

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

September 22, 1981

12 METER MILLIMETER WAVE TELESCOPE

MEMO No. 78

Subject: Request for Proposal # 231

Gentlemen:

Associated Universities, Inc. (AUI), a non-profit corporation operating the National Radio Astronomy Observatory (NRAO) under a contract with the National Science Foundation, solicits your proposal for the fabrication of a steel structure in accordance with specification titled, "Reflector Structure - 12 Meter Antenna", dated September 22, 1981.

AUI requests your firm fixed price proposal based on an award within thirty (30) days of the last date for submission of responses to this request. Delivery, F.O.B. NRAO, Green Bank, West Virginia, is desired within sixteen (16) weeks after award. A shorter delivery schedule may be proposed; a longer delivery schedule may be considered if justified in the proposal.

Factors that will be considered in awarding a subcontract will be:

- a) Relevant experience in similar type fabrications;
- b) Availability of experienced production and fabrication personnel;
- c) Management approach to engineering supervision and scheduling of the work;
- d) Manufacturing facility and resources;
- e) Financial resources and, in the event two or more firms responding to this Request for Proposal meet the technical and management criteria, then price will become the deciding factor.

All proposals will include a description of jobs which you regard as involving similar work within the last three (3) years, together with the names of individuals who may be contacted for references. Your proposal shall also include a copy of your most recent financial statement, a current organization chart, a schedule of the work, including procurement time for materials, and the qualifications of the engineer or supervisor who will oversee the work.

Cost should be set out in sufficient detail to allow analysis of these items:

- 1) Labor
 - a. engineering
 - b. fabrication
- 2) Materials
 - a. purchases
 - b. subcontracts
- 3) Overheads
- 4) General and administration expenses
- 5) Packing, packaging, and shipping

Options shall be quoted at a fixed price with appropriate price breakdowns. If your plant has a cognizant government auditor assigned, please include his name and telephone number.

A brief manufacturing plan will state place of manufacture, requirement for special tooling, if any; method and plan for shipping components to Green Bank, West Virginia, and your quality assurance plan or program.

We invite suggestions for alternate ways to manufacture, fabricate, or ship the reflector structure which will result in ease of manufacture or a reduction of subcontract price. These suggestions should reference appropriate sections of the specification and be in sufficient detail to fabricate engineering evaluation. Saving resulting from any alternate proposal or specification change shall be stated separately.

Options set forth in paragraphs 5 and 6 of the specification shall be priced separately. Paragraph 5 provides for the application of the finished coat of paint on the structure; paragraph 6 requests costs for a trial assembly of the structure. AUI is willing to entertain alternate proposals or methods for assuring that the entire structure can be assembled with little or no rework of the sub-assemblies or mating parts. In the event that this work is included in the price quoted for fabrication, it shall be explicitly stated. If work is quoted separately, labor, material, and other costs shall be shown.

The terms and conditions attached to this Request for Proposal generally follow the Federal Procurement Regulations and will be made part of any award. Your proposal shall be delivered before the close of business on October 26, 1981 to: J. Marymor, Manager, Contracts/Legal, National Radio Astronomy Observatory, Edgemont Road, Charlottesville, Virginia, 22901.

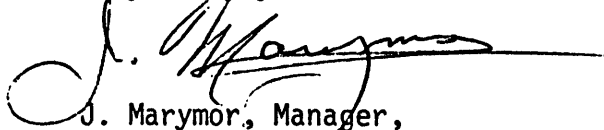
Please be sure to enclose the completed Representations, Certifications and Acknowledgements form with your proposal.

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AUI may make an award to other than the lowest bidder; in any event, AUI shall not be liable for the cost of proposal preparation or any other pre-contract cost incurred in response to this Request for Proposal.

Any questions concerning administrative matters shall be addressed to the undersigned. Questions regarding the substance of the technical specifications shall be addressed in writing to: William Horne, National Radio Astronomy Observatory, Post Office Box 0, 1000 Bullock Blvd., N.W., Socorro, New Mexico, 87801.

Very truly yours,



J. Marymor, Manager,
Contracts/Legal

JM/lc
Enclosure

BIDDERS LIST

Radiation Systems, Inc.
1501 Moran Road
Sterling, Virginia 22170

TIW Systems, Inc.
1284 Geneva Drive
Sunnyvale, California 94086

Atlas Machine and Iron Works 7308 Wellington Rd.
Gainesville, Virginia 22065 703-754-4171

Bristol Steel and Iron Works
Post Office Box 471 , 300 Piedmont Avenue
Bristol, Virginia 24201

Associated Steel Products, Inc.
Post Office Box 5568
Rio Road at Greenbrier Drive
Charlottesville, Virginia 22905

Ed Renneburg & Sons Company
2635 Boston Street
Baltimore, Maryland 21224

Richmond Metals Company
Highway 421 W.
Colfax, North Carolina 27235

Posey Iron Works
South & Prince Streets
Lancaster, Pennsylvania 17604

Nashville Bridge Company
Post Office Box 239, Shelby Street Bridge
Nashville, Tennessee 37202

Enterprise Fabricators, Inc.
1451 Euclid Avenue
Post Office Box 151
Bristol, Virginia 24201

Buck Hill Iron Works, Inc.
3504 Navarre Road
Canton, Ohio 44706

ESSCO Corporation
Old Powder Mill Road
Concord, Massachusetts 01742

Kushmaul Machine and Engineering Company, Inc.
2210 S. Freeway
Tucson, Arizona 85713

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 sub-contractor 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 70percent.

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.