December 14, 1960

Mr. Charles W. Creaser, Jr.
Antenna Systems, Inc.
349 Lincoln St.
Hingham, Massachusetts

Dear Charlie:

The NRAO wishes to obtain a transit-type radio telescope with specifications similar to those given on the attached sheet. These specifications are not rigid, and could be modified in some instances. They do define the general nature of the instrument we want.

The instrument will be used to make a long series of daily observations — for perhaps 5 or 6 years — under as nearly constant instrumental conditions as possible. Simplicity and stability of the telescope are therefore of paramount importance.

If you are interested in supplying us with such an instrument, could you give me a proposal for the design and construction, but not erection, of either the entire telescope, or the reflector alone. If you already have an instrument which might fill our need, even though its specifications may be somewhat different from those attached here, we would be particularly interested.

I would like to have detailed information and, if possible, firm prices by February 1. We hope to place an order for at least one of these telescopes in March or early April.

Sincerely yours,

D. S. Heeschen
Chairman
Astronomy Department

Encl.

NATIONAL RADIO ASTRONOMY OBSERVATORY
Green Bank, West Virginia

Suggested Specifications for 40-Ft. Transit Radio Telescope

1. Reflector and Feed Support

Paraboloid of revolution, 40-ft. diameter, 17-ft. focal length. Mesh surface with 3/8 inch square holes. The root-mean-square surface deviation from the best fit paraboloid should not exceed 1/2 inch, in any operating condition and available reflector attitude. The surface need not be adjustable.

Feed support may be a tripod, quadripod, two stiff legs and two cables, or something similar. It should be capable of supporting 200 pounds of equipment near the focal point. With this load, gravity deflections at the focus should not exceed 1/2". Assuming a surface area near the focus of 10 square feet, deflections due to winds up to 40 mph should not exceed 1/4 inch.

2. Mount

The mounting is to be transit-type, with motion in elevation only. Motion in elevation should permit the telescope beam to point at least 60° from the zenith, in either direction. A full 90° in either direction is desirable.

3. Drive

The drive system must be able to move the telescope about the elevation axis at a rate of about 20 degrees per minute. There must also be

a means of "setting" the telescope to within 1 minute of arc of a given position.

The drive system and/or mounting should be capable of holding the telescope in any given fixed position to within an accuracy of ± 1 minute of arc.

4. Indicators

A position indicator will be driven from the elevation axis shaft. The position indicator must have an accuracy of ± 1 minute of arc.

5. Operating Conditions

The telescope must be operable, with the above specifications met, in the following conditions:

a) temperature range -10° to +90° fahrenheit;

b) wind to 40 mph;

c) ice and snow load — 2 lbs./sq. ft. over entire surface.

The telescope must be capable of surviving, in a stowed position,

a) wind to 100 mph;

b) ice and snow loads of 15 lb./sq. ft.

file

April 26, 1961

Mr. J. E. Luton
Assistant Director for Administration
National Science Foundation
Washington 25, D. C.

Dear Mr. Luton:

The purpose of this letter is to request National Science Foundation approval of the purchase and erection of a 40-foot diameter transit telescope, which we discussed at our meeting of March 7.

The need for this telescope has arisen as a direct result of work at the NRAO with the 85-foot telescope directed towards determining whether certain discrete radio sources vary in intensity. It has been shown that at least one source - Cassiopeia A - does exhibit a slow secular decrease in intensity. We believe that further efforts on this problem can perhaps best be undertaken with a relatively small, very simple instrument, which can be used essentially for this program alone for an extended period of time. Rather better control of interval consistency should be obtainable by this means than is possible with a telescope such as the 85-foot, which is used for a wide variety of programs requiring relatively frequent changes in instrumentation.

Requests for proposals to supply the 40-foot telescope were sent to nine firms. Three firms responded with fixed-price quotations for 40-foot diameter instruments which would meet our specifications. A copy of these specifications is attached. One firm quoted on design only. A summary of the bids is enclosed. All three firms proposed instruments which adequately meet our requirements, and all are essentially "off-the-shelf" items modified slightly to meet our specific requirements. The differences in price arise largely because both the Blaw-Knox and the Philco reflectors have considerably greater surface accuracy than we require. Since this instrument is to be used for a very specific purpose, we do not believe it is necessary to obtain the greater surface accuracy. We, therefore, propose to purchase the Antenna Systems, Inc. telescope.

The cost of the telescope, excluding receivers, control building, and power to the site, is as follows:

Fabrication (Antenna Systems, Inc.)	fixed price	$29,850.
Shipping from Cohasset	estimated	1,000.
Foundation (by NRAO or subcontract)	estimated	2,000.
Erection (by NRAO or subcontract)	estimated	4,000.
Contingency		3,150.
	Total	$40,000.

We propose allocating $40,000 from item C4 - Other Observing Equipment - of the FY 1961 Financial Plan for the 40-foot telescope. After $40,000 is committed to the 40-foot, approximately $28,000 will remain. Analysis of expected expenditures and commitments for the remainder of this fiscal year indicates that this amount will be adequate.

We request approval of the 40-foot transit telescope program, as described here, and of purchase of the instrument from Antenna Systems, Inc.

Very sincerely yours,

Otto Struve

Encls.

CC: Geoffrey Keller
L. R. Burchill
D. S. Heeschen
F. Callender
J. Findlay

August 10, 1961

Mr. J. E. Luton
Assistant Director
for Administration
National Science Foundation
Washington 25, D.C.

Dear Mr. Luton:

I enclose a drawing of the building we propose for the 40 foot telescope control building and request your approval to the construction of this building. The estimated cost is $6000 and we have included such a sum as an item in the Financial Plan for 1962. As you know, the proposed plan will be in your hands shortly for your approval.

If you are able, however, to give us prior approval to proceed with this building, it would speed up the work of getting the 40 foot operating. We expect the telescope foundation to be poured tomorrow and the erection of the telescope to begin within a week.

Yours truly,

John W. Findlay
Deputy Director

JWF/lm
Enc: 1

cc: FJCallender
✓DSHeeschen

XXXXXXXX Arbovale 456-2011

September 6, 1961

MEMO TO: F. J. Callender

FROM: D. S. Heeschen

I have accepted the 40-ft. telescope, subject to receipt of the results of surface measurements they have made, and a description of the method they used. I think there is no question about the surface meeting specs, but would like their measurements before we accept.

They will ship it by Motor Freight on September 15, and they will handle shipping and insurance and bill us. They expect it to arrive here on the 18th and they will have their erection crew here to meet it. Erection will take two days, so it should be completed by September 21 or 22. Power is not needed for erection, but as soon as the telescope is up we will want to hook up the drives and try it out. Therefore power is needed by September 21.

40-FOOT TELESCOPE

The 40-foot telescope will be used to make daily measurements of a small number of discrete sources, for a period of several years, to search for possible intensity variations. Positioning of the telescope and operation of the receivers will be fully automatic. The antenna was ordered from Antenna Systems, Inc., Hingham, Massachusetts, in May and was erected in early October. It is now operational. 1400 Mc and 750 Mc radiometers for the telescope were designed by W. Waltman and T. Orhaug and built by them with the assistance of the electronics group. A dual feed system is being built by Jasik Laboratories and will be ready November 20. The telescope and radiometer control system and readouts were designed by J. F. Crews and O. Bowyer and are being built by them and others of the telescope operators group. The whole system is expected to be in operation for testing about December 1, and in routine use by January 1.