and the understanding of the noise properties of microwave transistors. He joins the other IEEE Fellows at NRAO: Tony Kerr, Dick Thompson, John Findlay (ret.), and John Granlund (ret.).

P. A. VANDEN BOUT

1992 SUMMER STUDENT RESEARCH ASSISTANTSHIPS

Information and application forms have been mailed soliciting applications for research assistantships next summer. The majority of the assistantships will be offered to undergraduate students who are currently enrolled in U.S. undergraduate institutions and who will not receive their degrees before or during the summer of 1992. A limited number of assistantships will be available for graduate students or students from non-U.S. institutions.

Owing to the large number of applicants, and the difficulty of distributing materials among sites across the continent, the deadline for receipt of application materials **HAS BEEN ADVANCED** to January 20. Notice of decisions will be sent by March 1. Forms are available from department heads or by writing to: Director, Summer Student Program, National Radio Astronomy Observatory, 520 Edgemont Road, Charlottesville, VA 22903.

H. A. WOOTTEN

WORKSHOP ON REMOTE OBSERVING

April 21 - 23, 1992

National Radio Astronomy Observatory
Tucson, Arizona

Please edit or fill in this form and return it to the address below, by e-mail if possible.

NAME:

E-MAIL ADDRESS:

POSTAL ADDRESS:

I will attend: ☐ Yes ☐ No

I might attend: ☐ Yes ☐ No

If you would like to demonstrate remote access to a telescope, please indicate your requirements (e.g., workstation, INTERNET access):

I would like accommodations for the following nights: (Please state requirements for any accompanying persons.)

Return this form, by e-mail if possible, to:

Jennifer Neighbours

INTERNET: jneighbo@nrao.edu
SPAN: 6654::jneighbo

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