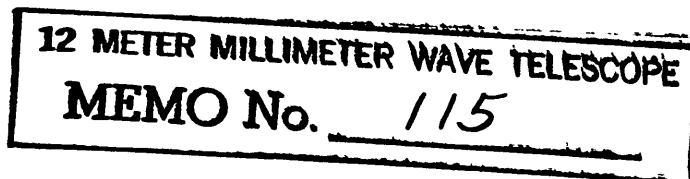


NATIONAL RADIO ASTRONOMY OBSERVATORY
EDGEMONT ROAD
CHARLOTTESVILLE, VIRGINIA 22901
TELEPHONE 804-296-0211 TWX 510-587-5482

January 5, 1982

Dr. William E. Howard, Director
Division of Astronomical Sciences
National Science Foundation
1800 G Street, N.W.
Washington, D.C. 20550



Subject: NSF AST 79-08925 - Notification
of Proposed Procurement

Dear Dr. Howard:

In accordance with Clause 8, Paragraph 4(ii), of the subject contract, we are hereby advising the Contracting Officer of our intention to procure a reflector structure for the 12-meter upgrade of the millimeter wave telescope located on Kitt Peak, Arizona.

Sixteen sources were solicited by AUI for the manufacture of the reflector structure in accordance with NRAO design and drawings. Five replies were received:

Bristol Steel	\$151,471
Dave Steel	\$166,750
Pearson Manufacturing	\$271,650
Central Fabricators, Inc.	\$ 71,145
TIW Systems, Inc.	\$194,400

AUI technical personnel have examined all replies and have visited with and reviewed the proposals of the two lowest bidders, Bristol Steel and Central Fabricators, Inc. Although there appears to be a large discrepancy in price, technical personnel recommended an award to Central Fabricators, Inc. of Madison Heights, Virginia. Analysis of their bid reveals that basic cost of materials and manufacturing labor are comparable to other bidders; the big difference in price is in the amount of engineering and overhead applied. In the opinion of NRAO technical personnel, Central Fabricators, Inc. is capable of working from the detail drawings provided by NRAO. Central Fabricators, Inc.'s management concurs.

Funds in the amount of \$71,145 for this procurement were budgeted in the 1981 Program Plan.

Very truly yours,

J. Marymor, Manager,
Contracts/Legal

JM/lc

cc: B. Horne, H. Hvatum, T. Riffe

PRIME CONTRACTOR: Associated Universities, Inc.

SUBCONTRACTOR: Central Fabricators, Inc.

This is an agreement made this 30th day of December, 1981, between ASSOCIATED UNIVERSITIES, INC., (hereinafter called "AUI"), a New York corporation, and CENTRAL FABRICATORS, INC. (hereinafter called the "Subcontractor"), a Virginia corporation, with its principle offices located in Madison Heights, Virginia.

AUI has entered into a contract (hereinafter called the "Prime Contract") with the United States of America (hereinafter called the "Government"), represented by the National Science Foundation (hereinafter called the "Foundation"), designated as Contract No. NSF AST 79-08925, for the construction, maintenance, and operation of a Radio Astronomy Observatory (hereinafter called the "Observatory").

The Subcontractor is willing to perform the work required by AUI, and AUI wishes the Subcontractor, in furtherance of the Prime Contract, to perform that portion of the work hereinafter more fully described.

ARTICLE I - SCOPE AND PERFORMANCE OF THE WORK

- A. The Subcontractor shall furnish all the labor and other personnel, materials, plant, and equipment necessary to perform the work described in Schedule A, incorporated herein and thereby made a part hereof, and in accordance with all the Specifications and Terms and Conditions of this Subcontract, included in Schedules B and C, made a part hereof, and incorporated herein.

SCHEDULE A - STATEMENT OF WORK

SCHEDULE B - FIXED PRICE SUPPLY CONTRACT TERMS AND CONDITIONS

SCHEDULE C - SPECIFICATIONS

- B. Work under this Subcontract shall commence promptly upon delivery to the Subcontractor of a copy hereof, executed by AUI, and shall be completed within the time specified in Schedule A.

ARTICLE II - COMPENSATION

- A. The total fixed price of this Subcontract is established at \$71,145, subject to any limitations herein. Payment to the Subcontractor of this amount shall constitute full compensation for the proper performance of the Subcontractor's undertakings hereunder.

ARTICLE III - NOTICES

- A. All notices and communications shall be in writing and mailed or delivered to the Manager, Contracts/Legal, National Radio Astronomy Observatory, Edgemont Road, Charlottesville, Virginia, 22901, and to the Subcontractor at the address shown above, or to such other place or places as AUI or the subcontractor, as the case may be, shall designate in writing.

ARTICLE IV - INSPECTION AND ACCEPTANCE

Final inspection and acceptance shall be performed in accordance with the requirements contained in the Schedules attached hereto.

ARTICLE V - ASSIGNMENT TO THE GOVERNMENT

This Subcontract shall be assignable by AUI to the U.S. Government. Subject to such assignment and acceptance thereof by the Government, this Subcontract shall not bind or purport to bind the Government.

ASSOCIATED UNIVERSITIES, INC.

By: Ms Roberts

Title: Director, National Radio Astronomy Observatory

Date: January 6, 1982

CENTRAL FABRICATORS, INC.

By: John M. Arrington

Title: President

Date: Jan 6, 1982

SCHEDULE A - STATEMENT OF WORK

I. SCOPE OF WORK

Subcontractor will provide material and services to manufacture, fabricate, test - assemble, and deliver a reflector structure in accordance with "Specifications, Reflector Structure - 12 Meter Antenna, September 22, 1981", Schedule C, with changes as follows:

A. Paragraph 3.0, Materials, of Schedule C shall be changed to read, "All structural steel used in the fabrication of the reflector structure shall be as specified on the drawings. In general, all steel is specified on the drawings as ASTM A 36. Tubing material shall be ASTM A 513. Where structural members are welded, only certified welders shall perform the welding and the type of welding rod used, as well as the welding process used, shall be approved by AUI."

B. Paragraph 6.0, Trial Assembly, shall be changed to read, "The Subcontractor shall trial assemble the reflector structure to assure correct location of all holes and mating assemblies."

II. INSPECTION

A. AUI shall have the right to inspect all work in progress. Central Fabricators, Inc. shall provide the AUI inspector with adequate space, facilities, and tooling to conduct inspection during the course of the work on a non-interference basis.

Final acceptance of the completed reflector structure shall be made at Green Bank, West Virginia.

III. DELIVERY

A. Delivery of the reflector structure shall be on or before Monday, April 26, 1982.

B. Shipment of the reflector structure shall be F.O.B. the National Radio Astronomy Observatory, Green Bank, West Virginia.

C. Subcontractor shall provide packaging and bracing, as required, to assure safe shipment to the F.O.B. destination.

IV. COMPENSATION

In consideration of the Subcontractor's undertaking hereunder, Subcontractor shall receive the fixed sum of \$71,145.00 in full compensation for the work undertaken hereunder.

V. PAYMENT

A. Subcontractor shall be paid the above sum in progress payments which shall be in accordance with the progress payment schedule prepared by the Subcontractor and accepted by AUI. Final payment of retainage against progress payments shall be made upon final acceptance of the reflector structure.

Schedule A

B. Invoices, in triplicate, shall be sent to the attention of J. Marymor, Manager, Contracts/Legal, National Radio Astronomy Observatory, Edgemont Road, Charlottesville, Virginia, 22901, with a copy to the National Radio Astronomy Observatory, Fiscal Division, Post Office Box 2, Green Bank, West Virginia, 24944.

VI. PAINING

In accordance with Paragraph 5.0, Protective Finish, of Schedule C, Subcontractor shall sandblast the surface and shall apply the prime and intermediate coats of Sherwin-Williams materials as specified.

The finish coat shall be applied by AUI after delivery and acceptance of the reflector structure.

SCHEDULE C

SPECIFICATIONS
REFLECTOR STRUCTURE - 12 METER ANTENNA
SEPTEMBER 22, 1981

1.0 General

1.1 General Statement of Work

The work described herein shall consist of the furnishing of all materials, labor, supervision, services, equipment, and other items required for the fabrication and delivery to Green Bank, West Virginia of a 12 meter diameter reflector structure. The reflector structure specified herein will be installed on an existing pedestal and elevation structure. Since the reflector structure must fit to existing interface points, dimensions shown on the drawings must be rigidly adhered to.

To assist the proposer in his understanding of the requirements of this specification, the proposer should be aware that NRAO plans to replace the existing reflector in the following steps:

- (a) Assemble the new reflector structure in Green Bank and install panels;
- (b) Disassemble the reflector structure into the largest pieces possible for truck shipment and ship to Tucson, Arizona;
- (c) Reassemble and install reflector structure at Tucson.

1.2 Drawings, Specification, Data

1.2.1 Drawings furnished herewith and made a part of this specification are as follows:

NRAO Drawings

<u>Drawing No.</u>	<u>Sheet/s</u>	<u>Rev.</u>	<u>Description</u>
86D00127	4		12 Meter Telescope Assembly
86D00128	20		Hub Half Assembly
86D00129	17		Inner Reflector Ring Assembly
86D00130	4		Outer Reflector Ring Assembly
86D00131	1		Apex Assembly
86D00132	1		Feed Leg Assembly
86D00133	1		Guy Assembly

NRAO Photographs

No. 7326 - 2, rear view, 36 ft. telescope

No. 7961, elevation structure, 36 ft. telescope

1.2.2 All designs, drawings, and technical data submitted with this Request for Proposal are the property of AUI and the Government and may be used without restriction in the performance of this work.

All drawings, sketches, purchase orders, and other pertinent papers prepared by the subcontractor or his subcontractors pursuant to this subcontract become the sole property of AUI and the Government for use without limitation.

During the progress of the work, the subcontractor shall deliver to AUI four blueprints of each of any shop drawings used in the prosecution of the work, and one copy of each purchase order or subcontract as issued for purchased parts, materials, components, or services procured by the subcontractor pursuant to this subcontract.

1.2.3 All work which is called for in the specifications but not shown on the drawings, or shown on the drawings but not called for in the specifications, shall be executed and performed by the subcontractor as if described in both. Should any conflict exist between the drawings and specifications, it shall be referred to AUI's engineer for his written decision. Should any work be required which is not denoted in the drawings or specifications, either directly or indirectly, but which is necessary for the proper carrying out of the intent of the specifications, the subcontractor shall inform AUI's engineer.

1.3 Special Terms and Conditions

1.3.1 Direction of the Work

Direction of the work in accordance with the terms of this subcontract will be assigned by AUI in writing. The AUI representative so assigned will have authority to act on behalf of AUI in all matters relating to the work within the contract, scope, and specifications.

1.3.2 Liaison During Program

Coordination meetings will be held between management and technical personnel of the subcontractor and AUI prior to the start of fabrication work. The place and time of such meetings shall be determined by AUI.

1.3.3 Shipment, Unloading, and Protection

All components shall be properly prepared, packaged for shipment, and properly marked for assembly. Loading for shipment to Green Bank, West Virginia, shipment to Green Bank, and protection during shipment shall be the responsibility of the subcontractor.

All unloading, receiving, storage, and protection of the material after delivery to Green Bank shall be the responsibility of AUI.

1.3.4 Progress Schedules and Reports

The subcontractor shall, within fifteen days after notice of award of the subcontract, prepare and submit to AUI three copies of a schedule showing the order in which the subcontractor proposes to carry on the work and the dates on which he will start each phase or subdivision thereof (including the procurement of materials). The subcontractor shall enter on the schedule the actual progress at the end of each month and deliver to AUI three copies thereof immediately following the end of the month.

1.3.5 Work Progress

The subcontractor shall utilize sufficient forces, fabrication, plant and equipment, and shall work such hours, including overtime operation, extra shifts, or holiday work, as may be necessary to insure the prosecution of the work in accordance with the approved schedule. If, in the opinion of AUI, the subcontractor is behind the progress schedule, it will notify the subcontractor in writing, and the subcontractor shall take such steps as may be necessary to improve his progress and regain his schedule position.

(continued on page 4)

2.0 Applicable Documents

The following documents of issue in effect at the date of contract award form a part of this document of this specification insofar as applicable. Wherever this specification conflicts with the below named specifications, standards, and other publications, the requirements of this specification shall govern.

American Institute of Steel Construction - Manual of Steel Construction, Latest Edition.

American Society for testing materials - standards for materials of the ASTM where referred to in this specification or on the drawings.

American Welding Society Handbook - Sect. I, Chapter 10.

3.0 Materials

3.1 Structural Steel

All structural steel used in the fabrication of the reflector structure shall be as specified on the drawings. In general, all steel is specified on the drawings as ASTM A36 steel. The subcontractor shall specify in his purchase order for the A36 steel that the steel shall be a silicon-killed fine grain steel with a maximum carbon content of 0.28 percent. Where structural members are welded, only certified welders shall perform the welding, and the type of welding rod used as well as the welding process used shall be approved by AUI.

4.0 Fabrication

Fabrication shall be in accordance with good fabrication practice as set forth by the American Institute of Steel Construction and shall be to the dimensions and tolerances set forth on the drawings. Mis-manufactured parts shall be discarded and not repaired unless prior approval is obtained from AUI. All holes shall be drilled or sub-punched and reamed according to good practice so that connection clearances may be held to a minimum.

Mis-aligned holes (for bolting) for two or more mating parts such that correct size of bolts cannot be installed, may be corrected by drilling or reaming until a round matching hole in each part is obtained and a larger diameter bolt whose diameter is 1/16 inch less than the hole diameter is installed. Hole size is not to be increased more than 25%.

Shop sub-assembly shall be by either welding or bolting (as set forth on the drawings) but components to be field assembled shall be assembled by high strength (ASTMA325) bolting.

Fabricated parts shall be shop assembled into the sub-assemblies as shown on drawings. Sub-assemblies shall be as follows:

		<u>Drawing Number</u>
(1)	2 pieces Hub Half	86D00128
(2)	8 pieces Inner Reflector Ring	86D00129
(3)	8 pieces Outer Reflector Ring	86D00130
(4)	1 piece Apex Assembly	86D00131
(5)	4 pieces Feed Leg Assembly	86D00132
(6)	4 pieces Guy Assembly	86D00133

These are considered as being the largest practical pieces for shipment from fabrication plant to the assembly site at Green Bank. Remaining parts shall be shipped as loose pieces or bundled for shipment.

All parts shall be identified by part number as set forth on the drawings.

Subcontractor shall furnish the required number, size, and length of bolts for final assembly of the reflector structure plus 10% excess (with minimum excess of four bolts) in each size and length of bolt.

5.0 Protective Finish

All surfaces shall be cleaned of rust, mill scale, oil or grease, according to best commercial practice. Wire brushing of all steel surfaces shall be considered a minimum requirement for cleaning of all steel surfaces. Simple spot brushing is not sufficient. Any stratified rust, blisters, or mill scale shall be removed by power impact tools, rotary scalers, or power grinding equipment. If oil or grease are present, these shall be removed by solvent washing. Steel surfaces shall be prime painted within 24 hours of wire brushing or cleaning.

No painting is to be performed when the surface to be painted is wet, nor when the air temperature is less than 50°F, nor when the relative humidity exceeds 70 percent.

The subcontractor shall apply a prime coat of Sherwin-Williams E41N1 Kromik Primer, applied full body by brush. Application by brush over cleaned surfaces is preferred to spraying in order to achieve superior metal-primer contact and superior corrosion protection. As an alternate, if the subcontractor chooses to clean all surfaces by sand-blasting to near white metal condition, AUI will approve application of the primer by spray painting. A minimum 1.5 mil dry film thickness should be attained. A minimum drying time of 18 hours shall elapse after priming before additional coats of paint are applied.

The subcontractor shall apply an intermediate coat of Sherwin-Williams metallastic B53W10 according to the manufacturer's instructions, in a manner to obtain a minimum dry film thickness of 2.0 mils. This is a white rust inhibition undercoat and should be tinted with lamp black or carbon black to a contrasting shade so that complete coverage of the final coat can be readily determined.

The subcontractor shall propose as an option the shop application of a finish coat of Sherwin-Williams B53WA3 white silicon enamel with a minimum dry film thickness of 2.0 mils applied according to manufacturers instructions. Both the intermediate and finish may be applied by spraying.

6.0 Trial Assembly

The subcontractor shall propose as an option the trial assembly of the reflector structure sufficient to assure correct location of all holes and mating assemblies.