Report of the ALMA-US Antenna Proposal Technical EvaluationCommittee

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3 August, 1999

The Technical Evaluation Committee has completed its evaluation of the Proposals received from Agra Coast, Antido, Mitsubishi and Vertex. The proposals were evaluated by the 6 committee members by scoring the proposals based on lists of questions in the following 10 areas:

A (10 points) Responsiveness to RFP
B (10 points) General quality of proposal
C (80 points) Technical concept
D (8 points) Technology testing plan
E (24 points) Manufacturing plan
F (8 points) Erection plan
G (12 points) Documentation plan
H (7 points) Test plan
I (26 points) Technical organization and personnel
J (30 points) Facilities

The detailed Proposal Evaluation Criteria are attached.

Results of the evaluation are shown below. For each area the score is shown, averaged over all 6 reviewers, expressed as a fraction of the possible maximum score. A total score is also shown, again expressed as a fraction of the total possible score. For each company the relative total ranking awarded by each of the 6 reviewers is also shown. For example, AGRA with rankings 121123 received three first place rankings, two second place rankings and one third place ranking.

	Agra	Antido	Misubishi	Vertex
A	.82	.72	.37	.72
B	.85	.72	.37	.73
C	.81	.75	.35	.74
D	.77	.75	.25	.63
E	.83	.74	.38	.76
F	.69	.65	.35	.50
G	.65	.71	.33	.76
H	.86	.76	.00	.88
I	.72	.81	.67	.89
J	.64	.69	.72	.82
Total	.77	.74	.43	.76

Rankings 121123 312332 444444 233211

One company, Mitsubishi, provided a Proposal which was unanimously ranked substantially below the others and the Committee does not believe it is worthwhile to proceed further with this company.

For the remaining three companies, Agra Coast, Antido and Vertex, all provided viable Proposals. No one of these Proposals stands out technically above the others sufficiently so that the Committee would recommend selecting only one for further action. For all three proposals the committee generated a list of significant technical questions which must be discussed with the companies before selecting one of the companies for contract award. These questions will be provided in a separate document.

CONFIDENTIAL

ALMA-US PROJECT
TECHNICAL EVALUATION CRITERIA FOR ANTENNA PROPOSALS
Final Version 1999-Jun-29

COMPANY NAME: _____

	Evaluation Factors	Maxi-mum Points	Points award ed	Points award ed	Points award ed	Points award ed
A.	Responsiveness to RFP Requirements.	10				
B.	General Quality of Bidder□s Proposal.	10				
C.	Technical Concept (80 points total).					
(C.1)	Does the proposed concept fit ALMA considerations?	4				
(C.2)	Does the technical proposal present adequate information to convey the approach and intent relative to meeting the requirements of the specifications?	4				
(C.3)	Are exceptions taken to antenna requirements of the RFP which would limit or reduce antenna performance?	4				
(C.4)	Does the performance of the antenna exceed the requirements of the RFP in any ways that will be advantageous to the mission of ALMA? Is the proposer able to commit to the surface accuracy goal? Does the mount provide the □over-the-top□ capability?	4				
(C.5)	Does the proposal provide calculations and/or error budgets sufficient to indicate that the design will meet the following specifications?:					
(C.5.1)	Pointing	4				
(C.5.2)	Surface accuracy	6				
(C.5.3)	Path length errors	2				
(C.5.4)	Fast motion	4				
(C.6)	Are the lowest resonant frequencies predicted and adequate?	4				
(C.7)	Is the electrical power required for maximum acceleration predicted and acceptable?	2				
(C.8)	Is the proposed design of the following key components adequate?					

(C.8.1)	Reflector surface panels (including surface treatment).	2				
(C.8.2)	Reflector surface panel adjusters.	2				
(C.8.3)	Reflector backup structure.	2				
(C.8.4)	Secondary mirror, xyz stage and support legs.	2				
(C.8.5)	Metrology for pointing and/or path length correction.	2				
(C.8.6)	Receiver cabin, including size and access.	2				
(C.8.7)	Servo system	2				
(C.8.8)	Elevation drive system.	2				
(C.8.9)	Azimuth bearing and drive system.	2				
(C.8.10)	Foundation	2				
(C.9)	Does the proposed design meet the requirement for transportability?	4				
(C.10)	Does the proposed design meet the lifetime requirement?	4				
(C.11)	Does the proposed design meet the maintainability and operability requirement?	4				
(C.12)	Does the proposed design have features which are likely to lead to an economic production run, including overseas shipping and assembly considerations?	10				
D	Has an adequate program of technology testing for any key, previously undemonstrated technology needed for the antenna been proposed?	8				
E	Manufacturing (24 points total)					
(E.1)	Does the proposal provide a detailed manufacturing plan for each major component?	4				
(E.2)	Does the proposal identify a qualified subcontractor for any major components which will not be manufactured by the proposer?	4				
(E.3)	Are all necessary special fabrication processes and special pieces of equipment or tooling identified, particularly with respect to metrology equipment, reflector surface panels and antenna components fabricated from CFRP?	4				
(E.4)	Are methods identified for transporting and shipping the major components of the antenna to the construction site, both for the prototype and production antennas?	4				
(E.5)	Is an estimated weight budget provided for the major antenna components, plus an estimate for the total antenna	4				

	weight. Are the estimated weights acceptable?					
(E.6)	Is an acceptable Quality Assurance plan provided for the prime contractor and all subcontractors? Is control of key tolerances addressed?	4				
F	On-Site Erection Plan (8 points total)					
(F.1)	Does the proposal define an adequate plan for the field assembly and erection of the antenna and all its subsystems at the VLA site? Are the requirements satisfied for disassembly of the prototype antenna for shipment to Chile and possible disassembly of the production antennas for shipment from San Pedro to the ALMA site?	2				
(F.2)	Are all necessary facilities and pieces of equipment identified?	2				
(F.3)	Are all necessary alignment and adjustment procedures identified so that key tolerances can be achieved?	2				
(F.4)	Has an acceptable plan for assembly of the production antennas in Chile been provided?	2				
G	Technical Data and Documentation (12 points total):					
(G.1)	Complete checked drawings and material lists to be provided	2				
(G.2)	All design analysis required in the Statement of Work to be provided	2				
(G.3)	Technical data on purchased components to be furnished, certify adherence to close tolerance requirements	2				
(G.4)	Are technical data free from limits imposed by proprietary knowledge or design	2				
(G.5)	Operation and maintenance manuals to be provided	2				
(G.6)	Critical component replacement plan provided	2				
H	Test and Acceptance Plan: is an adequate test and acceptance plan proposed for each of the following areas?:(7 points total)					
(H.1)	Mechanical (drives, HVAC, Cable wraps etc.)	1				
(H.2)	Structural performance of the antenna	1				
(H.3)	Servo	1				
(H.4)	Electrical	1				
(H.5)	Safety	1				

(H.6)	Environmental	1				
(H.7)	Reliability	1				
I	Technical Organization and Personnel (26 points total)					
(I.1)	Does the company provide a current organization chart indicating names, titles and functions of the key personnel?	4				
(I.2)	Are all necessary key personnel identified?	8				
(I.3)	Are personnel experienced in work of a similar nature?	8				
(I.4)	Are experienced erection personnel available for the installation and precision alignment of the prototype antenna?	4				
(I.5)	Is there an indication of too heavy reliance on outside technical and consultant personnel?	2				
J	Facilities (30 points total)					
(J.1)	Does the company have access to adequate facilities, equipment and qualified personnel to design, fabricate and erect the ALMA prototype antenna?	8				
(J.2)	Does the company have access to adequate facilities, equipment and qualified personnel to fabricate the ALMA production antennas and assemble and acceptance test them in San Pedro?	8				
(J.3)	Are test facilities adequate and identified?	4				
(J.4)	Does the company have similar work experience?	6				
(J.5)	Are there adequate computer facilities and software necessary for comprehensive design and analysis?	4				
	Total	215				

SUMMARY (General statement of your opinion of the proposal):

NATIONAL RADIO ASTRONOMY OBSERVATORY

1999-August-04

MEMORANDUM CONFIDENTIAL

To: R. L. Brown
Chairman, Contract Selection Committee

From: W. H. Porter
Chairman, Business Evaluation Committee WP

Subject: ALMA US Prototype Antenna Proposal Business Evaluation

The Business Evaluation Committee, consisting of John Webber, Harvey Liszt, Mike Holstine, Jim Gibb, John Dowling and Bill Porter, has reviewed and evaluated the four proposals received in response to the MMA/LSA Prototype Antenna RFP.

Each committee member performed an independent review of each proposal and graded the proposers numerically in accordance with the evaluation criteria established prior to the proposal due date. A blank copy of the evaluation form is attached for your information as Attachment 1.

Following the completion of the independent reviews, the committee met to discuss the evaluations. Although there were clear differences of opinion about the relative scoring of the firms, no committee member opted to change his scoring and no attempt was made to force a normalization of the reviews. The scores of the six reviewers were simply averaged to obtain the final company scores. The average scores are provided on the Business Evaluation Committee Scoring Summary, attached hereto as Attachment 2. As you will note, the final scores and rankings are:

Ability, Work Management and Business Considerations

1	Vertex Antenna Systems, LLC	90.8
2	Mitsubishi Electric Corporation	81.4
3	Antedo, Inc	73.6
4	Agra Coast	72.5

Schedule Considerations

1	Vertex Antenna Systems, LLC	88.1
2	Antedo, Inc.	69.9
3	Mitsubishi Electric Corporation	68.6
4	Agra Coast	60.6

Since the committee did not achieve unanimity in the individual rankings, it was decided to relay to the Contract Selection Committee some concerns which are not clearly reflected in the averaged scores.

Regarding **Vertex**: As reflected by its score, Vertex was the top-rated firm by a large majority of the committee (5 of 6). However, the question is raised why was Vertex replaced by Coast Steel (now Agra Coast) for the Keck II telescope?

Regarding **Mitsubishi**: This proposal generated considerable discussion. It was felt by some that Mitsubishi did not respond to the request for a 12-meter telescope proposal, but instead submitted a proposal for a 10-meter telescope with indications that the concept could be made to work at 12-meters. While some committee members desired to mark them low for this, others felt that Mitsubishi has proven qualifications and experience and is certainly capable of building a 12-meter telescope. Hence, even though there was disagreement within the committee, Mitsubishi's average score puts it in second place. Also, the master summary schedule presented in the proposal was judged to be poor with a proposed delivery of December 2001.

Regarding **Antedo**: The Antedo engineering group consists, in large part, of former Loral engineers who were responsible for the GBT design, which raised some concern within the committee. Also, the stated exception of not proffering the servo code is unacceptable and must be worked out. Antedo's schedule offers delivery in mid-September 2001.

Regarding **Agra Coast**: Agra states that it is providing a FFP quote in order to be compliant with the RFP; however, it is clearly pressing for an alternate approach which involves a six month study of the project followed by a negotiated prototype price. The fact that Agra has already spent "over three thousand engineering hours" on the design and still desires an additional six months of study raised concern within the committee which is reflected in its score. In addition, Agra's summary schedule begins to run on 1999-July-14, which (1) is not possible and (2) if slid to September 30, would force the delivery date of the prototype into December 2001. Other concerns include the experience/capability of the CFRP supplier, RSI's servo involvement, and the project organization structure (it is not clear who will manage the project; Mr. Halliday who is a VP with other major responsibilities, or Mr. Page who has considerable experience, but is not an engineer).

None of the companies exhibited exceptions to the terms and conditions which probably could not be worked out during negotiation (however, it is noted that two of the firms--Mitsubishi and Agra Coast--are not U.S. firms, which fact will require careful consideration during contract finalization).

If you desire additional information or comments from the BEC, please contact me.

ATTACHMENT 1

Business Evaluation Form
MMA/LSA Prototype Antenna

_____

Name of Company

Criterion	Points	Weighting	Total
Ability, Work Management and Business Considerations			
A. Experience/Record in Similar or Related Work		1.40	
B. Grasp of Problems		1.25	
C. Qualifications/Availability of Personnel		1.10	
D. Organization and Management Practices		1.00	
E. Completeness of Proposed Work Plan		0.90	
F. Facilities		0.95	
G. Financial Stability		0.80	
H. Responsiveness to Terms and Conditions		0.60	
Point Accumulation (Sum A thru H)			
Total Point Rating (Point Accumulation ÷ 8)			

Criterion	Points	Weighting	Total
Schedule Considerations			
A. Completeness of Detailed Schedules		0.80	
B. Schedule Acceptability		1.10	
C. Likelihood of Meeting Schedule		1.10	
Point Accumulation (Sum A thru C)			
Total Point Rating (Point Accumulation ÷ 3)			

_____

Reviewer's Signature

_____

Date

Business Evaluation Committee Scoring Summary

Prototype Antenna for the Millimeter Array/Large Southern Array Radio Telescope

Date of Report: 1999-Aug-3

Ability, Work Management and Business Considerations

	Possible Score	Committee Average Scores			
		Vertex	**Mitsubishi**	**Antedo**	**Agra/Coast**
A. Experience/Record	140	134.2	122.5	95.7	84.0
B. Grasp of Problems	125	116.3	90.6	92.7	93.1
C. Personnel Q/A	110	103.0	74.3	82.5	78.7
D. Organization Management	100	86.7	86.7	75.8	75.4
E. Completeness of Work Plan	90	76.5	66.0	69.8	69.4
F. Facilities	95	83.9	85.5	67.3	69.7
G. Financial Stability	80	71.6	74.7	55.3	63.3
H. T&C Responsiveness	60	54.3	51.0	50.0	46.0
Sum	800	726.5	651.3	589.1	579.6
Average Score		**90.8**	**81.4**	**73.6**	**72.5**
Ranking		1	2	3	4

Schedule Consideration

A. Completeness of Schedules	80	65.7	42.7	66.7	61.3
B. Schedule Acceptability	110	105.0	77.0	73.3	58.7
C. Likelihood of Meeting Sched	110	93.5	86.2	69.7	61.9
Sum	300	264.2	205.9	209.7	181.9
Average Score		**88.1**	**68.6**	**69.9**	**60.6**
Ranking		1	3	2	4

Memorandum
August 5, 1999

To: P. Vanden Bout
From: R. L. Brown, for the MMA Antenna Contract Selection Committee
Subject: Proposal Ranking

The MMA Antenna Contract Selection Committee met on August 4, 1999 to review the following materials:

- The rankings of proposals received from contractors responding to the MMA antenna RFP by the MMA Technical Evaluation Committee;
- The rankings of the proposals by the MMA Business Evaluation Committee;
- The pricing data provided by each contractor. Neither the MMA Technical Evaluation Committee nor the MMA Business Evaluation Committee has seen the pricing data.

It was the purpose of the MMA Antenna Contract Selection Committee to establish a rank order of the contractor's proposals using an algorithm established for the purpose by the Committee on June 29, 1999. A copy of that ranking algorithm is attached. It establishes weights for the ranking assessment that depend on technical approach (50%), business management plan (20%), and cost (30%). Each of the three committees used a finer division of assessments appropriate for their task to establish their quantitative rank order. The reports of the Technical Evaluation Committee and the Business Evaluation Committee are also attached.

Proposals were received from four contractors. The four were ranked according to the algorithm established by our committee for this purpose. The ranking of the four in each of the three areas–cost, technical approach and business–and the weighted sum of those rankings is attached in spreadsheet form. Two of the contractors achieved scores, percentage points, in excess of 90: these companies are Antedo and Vertex. The other two contractors, Mitsubishi and Agra Coast, received scores of 64 and 77 respectively. Mitsubishi was scored down on technical merit. Their proposal was written for a 10m diameter antenna with simple scaling, not engineering analysis, used to argue that it would comply with the MMA specifications at 12 m diameter. Agra Coast was scored down in the business evaluation on schedule, project organization and choice of subcontractors. In addition, the Agra Coast fixed price for the prototype antenna is out of the competitive range.

As a result of our rankings it is our intention to seek clarifications of the technical proposal and the business arrangements proposed by Antedo and Vertex. This will be done by means of visits of the MMA Technical and Business Evaluation Committees to the two contractors' plant facilities. If our questions and concerns can be addressed satisfactorily it is our intention to ask these two vendors for a best and final costing.

ALMA PROTOTYPE ANTENNA CONTRACTOR SELECTION

1999 August 05

COST RANKING

Contractor	C_proto	C_prod	E_proto	S_proto	E_prod	S_prod	MS_proto	MS_prod	P_cost
Agra Coast	$ 8,000.0	$ 4,400.0	$ 15,788.4	80.00	$ 8,510.8	17.78	120.00	136.29	11.96
Antedo	$ 8,000.0	$ 4,400.0	$ 7,615.9	103.84	$ 2,934.1	129.32	120.00	136.29	27.21
Mitsubishi	$ 8,000.0	$ 4,400.0	$ 8,879.8	91.20	$ 5,951.0	68.98	120.00	136.29	18.99
Vertex	$ 8,000.0	$ 4,400.0	$ 5,676.7	120.00	$ 2,585.3	136.29	120.00	136.29	30.00

BUSINESS RANKING

Contractor	Ability, Work Management & Business	Schedule Consider-ations	Sum Total	Maximum Achieved	P_bus
Agra Coast	72.5	60.6	133.1	178.9	14.88
Antedo	73.6	69.9	143.5	178.9	16.04
Mitsubishi	81.4	68.6	150	178.9	16.77
Vertex	90.8	88.1	178.9	178.9	20.00

TECHNICAL RANKING

Contractor	Response to RFP	Proposal Quality	Technical Concept	Technology Test Plan	Manufact Plan	Erection Plan	Document Plan	Test Plan	Technical Organization & Personnel	Facilities
Agra Coast	0.82	0.85	0.81	0.77	0.83	0.69	0.65	0.86	0.72	0.64
Antedo	0.72	0.72	0.75	0.75	0.74	0.65	0.71	0.76	0.81	0.69
Mitsubishi	0.37	0.37	0.35	0.25	0.38	0.35	0.33	0	0.67	0.72
Vertex	0.72	0.73	0.74	0.63	0.76	0.5	0.76	0.88	0.89	0.82

Contractor	Sum Total	Maximum Achieved	Relative Total	P_tech
Agra Coast	164.84	164.84	1.000	50.00
Antedo	158.96	164.84	0.964	48.22
Mitsubishi	92.3	164.84	0.560	28.00
Vertex	164	164.84	0.995	49.75

CUMULATIVE RANKING

Contractor	P_tech	P_bus	P_cost	TOTAL
Agra Coast	50.00	14.88	11.96	**76.84**
Antedo	48.22	16.04	27.21	**91.47**
Mitsubishi	28.00	16.77	18.99	**63.76**
Vertex	49.75	20.00	30.00	**99.75**

METHOD FOR RANKING COSTS OF THE MMA/ALMA PROTOTYPE 12 METER ANTENNA

R. L. Brown
29 June 1999

1. A reference cost figure is established for both the Prototype Antenna and for the cost of antennas in production. Call these two costs:

C_proto for the prototype antenna in thousands of dollars
C_prod for the per-unit production antennas in thousands of dollars

From the design and costing work done by the MMA Project, and the work done in consultation with the European antenna design group, estimates exist for the costs of a 10-m diameter antenna that meets the MMA specifications. These costs have been scaled to establish estimates for C_proto and C_prod appropriate for an antenna of 12m diameter; the estimates in thousands of dollars are:

C_proto = $8000
C_prod = $4400

2. A score, S_proto, will be established for the expense, E_proto expressed in thousands of dollars, given in each contractor's proposal for the prototype antenna in the range 80 - 120. That score will be computed as:

$$S\_proto = 100 + (C\_proto - E\_proto)/100$$

If the computed S_proto is greater than 120 it will be set equal to 120; if the computed S_proto is less than 80 it will be set equal to 80.

3. A score, S_prod, will be established for the per-unit estimated expense, E_prod expressed in thousands of dollars, given in each contractor's proposal for the production antennas. That score will be computed as:

$$S\_prod = 100 + (C\_prod - E\_prod)/50$$

4. From a review of all the contractor's scores the maximum S_proto and S_prod computed will be established; we call these maximum values MS_proto and MS_prod respectively.

5. The costing points, P_cost, assigned to each contractor will then be computed as:

$$P\_cost = 15*S\_proto/MS\_proto + 15*S\_prod/MS\_prod$$

6. The contractors will be ranked in order by P_cost. P_cost has a maximum value of 30.

METHOD FOR RANKING THE CONTRACTORS

The contractors will be ranked on the basis of points received for Technical evaluation, P_tech, Business evaluation, P_bus, and cost, P_cost. The highest ranked proposal from the technical evaluation will be assigned 50 points, i.e. P_tech = 50 is the maximum. The highest ranked proposal from the business evaluation will be assigned 20 points, i.e. P_bus = 20 is the maximum.

Contractors will be ranked by the following sum of points received:

P_tech + P_bus + P_cost.

The maximum possible is a sum of 100.