

VISITOR INFORMATION

The NRAO 12-Meter Millimeter-wave Telescope

NATIONAL RADIO ASTRONOMY OBSERVATORY  
949 N. Cherry Avenue  
Campus Building 65  
Tucson, Arizona 85721-0655

Commercial Telephone: (602) 882-8250

FTS Telephone: 762-6103

March 1987

## I. OBSERVING OPPORTUNITIES AND RESPONSIBILITIES

The NRAO 12-meter telescope is available, on a competitive basis, to all qualified scientists and students without regard to nationality or institutional affiliation. Financial support, in the form of travel funds and publication fees are, however, only provided to investigators employed by U.S. institutions. The procedure for submitting proposals to the NRAO, and the mechanics of the evaluation and approval of these proposals are outlined below.

Once scheduled on the telescope, the principal investigator has the responsibility for proper supervision of all aspects of the observing program. This means, for example, that each principal investigator is responsible for obtaining all calibrations and other receiver/telescope parameters necessary for the reduction of his data--the NRAO assumes no responsibility in these matters. For this reason it is the policy of the NRAO that the principal investigator, or one of his collaborators, be in residence throughout the observations to supervise the program.

## II. PROPOSALS FOR OBSERVATIONS

Scientific proposals for use of the 12-meter telescope should be submitted to

Director  
National Radio Astronomy Observatory  
Edgemont Road  
Charlottesville, Virginia 22903

The proposals, no more than 3 pages in length, should contain a thorough but succinct discussion of the scientific justification for the observations being proposed as well as a discussion of the sources to be observed, the manner in which the data will be taken, and an estimate of the telescope time needed to carry out the scientific program. A source list containing source identifications and coordinates should be included. For extensive lists (>50 objects), specific criteria defining the observing sample may be substituted. Special needs, instrumentation or software, should also be noted explicitly. A Cover Sheet on which this information can be summarized is appended; it should accompany each proposal.

Once received, the proposals are sent to five referees-- established scientists with broad backgrounds and considerable experience in millimeter-wave astronomy but unaffiliated with the NRAO--who consider each of the proposals individually and advise the telescope scheduling committee as to whether the scientific merit of the proposal is sufficient for them to be allocated time on the telescope and, if so, with what restrictions. Using the referees' remarks as a guide, the observations are either scheduled or the proposal is returned to the proposer for further consideration or explanation.

Proposals are reviewed, and the telescope is scheduled, in trimesters as follows:

<u>Proposals received by</u>	<u>Scheduled in</u>
1 January	2nd trimester (1 April to 15 July)
1 July	3rd trimester (15 Sept to 31 Dec)
1 October	1st trimester (1 Jan to 31 March)

Some time exists in each of the trimesters for proposals requesting frequencies lower than 270 GHz. Such proposals, if received before the deadline for a trimester, will either be scheduled in that trimester or, if unsuccessful, will again be considered in the subsequent trimester. A proposal unsuccessful in two consecutive trimesters will be dropped from the telescope queue and the proposer notified. Proposals for frequencies above 270 GHz can be scheduled only in the first trimester (1 January to 31 March) for reasons of atmospheric transparency. The NRAO will take receipt of high frequency proposals at any time of the year and will referee the proposals upon receipt. Scheduling consideration will be deferred until the first trimester of the year. If the proposal cannot be scheduled on its first consideration, it will be dropped from the queue and the proposer notified.

### III. LOGISTICS OF OBSERVING AT THE 12-METER

#### A. The Tucson Organization

The following individuals should be contacted when questions arise in their areas of responsibility:

Darrel Emerson	Site Director; responsible for general matters of operations policy.
John Payne	Responsible for telescope electronics.
Betty Stobie	Computer systems and software.

Phil Jewell	Handles detailed scheduling of the telescope; provides scientific assistance for users; handles telescope calibration and pointing.
Dennis Chase	Responsible for the telescope and all operations on the mountain.
Cal Sparks	Arranges transportation to Kitt Peak; handles shipping and receiving.
Maxine Thomas	Coordinates visitor travel in and out of Tucson as well as lodging in Tucson.
Jennifer Neighbours	Responsible for 12-meter data archives and handling of observer data tape requests.

In addition, more general questions or comments pertaining to Observatory-wide activities (scheduling procedures, scientific or instrumentation priorities, inter-site relations) or specific criticisms of, or suggestions for, the Tucson operation may be addressed to the director of the NRAO located at the Charlottesville, Virginia office.

## B. Travel

### 1. To the NRAO Tucson Office

It is most convenient for the observer arriving at the Tucson airport to take the airport limousine to the NRAO office. The limousine, called the "Arizona Stagecoach", departs from a stand located about 50m on the right as one exits the main terminal building on the lower level. The limousine driver will know where Steward Observatory is on the UA Campus and/or he will know where the Kitt Peak National Observatory (KPNO) building is. The NRAO is found on the 5th floor of the Steward Observatory building directly across Cherry Avenue from the National Optical Astronomy Observatory office and KPNO.

## 2. To Kitt Peak

The 12-meter telescope on Kitt Peak is 55 miles from the NRAO Tucson office. Observers travel to and from the mountain with U.S. government GSA cars. The cars, one for each observing team, are available from Cal Sparks at the Tucson office. The observer should contact Cal at least a week prior to his observations to arrange for the vehicle. A current driver's license is required for those driving CSA cars.

Federal regulations require that GSA vehicles are to be used for official business only. They must not be taken to local tourist attractions or local restaurants. Because we have only two vehicles for observing teams, you are requested to return the vehicle to the downtown office as soon as your scheduled observing run is completed. The principal investigator should coordinate the return of the vehicle with Cal Sparks sometime during his observing run.

### C. Housing on Kitt Peak

The NRAO maintains 7 rooms in 2 dormitory trailers immediately adjacent to the telescope for observers' lodging. Each room is provided with clean linens and towels: the observer is requested to make up his own bed upon arrival and later to return used linen, towels and wash cloths to the clothes hamper at the conclusion of his visit. In addition to bedrooms, each trailer has a living area with a color television, a desk and a small kitchen

for the observer's use. (Contact the telescope operator if you wish to use the stove in the trailer's kitchen -- the gas to the stove is usually shut off.)

As at all NRAO facilities, spouses are welcome. The necessity for maintaining quiet in the vicinity of the dormitory trailers generally precludes children from using these facilities. Pets are not permitted in the trailers or on the mountain.

D. Meals

Visitors using the 12-m telescope are welcome to use the cafeteria on the mountain operated by Kitt Peak National Observatory. Children, however, are not permitted to use the KPNO cafeteria.

The cafeteria is located at the summit of Kitt Peak approximately 2 miles from the 12-m telescope; observers usually drive their GSA cars to and from the cafeteria. Meal hours are as follows:

Breakfast	0600 - 0800
Lunch	1200 - 1300
Dinner	1700 - 1800

Note: At all the above hours a cook is present in the cafeteria to take orders. There is also a small kitchen in the KPNO dining area, open 24-hours a day, from which observers may obtain cold cuts, cereals, soup, etc.

E. Laundry

A free self-service clothes washer and dryer are available for the observer's use in the recreation building on the summit.

F. Recreation and Leisure

Adjacent to the KPNO cafeteria is a lounge with a color television, stereo, magazines and card tables. Pool tables, ping-pong tables and shuffleboard are available for the observer's use at the recreation building. Candy bars, soft drinks, gum and cigarettes may be purchased either at the KPNO museum or in the recreation building.

G. Charges for Room and Board

While observing on the 12-meter telescope all observers will be charged \$25.00 per night. This charge will cover all meals (whether eaten or not), lodging, and mountain services. Of this \$5.00 goes to the NRAO for lodging and \$20.00 is allocated to KPNO for food and other services. No charge for meals will be made on the last day an observer is at the telescope if dinner is not eaten on the mountain. To facilitate accounting a clipboard is provided at the entrance to the KPNO cafeteria. On the NRAO clipboard observers should sign for all meals when they are taken; the column for lodging also should be checked for each night's stay on the mountain.



All payments, for meals and lodging, are made to the NRAO.

- (1) Payment may be made by check once a bill is received from the NRAO Fiscal Division in Socorro, New Mexico.
- (2) Payment may be made in cash or check at the Tucson office between 0800 and 1530 Monday through Friday when you return the GSA car.

Observers from foreign countries and U.S. observers who will be away from their home institution for more than 30-60 days should make every effort to pay their bill at the Tucson office prior to departing.

#### H. Telephone

Commercial, long distance WATS, and long distance FTS telephone services are available on the mountain.

Long Distance WATS: The WATS service should be used for all business calls (use commercial AT&T or MCI for personal calls). To make a WATS call, dial 8-75-A/C+7-digit number.

Long Distance FTS: The Federal Telecommunication System is for official government business only. This service is more expensive than WATS, so we ask that business calls be made on WATS whenever possible.

Commercial Telephone: Two commercial long distance services are available for personal telephone calls, AT&T and MCI. All commercial long distance calls should be

recorded on the clip pad next to the telephone in the observer's office unless charges are reversed or credited elsewhere. Personal calls should be made on a commercial telephone; you will be billed for all personal calls. To make an AT&T call, dial 7-1-A/C+ 7-digit number. To make an MCI call, dial 9-1-A/C+ 7-digit number.

G. Library

A modest library with recent issues of the principal astronomical journals and books is located in the KPNO administrative building adjacent to the 1.3 m telescope on the mountain summit.

IV. OBSERVING

Instrumentation/Software: Visitors who require special hardware or software configurations should keep us (electronics: John Payne; computer software: Betty Stobie) informed of their needs.

Propriety: Each observer is scheduled on the telescope with the understanding that he is to pursue only the program described in his observing request. Since we have many observers from various institutions working on related programs, we require that any observer wishing to change his program, or to exchange time with other observers, do so only with the consent of the Site Director.

Observer Comments: In an effort to improve our facilities and service, we request that observers completing their obser-

vations provide us with a brief summary of their observations, and remarks about any difficulties they encountered. These remarks are not normally kept confidential.

User Manuals: Four User Manuals are available which describe in detail the telescope control, data acquisition and data reduction programs that are implemented at the 12-meter.

1. "User's Manual for the NRAO 12-m Telescope"  
Describes observing setup, source catalog, etc.
2. "Spectral Analysis System"  
Spectral line reduction program and procedures.
3. "CONDAR: Continuum Data Analysis"  
Off-line reduction of continuum data: programs and procedures.
4. "Continuum Mapping with the 12-m Telescope"  
Observing strategies and data analysis for beam-switched maps.

Copies of these manuals can be found at the telescope and at the Tucson office.

Observer Assistance: Phil Jewell is the NRAO "friend of the telescope". At any time prior to, during, or after the observations, specific questions should be referred to Phil. Since telescope time at the 12-meter is so much in demand observers will want to observe as efficiently as possible. A discussion with Phil prior to the observations may enable one to optimize the observations and make the most effective use of the time scheduled.

Getting Your Data on Tape: The raw data may be saved on a Fortran binary tape that is available at the end of your observing run. The charge for each tape supplied to you by NRAO is \$11.00. Analysis system (VAX) tapes require some time to make and cannot normally be produced on the mountain. They are made on the downtown computer after the observing run. More than one file can be written on a tape depending on the size and BPI requested. All tapes will be FITS format unless otherwise requested. The tapes will be mailed to you, at a cost of \$13.00 each. You will receive a credit or a refund if the tape is returned to NRAO.

Please complete a Data Tape Request Form before leaving the telescope.

## V. PUBLICATION OF RESULTS

### A. Publication Obligation:

The results obtained by NRAO staff and visitors are expected to appear in publication. Observers are urged to analyze their data and to publish their results with minimum delay. The accumulation of masses of unpublished data may be a detrimental factor in future considerations of requests for observing time.

### B. Acknowledgement:

Whenever a significant portion of research was done, or observational material taken, at the NRAO, we request that the author include a footnote in the text

where the Observatory is mentioned:

"The National Radio Astronomy Observatory is operated by Associated Universities, Inc., under contract with the National Science Foundation.

#### VI. NRAO TUCSON OFFICE

Visitor Facilities: Office space has been set aside specifically for the use of visitors in the NRAO downtown office; we encourage telescope users to spend time with us prior to or upon completion of their observations. Visitors will have access to a VAX-11/750 Computer identical to that on the mountain for data reduction at a more considered pace. The downtown computer is equipped with a laser graphics printer and a pen plotter so that one can produce publication quality spectra and maps. In addition, visitors have access to a modest library in the NRAO office as well as to the very extensive Steward Observatory library.

We intend to further develop our downtown visitor facilities; we welcome your suggestions as well as your presence.

Information Sharing: The Tucson NRAO staff is very interested in the scientific results of the research that they support. Feedback, positive or negative, is desirable because it helps assure that our efforts are consonant with your goals. To this end we would particularly appreciate it if you would summarize your work in a brief and very informal talk, a "brown-bag" lunchtime talk, while you are with us in Tucson. Let any of us know if you would be willing to give such a presentation.

VII. NRAO REIMBURSEMENTS

A. Travel Reimbursement:

The NRAO will reimburse travel to and from the 12-meter telescope under the following conditions:

- (1) A reimbursement request must be submitted within 30 days of the completion of travel.
- (2) The NRAO will reimburse the cost of actual round-trip fare (not to exceed the normal coach airfare) less a deductible. The deductible is \$150 or 0.25 (\$300 + air fare) whichever is greater.
- (3) Original ticket receipts must be submitted to the NRAO when reimbursement is claimed.
- (4) Only travel originating within the United States or Puerto Rico will be considered for reimbursement.
- (5) Reimbursement will be made only to supporting institutions and organizations -- not to an individual.

This policy is limited to persons affiliated with U.S. institutions. Reimbursement will be provided for one round-trip per person and for no more than two persons for each observing program. Max Thomas can provide the observer with a travel authorization form which the observer should send, together with the original air ticket stub, to the NRAO Fiscal Division, Post Office Box 0, in Socorro, New Mexico 87801. Visitors should expect to pay for all lodging and meals connected with

their visit -- the NRAO does not reimburse these charges.

B. NRAO Support for Page Charges:

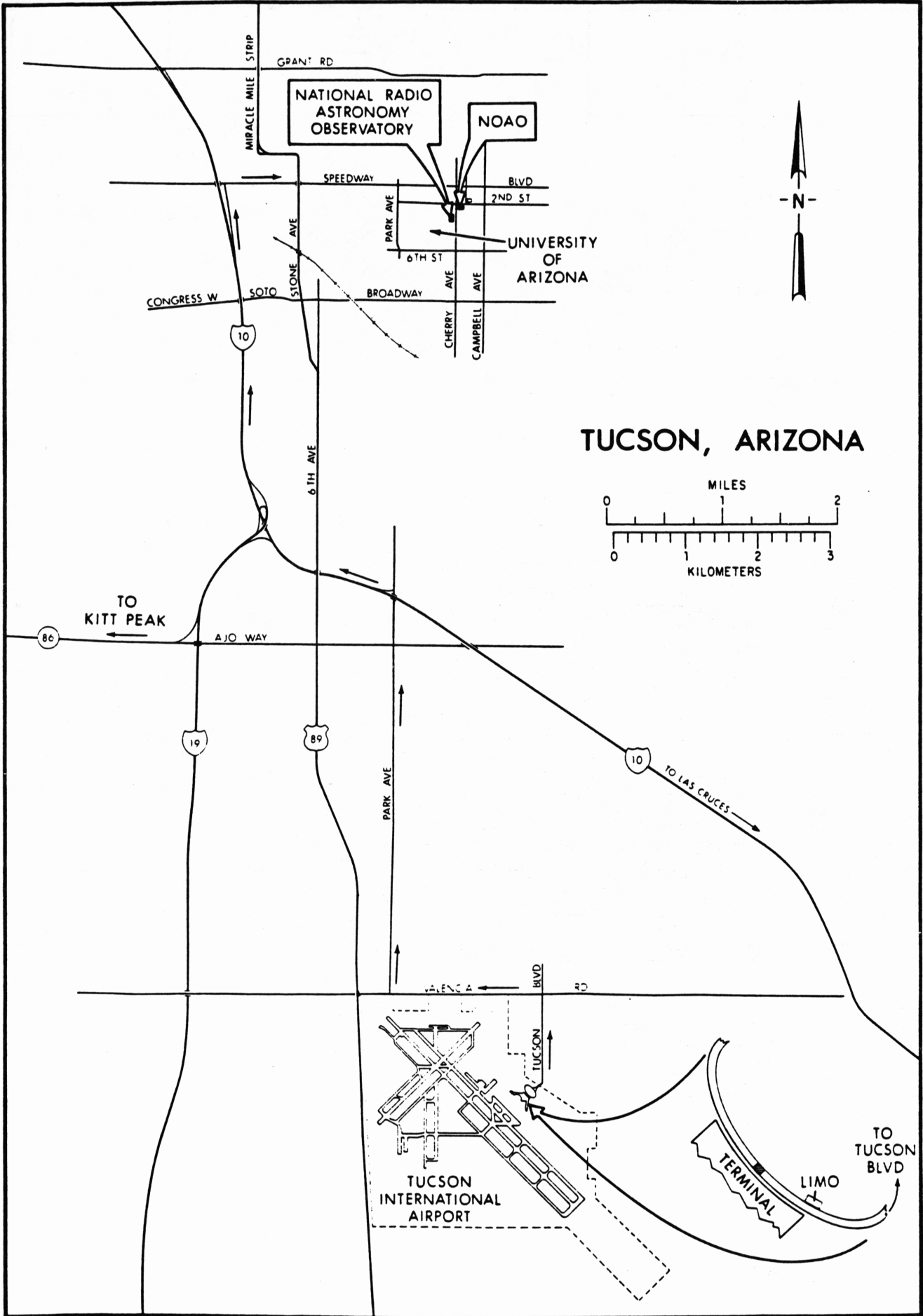
The Observatory will pay up to one-half of the page charges for the publications of visitors from U.S. institutions when a significant portion of the work was done, or the observational material taken, at the NRAO. In the case of papers reporting VLB data, the NRAO will support that portion of the page charges corresponding to the fraction of NRAO telescope involvement or staff member authorship, whichever is greater. The NRAO does not distribute reprints or preprints, but does request the privilege of including visitor publications in its preprint listings.

The specific procedure to be followed is:

1. At the time of submission, please send four publication copies of the paper to the NRAO Librarian, Charlottesville, indicating the journal to which paper has been submitted. One copy is for the Director's office; three copies are for the libraries. If you wish to have the preprint placed at the 12 m telescope, send one additional copy and indicate that it is for the telescope. The Observatory does not desire to referee visitors' publications prior to submittal.

2. At the time of acceptance for publication, please notify the Librarian in Charlottesville of the proposed date of publication and apportionment of page charges, so that the necessary purchase orders can be initiated.
3. All other scientific and administrative communications should be kept between the authors and the journals.



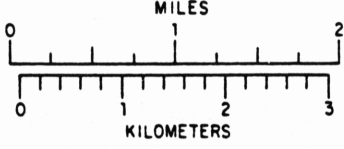


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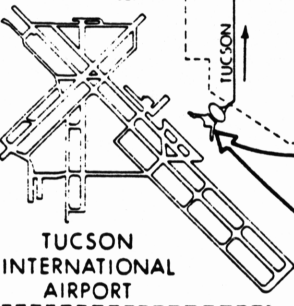
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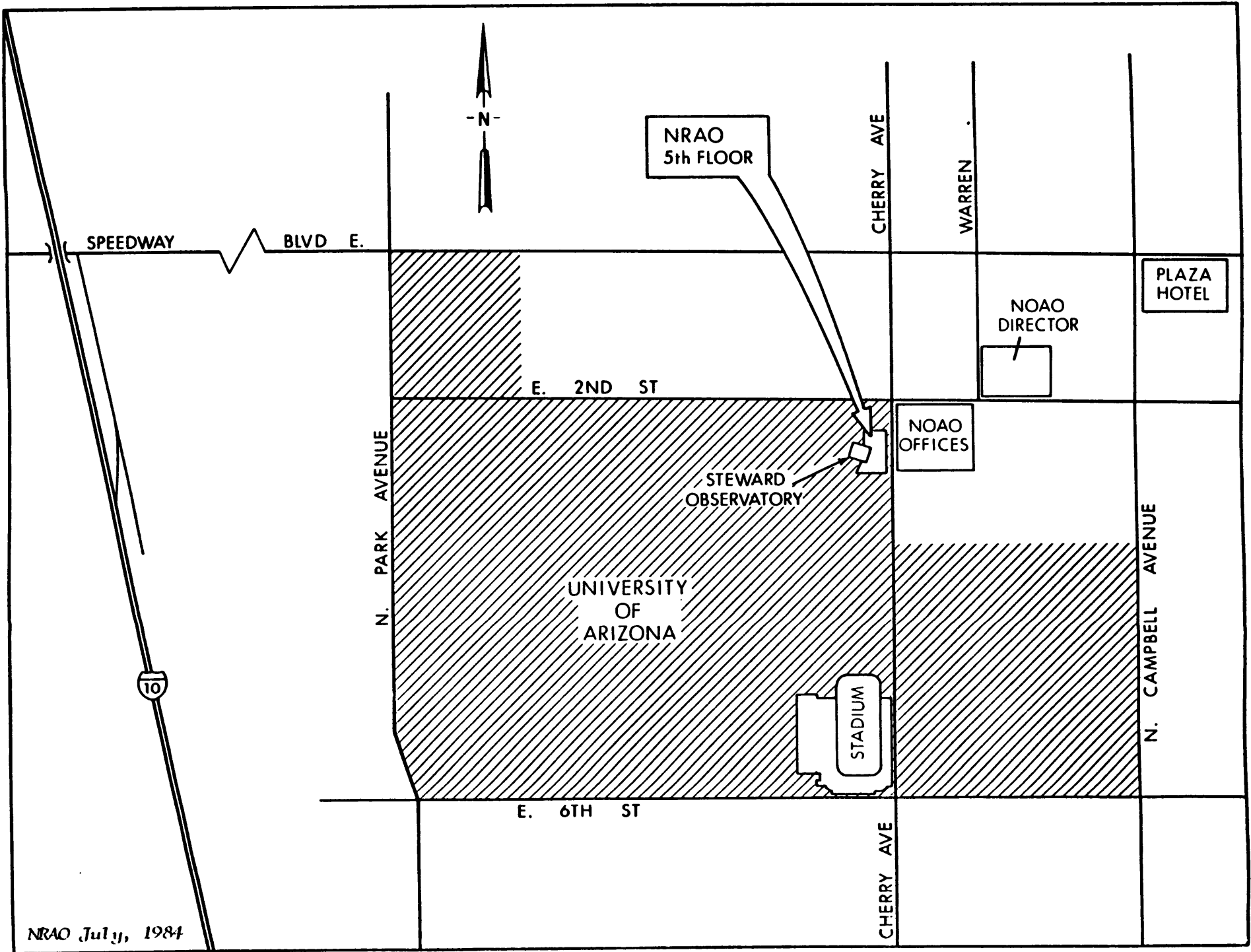


TUCSON INTERNATIONAL AIRPORT

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TO TUCSON BLVD



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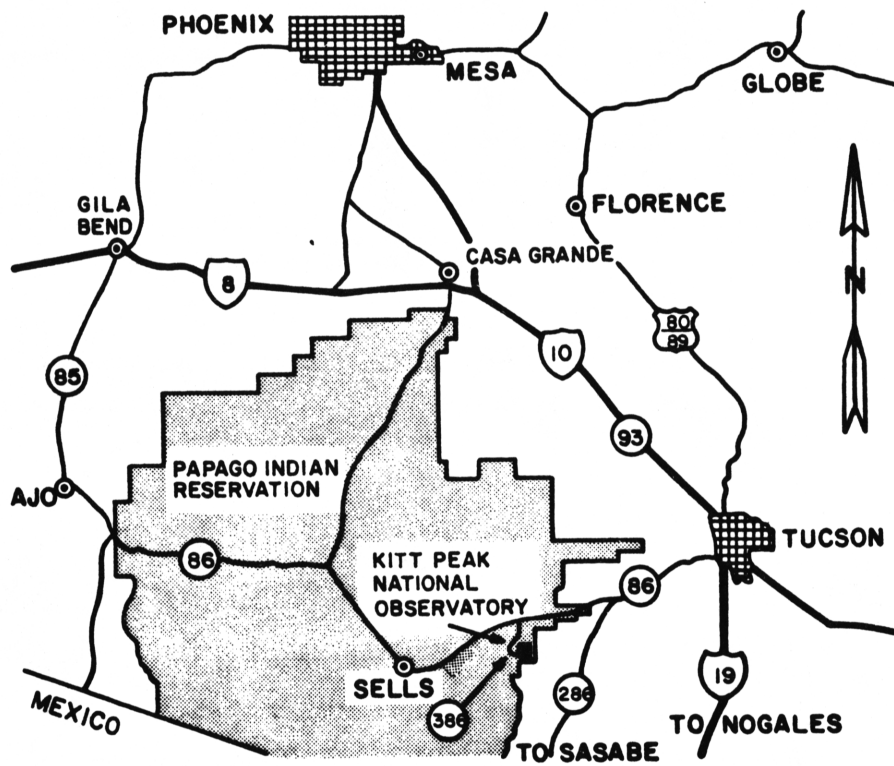
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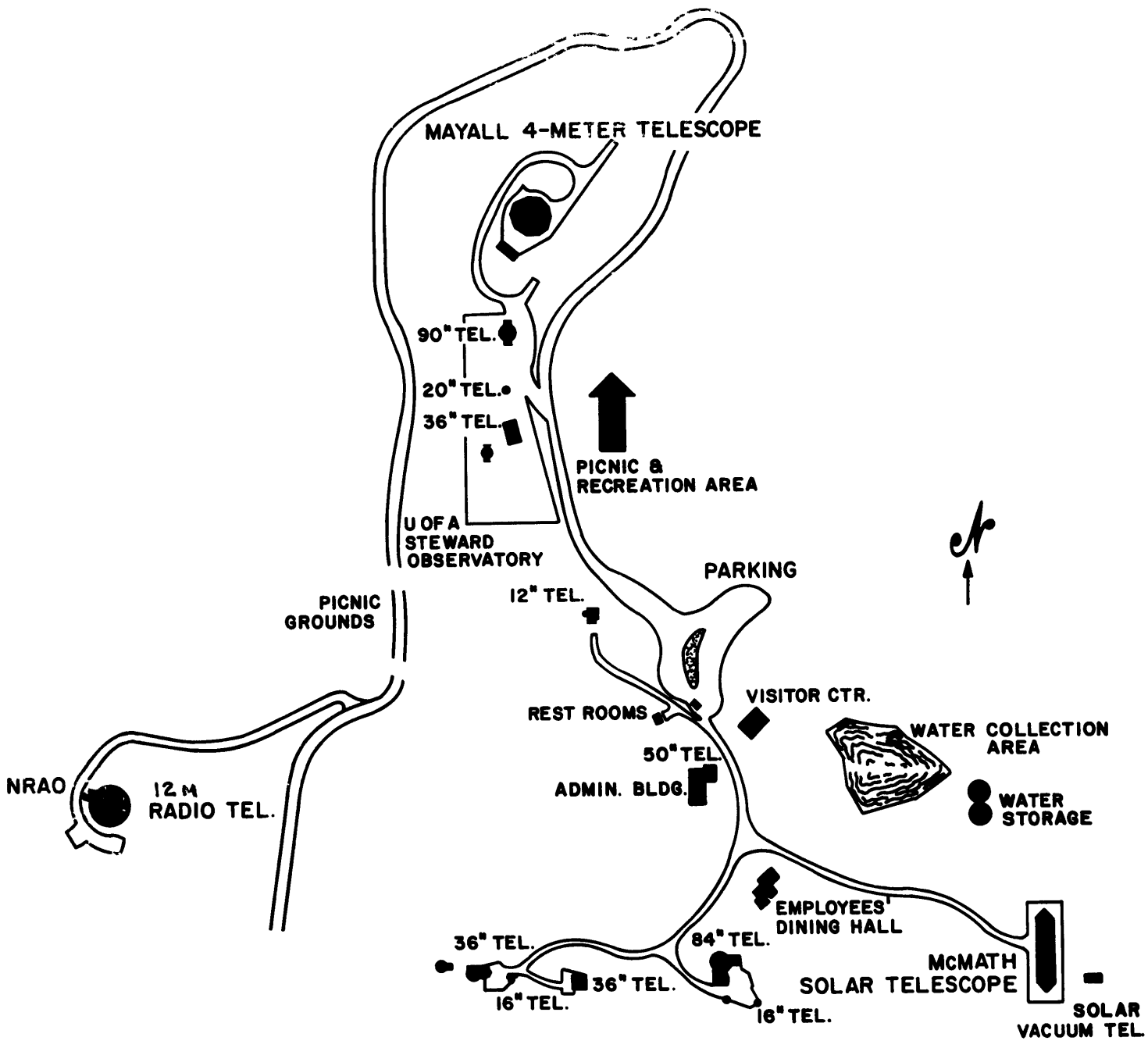
STADIUM

E. 6TH ST

CHERRY AVE



Route from Tucson to Kitt Peak.



Map of Kitt Peak (not to scale). Note the discontinuities in the road connecting the NRAO facility to that of KPNO.



**National Radio Astronomy Observatory  
12-Meter Telescope/Arizona Operations  
Observing Application  
Cover Sheet**

*NRAO USE ONLY*

Received: \_\_\_\_\_

SEND TO: Director, NRAO, Edgemont Road, Charlottesville, VA. 22903-2475  
DEADLINES: 1st of Jan, July, Oct for the Spring, Fall, and Winter Periods, respectively.

**1** Date:

**2** Title of Proposal:

<b>3</b>	<b>Authors</b>	<b>Institution</b>	<b>Who Will Observe?</b>	<b>Grad Student?</b>	<b>Observations for PhD Thesis?</b>	<b>Anticipated PhD Year</b>

**4** Contact Author for Scheduling

Name/Address

**5** Telephones:

Office:

Home:

**6** Scientific Category:    atmospheric,    planetary,    solar,    stellar,    galactic,    extragalactic

**7** Mode:    spectra,    continuum,    other (specify):

**8** Receiver:

**9** Ancillary Equipment:

**10** Filters:    Expander,    30-kHz,    100-kHz,    250-kHz,    500-kHz   

Units	<input type="checkbox"/>	<input type="checkbox"/>
	1	2

 1-MHz   

Units	<input type="checkbox"/>	<input type="checkbox"/>
	1	2

 2-MHz

**11** Frequencies (include test lines):

**12** Special Software? (describe on separate sheet)

**13** Special Hardware? (describe on separate sheet)

**14** Sessions/Days Requested:

**15** LST Range:

**16** Possible conflict with Sun? (time of year to avoid)

**17** Abstract (do not write outside this space):

Please attach a summary (of less than 1000 words) which contains the following information:

- 1) Scientific justification; 2) Observing strategy; 3) **Source list with coordinates**

*After your proposal is scheduled, the contents of this cover sheet become public information (supporting documents are for referees only).*

For Internal Use Only: