

Getting to the AUI ALMA Antenna Contract

W. Porter
2 March 2004

Reference Documents

Two documents should be kept handy for reference:

1. "Joint Evaluation of the Proposals for the 64 ALMA Antenna", S. Stanghellini, 29.01.04.
2. "AUI/NRAO Proposal Receipt and Business Evaluation Plan for the ALMA Antenna Procurement", W. Porter, Draft 16 February 2004.

Introduction

Radio telescope antenna procurement is a multi-phase process. The three phases considered here are: (1) Request for Proposal (RFP) Phase, (2) Proposal Review Phase, and (3) Contract Development Phase (leading to contract signature).

Phase Status

RFP Phase

The NRAO RFP and the corresponding ESO Call for Tenders (CFT) were made available to the respective interested and qualified antenna firms via the NRAO and ESO websites on 17 December 2003. Proposals/Tenders are due to the respective organizations on 30 April 2004. It is expected that date will not change, even if requested by a Proposer/Tenderer.

Proposal Review Phase

The planned schedule for activities which will occur during the Proposal Review Phase is the topic of References 1 and 2. Reference 1 (Stanghellini), which describes a joint technical review process, has been approved by the ALMA Management IPT and the JAO. Reference 2 (Porter), which refers to an AUI business review process, is a draft and is out for comment at this time. Modifications are almost certainly forthcoming.

Contract Development Phase

The reference documents refer to the proposal review/evaluation processes (joint technical and AUI business, respectively), but do not address how to get *from* the evaluation/selection *to* a signed contract. In fact, this may become the most critical phase and must be carefully thought out.

The ALMA scheduled milestones leading to a signed contract on 15 September 2004 are:

Proposal/Tender Receipt	30 April 2004
Proposal Evaluation Complete (to JAO and Executives)	15 June 2004
Contractor Selection	1 July 2004
Joint Agreement by Executives On Contractor Selection	22 July 2004
Executives Authorize Contract Signature	30 August 2004
Contracts signed	15 September 2004

Concerns

1. It is well known that AUI and ESO procurement rules and typical procedures are different (that is one factor that has led to the parallel procurement approach). This may make it difficult to keep the parallel procurements on a locked schedule.
2. Neither of the reference documents address the issue of when the antenna pricing will be opened and reviewed nor by whom. This needs to be clarified.
3. It is likely that the antenna prices will be higher than originally anticipated in the project budget. It is important to develop a contingency plan to guide the process through to an acceptable contract price.
4. The project schedule shown above will have to be revised slightly to allow AUI to pursue negotiation, if necessary, in order to reach the best price achievable with its contractor.

Recommendations

1. The ALMA Project Controller should provide the target antenna price, which considers the budget plan and any contingency which will be available for antenna purchase.
2. The NRAO Director should appoint an antenna procurement planning team to develop a plan for pricing proposal review and negotiation. The plan must include contingency strategies that will guide the negotiation over a range of antenna prices, i.e., how will AUI react in negotiation if the initial antenna prices are \$4 million, or \$5 million, or \$6 million per antenna.
3. A prioritized list of scope reductions should be developed to pre-determine what items and contract terms may be given up in order to reduce price. This will need to be agreed to with ESO and the JAO.
4. The NRAO Director should appoint a negotiating team to be prepared in the event negotiation is warranted.
5. The AUI procurement schedule should be modified slightly to something that approximates the following to cover the event that negotiation is warranted:

Proposal Evaluation Complete	
(to JAO, Executives, and AUI Procurement Team)	15 June 2004
AUI Opens/Reviews Its Price Proposals	16 June 2004
AUI Negotiates w/ First Choice Proposer	
(if necessary)	16-30 June 2004
Contractor Selection	8 July 2004
Joint Agreement by Executives	
On Contractor Selection	22 July 2004
AUI Applies for NSF Approval	27 July 2004

NSF Approval Received
AUI Contract Finalization/Signature

7 Sept 2004
15 Sept 2004

[End]

ACTION ITEM - please respond to PD ASAP

Subject: ACTION ITEM - please respond to PD ASAP
From: Fred Lo <flo@nrao.edu>
Date: Wed, 30 Jun 2004 18:50:48 -0400
To: "Fred K. Lo" <kylo@nrao.edu>
CC: Betty Trujillo <btrujill@zia.aoc.nrao.edu>

----- Original Message -----

Subject: RE: Antenna Procurement Update
Date: Wed, 30 Jun 2004 18:05:12 -0400
From: Patrick W. Donahoe <pdonahoe@au.edu>
To: Fred Lo <flo@nrao.edu>, Ethan J. Schreier <ejs@au.edu>

Ian and Fred, Please review and comment on my proposed response to Corbett's email. I want to get this out tonight (Wednesday) so that it will be there in the morning for him.

Ian,

I am sorry that the AUI/NRAO procurement process is causing ESO, in your words, "great difficulties". However, we are following precisely the plan we outlined in our series of August/September 2003 antenna procurement videoconferences, and again in the joint procurement RFP/CfT meeting in Socorro last November. It was clear in all these meetings that ESO is not at all comfortable with the manner in which our procurements are conducted. As I explained in our conversation, we have made significant modifications in the sequencing of our procurement actions in order to accommodate ESO rules...especially in the JTET process. Now we must undertake those actions which we would have done much earlier in the process.

As I mentioned, there have been a number of instances when changes in plans have been made. Before the JTET process began, our people were told that on-site visits to contractors by the JTET were contemplated. A few weeks before the JTET commenced, this was changed. Entering the JTET process, our people had the explicit understanding that we were free to ask proposers the normal types of questions we would ask during a regular NRAO procurement. Then during the JTET deliberations, they were then told that ESO's rules do not allow certain types of questions to be asked. We were also surprised that ESO intended to engage in direct interaction with proposer(s) before the meeting between Executives (now scheduled for July 7).

More recently we do not understand the change in ESO's ability to share price information. In several discussions, including as late as Monday, there was no conditionality associated with the sharing of all pricing information. You posit ESO's willingness to share Vertex and Alcatel information on the basis of them having submitted proposals to both AUI and ESO. Since it has been known for months that Alenia did not submit a bid to us, why is this issue only now arising? Please understand that I am not accusing anyone of purposely misleading us...it's just that it seems that some people involved in the ESO process do not understand ESO rules and this leads to misunderstanding.

You had asserted that our procurement process precluded Alenia from submitting a bid to AUI/NRAO. This is simply not true as we did not exclude any company. Our restriction was that a bidding entity team would have to meet a substantial participation criteria in development of an ALMA prototype antenna. Certainly Alenia's bid to ESO has subcontractors that did participate in the prototype process. Whether these subcontractors'

ACTION ITEM - please respond to PD ASAP

prototype participation was sufficient to meet our restriction, I can not speculate because Alenia chose, for whatever reason, not to submit a bid to us.

I don't understand why you consider Vertex's shared risk option as not acceptable to ESO. In our June 25 telecon, you indicated that Vertex's pricing proposal was totally compliant. Our understanding is that your CFT solicited alternative pricing that might be considered advantageous to ESO. Could you clarify this point for me?

I am quite concerned about your email reference that that the only outstanding issue with Alenia is price. While I am clearly not a technical expert, I think the JFET's addendum opinion that the testing results of some aspects of AEC design can be extracted to the proposed Alenia design needs serious additional analyses. My understanding is that it also has features that are on neither prototype antenna. It seems to me that any antenna design must be analyzed as an integral system...not just certain aspects. I expect this issue will be addressed in our July 7th meeting.

With respect to the meeting on the 7th, I believe an extremely important point is to clearly and frankly understand the implications of the procurement strategies upon which we are currently embarked. We need to keep in mind that the best thing for science is for each Executive to procure as many antenna of as possible (that meet specs), at the lowest price, with the goal of a single design.

Best Regards,

Patrick W. Donahoe
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-----Original Message-----

From: Ian Corbett [<mailto:icorbett@eso.org>]
Sent: Wednesday, June 30, 2004 4:38 AM
To: P. Donahoe
Cc: [rfischer](mailto:rfischer@eso.org); sstanghe@eso.org; John Credland; khansen@eso.org
Subject: Antenna Procurement Update

Dear Pat,

In the interest of clarity and transparency I'd like to confirm the points I made in our discussion last night.

1. I vehemently disagree that ESO has departed from the process we agreed. We believe we have explained everything to you and have been consistent in what we have said. We made it clear before we met on 22nd that we would open discussions as soon as possible with Alenia unless there was a show-stopper when we opened the financial part of the bids, and that we would not contact either Alcatel or Vertex. We thought at that time that we might write to Alenia. We told you immediately after the meeting of the ESO CAC on 24th, after we had examined the cost information, that we would seek a meeting with Alenia on 29th and that we would not be able to send written questions because of the time available.

2. I don't understand the motivation of those who are saying (I quote)

ESO is just doing what it likes. Nothing could be further from the truth. This is a very difficult and politically charged procurement, and we are being scrupulously careful in following our Procurement and Contracting rules and regulations. I believe you have copies of these. I could just as usefully say that there is no shortage of people in Europe who regard the AUI procurement as a charade and that you will simply accept the best deal you can get with Vertex, and that you have intended to do this from day 1.

3. However, ESO has no quarrel with what you are doing, which is what you said you would do.

4. We confirm that we would like to share cost information with you on or before our meeting on 7th July. For the Alcatel and Vertex bids that poses no problems. It is different for Alenia. You did not send them an RFP and they have not submitted a bid to you. As a courtesy we should tell them we intend to share information with you and seek their reaction. I do not see how they can object, but we must be careful in following the rules.

5. We have not posed any written questions to Alenia, partly because we had hoped to meet them on 29th and there would not have been time, and partly because we only wish at this stage to explore the cost drivers item by item in the tender response form. That sets the agenda, because there are no major technical or contractual issues. We will report the outcome at our meeting on 7th. Unfortunately, John Credland is temporarily out of action and cannot participate in the meeting with Alenia on Friday. I confirm that Massimo will not take part but is fully informed of the meeting and our intended approach.

6. We await with great interest the response of Alenia and Alcatel to our question on the impact of a merger. We will certainly raise this with Alenia on Friday.

7. I repeat that the bids from Alcatel and Vertex (including the so-called "shared risk" option) are not acceptable, and that the offer from Alenia is fully compliant and responsive. In particular, I confirm that Alenia has offered a firm fixed price for baseline and options, and has explicitly confirmed full acceptance of the contract conditions. The only outstanding issue is price: if we reach agreement with Alenia we will be obliged to place a contract with Alenia. If we cannot reach an acceptable position with Alenia we will have to declare this procurement a failure and open a new call for tenders. We do not yet know whom we would invite to participate. That may depend in part on the Alcatel-Alenia merger situation.

8. In this context we are very concerned at the amount of information being provided by you to Vertex, particularly the edited excerpts from the AEG Executive Summary, and the degree of "coaching" in your draft letter. We would not be permitted to send such a letter under either our own procurement rules or those of the European Community. Were we to launch a new call for tenders in which Vertex could participate we would have to ensure that all potential bidders were provided with the same level of supplementary information as had been provided to Vertex.

9. The "shared risk" option creates an unusual relationship between customer and contractor. If AUI were to decide to go down that route and ESO were to launch a new call for tenders the situation between ESO and Vertex would require very careful handling.

10. We have no questions for Vertex to add to those in your draft. We believe you have covered the necessary topics.

11. We do not believe that the questions you propose for the JTET, Management IPT, and Directors Council can be answered on a reasonable time scale, and we suspect that many of them are not answerable without a great deal of unavailable additional information.

12. We do not know the current status of the Alcatel bid to AUI. Is that now definitively ruled out? You are now asking questions of Vertex to bring their bid up to an acceptable level. What happens if you fail, or Alenia produces a lower offer? We have always had a □Plan B□ (new call). Do you have a Plan B?

13. We believe that a decision on the number of antenna that can be purchased has to be taken in the context of the project as a whole, taking into account operations costs as well as construction costs, i.e. whole life costs.

14. We believe that the meeting on 7th should concentrate on policy and strategy issues, and not technical issues. This should be reflected in the attendees. The outcome should be an agreed set of actions, including the need for and value of a Board telecom on 22nd July.

Best wishes

Ian

Dear Pat,

Here are my responses, in red type, to your e-mail of yesterday.

I am sorry that the AUI/NRAO procurement process is causing ESO, in your words, "great difficulties". However, we are following precisely the plan we outlined in our series of August/September 2003 antenna procurement videoconferences, and again in the joint procurement RFP/CfT meeting in Socorro last November. It was clear in all these meetings that ESO is not at all comfortable with the manner in which our procurements are conducted. As I explained in our conversation, we have made significant modifications in the sequencing of our procurement actions in order to accommodate ESO rules...especially in the JTET process of not incorporating the AEG report to begin with and only having the core team providing an addendum. Now we must undertake those actions that we would have done much earlier in the process if we had adhered to our usual internal sequencing guidelines.

We fully understand this and are not complaining in any way about what you are doing. This is not an issue for us. But it does mean that we have to take into account your actions when planning ahead, and this particularly affects any plans we might have to make for a new call for tenders. I suspect that many of the problems we are now confronting arise from a lack of understanding of the other's process at the detailed level, and that the issues that are now surfacing are very much at that level.

Regarding the AEG report, you know that the JTET core team had the option of preparing a second issue of the JTET report or of making an addendum. They decided to make an addendum because this was much less complicated. This decision had nothing whatsoever to do with ESO. A new report would have been issued if the AEG report had substantially affected the JTET analysis. The core team members agreed that this was not the case. There is a suspicion that AUI/NRAO now wish to challenge the conclusions of the core JTET, shared unanimously by the core team members (US and ESO). The questions you are posing to Vertex have nothing whatsoever to do with the fact that the AEG report is considered by the JTET in an addendum. It was never a charge of the JTET to discuss the AEG report with the bidders.

As I mentioned, there have been a number of instances when changes in plans have been made. Before the JTET process began, our people were told that on-site visits to contractors by the JTET were contemplated. A few weeks before the JTET commenced, this was changed. Entering the JTET process, our people had the explicit understanding that they were free to ask proposers the normal types of questions we would ask during a regular NRAO procurement. Then during the JTET deliberations, they were then told that ESO's rules do not allow certain types of questions to be asked.

The ESO rules do not allow the bidders to be asked to provide information requested in the CfT but not provided originally in the tender submission – see 13.4.2 *et seq* of our Procurement rules. We are restricted to questions of clarification at this stage. Of

course, 'clarification' is open to interpretation, but I believe this was discussed within JTET and an understanding reached. I understand that JTET did ask for additional input (for example, schedule and others in case of the Vertex offer).

More recently, we do not understand the change in ESO's ability to share price information. In several discussions, including as late as Monday, there were no conditions associated with the sharing of all pricing information. You posit ESO's willingness to share Vertex and Alcatel information on the basis of them having submitted proposals to both AUI and ESO. Since it has been known for months that Alenia did not submit a bid to us, why is this issue only now arising? Please understand that I am not accusing anyone of purposely misleading us...it just appears that agreements were made that upon clarification of ESO rules they have to be changed, leading to misunderstanding and mistrust.

I think this is my fault. In my enthusiasm to be open and helpful I agreed that we would share the price information. We have no problem with the Alcatel and Vertex bids, because you are conjoined through the basic process and should not be considered as 'third parties'. This is not true of Alenia. When we thought more carefully about it at our CAC meeting, I realized that we had to be careful in the way we handled their bid. They are entitled to the full protection of our procurement rules and their bid is clearly 'commercial in confidence' and must not be transmitted to third parties. Hence the approach I suggested. We expect to be able to reach agreement with Alenia on the information we want to pass on to you.

You asserted that our procurement process precluded Alenia from submitting a bid to AUI/NRAO. This is simply not true as we did not exclude any company. This is a misunderstanding: I said that Alenia said that you excluded them, although they submitted a response to the Preliminary Enquiry. Our restriction was that a bidding entity team would have to meet a substantial participation criteria in the development of an ALMA prototype antenna. Certainly Alenia's bid to ESO has subcontractors that did participate in the prototype process. Whether these subcontractors' prototype participation was sufficient to meet our restriction, I can not speculate because Alenia chose, for whatever reason, not to submit a bid to us. As you know, because Alenia did not submit a proposal to us, we can't consider them as part of our procurement process...at any price.

I am informed that during the bidders meeting NRAO/AUI specifically answered potential bidders by saying that "substantial participation" meant teaming with Vertex or EIE or Alcatel. It may be that this was interpreted by Alenia as a specific statement by you that subcontractor participation was insufficient to meet your restrictions. We will ask Alenia for clarification.

I don't understand why you consider Vertex's shared risk option as not acceptable to ESO. In our June 25 telecon, you indicated that Vertex's pricing proposal was totally compliant. Our understanding is that your CfT solicited alternative pricing that might be considered advantageous to ESO. Could you clarify this point for me?

The Vertex baseline response for 32 or 64 is fully compliant. The 'shared risk' is not. It is true that our CFT (Article 5.2 of the Special Conditions) gave bidders the possibility of submitting Alternatives Offers "which present technical and/or financial advantages, always fulfilling the requirements of the Statement of Work and of the Technical Specifications". The "shared risks" offer submitted by Vertex is based on a contractual scheme which is to some extent the extreme inverse of the type of contract ESO wants to conclude. ESO has never concluded such a contract and has neither the experience nor the Project Management capacities from a technical and contractual point of view to follow-up such a contract successfully over such a long period of time.

In addition, we have very serious concerns over other aspect of this offer and for the moment are content for you to follow it up. The shared risk option allows very little control over the design of the antennas and its full compliance with the specification, which as of today is not achieved by the Vertex design. In addition, the antennas supplied will be of identical design only in groups of 8. This is a risk; it makes it difficult for ESO to procure an additional identical 32 antennas, and could increase the operational cost.

With respect to Alcatel's status, we have not ruled them out at this point in the process. However, their proposal is significantly inferior to Vertex's proposal. As I have said many times, if we fail to conclude a deal with either Vertex or Alcatel, this procurement is dead and we begin anew.

Thank you for the confirmation. We do not believe that the Alcatel proposal is 'significantly' inferior to Vertex's proposal, nor did the JTET come to this conclusion, but the proposed contractual amendments are not acceptable as they stand. Under our procurement rule 13.3.4 we can accept a price revision formula, but we were seeking a firm fixed price.

I am quite concerned about your email reference that that the only outstanding issue with Alenia is price. While I am not a technical expert, I think the JTET's addendum opinion, that the testing results of some aspects of AEC design can be extracted to the proposed Alenia design, needs serious additional analyses. My understanding is that it also has features that are on neither prototype antenna. It seems to me that any antenna design must be analyzed as an integral system...not just certain aspects. I expect this issue will be addressed in our July 7th meeting.

This is not the place or time for an extended technical argument. We could end up like a court of law with 'expert witnesses' who disagree. It is an important issue of principle that we should not challenge the technical team because their analysis gives the 'wrong' answer. The Addendum to the JTET report, and the main report, makes the Vertex proposals marginally inferior to the Alcatel, and far below the Alenia. Alenia has independently evaluated both designs and concluded, for its own purposes, that the Alcatel design is superior. Alenia proposed an improvement of this design which they would appear to have identified, and have proposed solutions in several major areas of concern. The technical question of thermal insulation of the yoke and base will need to

be addressed, but it is not a major technical challenge. We will raise some technical issues with Alenia, but will not expect them to be answered tomorrow.

With respect to the meeting on the 7th, I fully agree that the Heathrow meeting should focus on policy and strategy issues but this must be done in the context of important technical considerations. Thus we have modified our attendee list from the one that you proposed. We must understand the technical and scientific implications of the procurement strategies upon which we are currently embarked. Further, we need to keep in mind that the best thing for science is for each Executive to procure as many antenna as possible (that meet specs), at the lowest price, with the goal of a single design.

I agree with the sentiment, but the optimization is complex and we should not let ourselves be blind-sided by technical detail. And we cannot look at the antenna purchase in isolation.

We will have an internal meeting today at 17.00 and will then send you our proposed agenda for the meeting tomorrow. We will report fully on the outcome when we meet with you on 7th.

Best wishes

Ian
1 July 2004.

Subject: RE: Heathrow Meeting - Potential Agenda Modified

From: "Patrick W. Donahoe" <pdonahoe@au.edu>

Date: Mon, 5 Jul 2004 12:23:16 -0400

To: "Ian Corbett" <icorbett@eso.org>

CC: "Ethan J. Schreier" <ejs@au.edu>, "Fred Lo" <flo@nrao.edu>, "ccesarsk" <ccesarsk@eso.org>, "John Credland" <jcredlan@eso.org>, <sstanghe@eso.org>, "rfischer" <rfischer@eso.org>, <khansen@eso.org>

Ian,

Per our telecon, here is a slightly revised agenda. The only change has to do with item 8 under "Separate Designs". As agreed, we should keep the text factual without any reference to the likelihood of the success (failure) of our respective negotiations.

For clarities sake, AUI's has not totally ruled out the Alcatel proposal. Per our discussion, ESO has conclusively ruled out both Alcatel and Vertex as part of the current procurement. Your reference to "ESO's position remains open" (which I have deleted from the revised agenda) pertained to the likelihood (or not) or concluding a deal with Alenia.

Best Regards,

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-----Original Message-----

From: Ian Corbett [mailto:icorbett@eso.org]

Sent: Monday, July 05, 2004 8:58 AM

To: Patrick W. Donahoe

Cc: Ethan J. Schreier; Fred Lo; ccesarsk; John Credland; sstanghe@eso.org; rfischer; khansen@eso.org

Subject: Re: Heathrow Meeting - Potential Agenda Modified

Pat,

We had a brief discussion today, not including Catherine, and suggest the attached agenda, most yours re-ordered.

Best wishes

Ian

Patrick W. Donahoe wrote:

Ian,

In order to help structure the Heathrow meeting, AUI offers the attached draft agenda.

In the absence of an agenda, this meeting could become quite unstructured and unproductive.

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Phone: 202-462-1676 Fax 202-232-7161
donahoe@ui.edu

Potential Agenda for 7 July Heathrow Meeting
(as proposed by AUI and modified by BSO - 05 July04)

1. Reminder of overall goals of antenna procurement

- To obtain 64 (or as many as possible) high quality antennae that meet specifications, and to minimize technical risk and life-cycle cost
- To have an equitable distribution of industrial effort in the partner countries
- To minimize development, integration, operations and maintenance by having a single antenna design

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2. Status of current procurement activities

- general quality of the proposals
- AUI activities with Alcatel and Vertex
 - i. - due diligence inquiry letters
 - ii. - Questions to Vertex, Management IPT and JTET
- ESO activities with Alenia, Alcatel, Vertex
 - i. Due diligence letters
 - ii. Results of ESO meeting with Alenia

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3. Exchange of cost information

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4. Outstanding technical concerns

- life cycle costs
- ability to meet specs
- other issues?

5. Funding issues and basic timescales in Europe and North America

6. Implications of smaller number of antennae on science

7. Possible implications of multiple manufacturers

- Impact on science of different designs
- Impact on cost of increased oversight, integration, test, maintenance and ops.
- Possible decreased risk if one design is seriously flawed, or one manufacturer defaults
- Impact on re-baselining

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~~<#>Impact on science of different designs¶~~
~~<#>Impact on cost of increased oversight, integration, test, maintenance and ops.¶~~
~~<#>Explanation to communities, funding agencies¶~~
~~<#>Possible decreased risk if one design is seriously flawed, or one manufacturer defaults¶~~
~~<#>Impact on rebaselining¶~~
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~~Inserted: ESO's position remains open~~

8. Options to proceed

- Criteria for declaring current procurements failed
- single design
 - i. would have to cancel current procurements, start again
 - ii. impact on potential re-baselining
- Separate designs
 - i. Both Executives' procurements are *currently* heading toward separate designs.
 - ii. get to the point in negotiations with respective vendors to understand how many of each antennae we could procure
 - iii. set up processes to monitor/compare parallel development and two vendors; might insert checkpoints and explicitly compare progress

Subject: RE: Heathrow Meeting - Potential Agenda Modified

From: "Fred K. Y. Lo" <flo@cv.nrao.edu>

Date: Mon, 5 Jul 2004 21:35:29 -0400 (EDT)

To: "Patrick W. Donahoe" <pdonahoe@ui.edu>

CC: Ian Corbett <icorbett@eso.org>, "Ethan J. Schreier" <ejs@ui.edu>, Billie Rodriguez <brodrigu@nrao.edu>, ccesarsk <ccesarsk@eso.org>, John Credland <jcredlan@eso.org>, <sstanghe@eso.org>, rfischer <rfischer@eso.org>, <khansen@eso.org>

Dear Pat and Ian,

May I remind everyone that an important goal, set by the ALMA Board, is to get 64 antennas of the same design, and certainly the same specifications?

While it is clearly a tremendously challenging process to procure the 64 antennas, in the end, it is the science goals that we are trying to meet. Antennas of the same design have a very important advantage that many systematic effects that limits the ultimate performance of the ALMA as an array tend to cancel out.

And there are the many practical advantages of having antennas of the same design for minimizing the cost of maintenance and repair...

Cheers,
KYL

**AUI/NRAO Contract Selection Committee (CSC) Meeting with Vertex/RSI and
Vertex Antennentechnik July 27-28, 2004**
(P. Donahoe's informal meeting outline notes)

Opening CSC Remarks

CSC emphatically stressed that:

- CSC currently agrees with JTET and NRAO Business Evaluation Committee that Vertex/RSI proposal (including responses to all questions) "fails to demonstrate (their) readiness to carry out a project of this size.
- Fabrication of a prototype is not sufficient proof of Vertex's qualifications
- Notable deficiencies existed in management, technical pricing areas.
- The CSC must be presented with rock-solid evidence that Vertex can do the job
- Deficiencies must be satisfactorily and quickly addressed if CSC is to proceed to a "best and final offer" stage
- CSC is very open to all reasonable suggestions for using limited resources in an optimal fashion

Management Issues Discussions

Extensive discussion took place on management-related issues including the following:
(Note: management-related "action items" are included in the attached document)

- The Vertex's proposed revised organization structure, in particular the 32+32 scenario management structure.
- The role of the Vertex "Oversight Committee"
- A frank and open exchange of views on Vertex's management of the prototype and APEX contracts.
- Vertex's experience in utilizing an "earned value system (Winsoft) and how it would be implemented for the ALMA project
- Examples of Vertex/RSI and VA collaboration
- Vertex's production management capabilities including their use of an "enterprise planning resource system (EPRS) called "JobScope" which integrates in-plant logistics such as raw material and subcomponent inventory, purchasing, labor workstation management, materials management workflow management, manufacturing documentation and job cost accounting)
- Logistic management issues which revealed that Vertex has done an enormous amount of work identifying Texas-to-OSF shipping issues including identification and potential solutions of potential "choke points".
- On-site assembly issues which indicated substantial planning has been done regarding assembly facility options, local labor recruitment, shift planning, training efforts and rotation of US-based personnel to OSF.
- Subcontractor issues including Vertex's use of ISO 9001 vendor qualification program and subcontract management procedures
- Safety and quality assurance procedures (ISO 9001)

Technical Issues

The CSC and Vertex discussed a wide variety of technical issues, most of which were identified in the CSC's June 30 questions to which Vertex replied on July 16.

- Identification of schedule and cost impact of prototype vs production technical specification and SOW changes.
- Reliability and cost issues pertaining to tiltmeter issues
- Providing the CSC with a numerical error budget table
- The extent to which weight reductions might be achieved
- The apparent discrepancy between certain results of the finite element model (FEM) calculations and actual prototype results, and the development of a plan of to resolve this issue
- Prototype consumption issues

Pricing Issues

Extensive discussions regarding potential areas of cost reductions were conducted.

Subject areas included

- ALMA (versus Vertex) providing and paying for support services for assembly site support services (e.g. housing, power, water etc.)
- Deletion of the assembly facility removal requirement
- ALMA building and equipping the assembly facility
- ALMA providing the local labor
- Cost impact of extending AUI's tax privileges to Vertex
- Potential production and engineering studies aim at reducing costs
- Cost optimized geographic distribution of work for 32+32 scenario
- Cost impact of liquidated damages business terms and conditions
- Cost indices associated with "shared risk" options

Note: Except for a couple of technical issues (e.g. the FEM vs. prototype test results), action items pertaining to management and technical issues are due COB August 6, 2004. Vertex's indicative cost reduction information is due August 11, 2004.



301A E. Methvin Street
Longview, Texas 75601 USA
903/553-0201
Fax 903/553-0209

August 10, 2004
JRV04-025

Mr. William H. Porter
ALMA Business Manager
National Radio Astronomy Observatory
520 Edgemont Road
Charlottesville, VA 22903

Subject: Indicative Pricing Options per CSC Discussions and Telcon of 4 August 2004

Dear Mr. Porter:

In accordance with the request from the ALMA Contract Selection Committee, VertexRSI respectfully submits the requested pricing options for the ALMA project.

Option A:

Option A-1	32 Antennas	End Date - 2009	FFP = \$192,025,000
Option A-2	32+32 Antennas	End Date - 2009	FFP = \$173,870,000 (Qty. 32)
Option A-3	32 Antennas	End Date - 2011	FFP = \$200,885,000
Option A-4	32+32 Antennas	End Date - 2011	FFP = \$177,610,000 (Qty. 32)

All FF prices above are based on AUI/NRAO pricing only with no LD's, no geographical return, bank guarantees or other ESO terms and conditions.

Option B:

After receipt of the RFP for the quantity 32 and 32+32 antennas and as part of VRSI attempt to be responsive to the request by NRAO to submit any proposal that would be of financial benefit to the ALMA program, VRSI performed cost optimization studies on the program. VRSI examined trade offs of such cost factors as inflation, carrying costs of materials, fixed cost of corporate overhead, risks factors involved with a stretched out program, and production/assembly efficiencies weighed against rates of deliveries. While these studies were not exact, the most effective schedule was determined to be one that concludes the program at the end of calendar year 2009. The year 2010 was somewhat higher and 2011 was much higher (as indicated in Option A-3 above). Extending completion beyond 2011, results in a disproportional increased cost for the program. Therefore, within our estimating accuracies, VRSI believes that our proposal for the 2009 (Option A-1 above) is the "cost optimized" delivery schedule for this unique program.

Option C:

NRAO 32 FFP = \$173,870,000 (USD)

ESO 32 FFP = €160,184,000 (Euros)
{Inclusive of €15,292,000 for ESO T&C's, penalties and bank guarantees}

The above FF prices are based on the direction in the August 4 CSC request for pricing as follows:

- NRAO price for 32 (in USD) and the ESO price for 32 (in Euros)
- Two separate contracts will be issued (one NRAO-VRSI, one ESO-VA) each with common S.O.W. and technical Specifications, but with different business terms and conditions. [Assume ESO standard T&C's but separately identify cost associated with penalties and bank guarantees.]
- VRSI to manage the overall 64 unit production as a single integrated project
- Provide as close as possible a 50/50% US/ESO member nation distribution of costs (excluding cost incurred in Chile)
- Assume US contract signed by October 31, 2004 with ESO contract signed 2-3 months following US contract.

Note 1: As instructed, all US Dollar pricing for NRAO *excludes* liquidated damages. The FFP in Option C for ESO (in Euros) *includes* penalties and bank guarantees. These additional charges are identified separately.

Note 2: Presently all pricing is based on VertexRSI purchasing lodging, water and power at the rates published in the S.O.W. The estimated price reduction of each of these categories will be as follows:

- Lodging – \$180,000 (based on crew size required to complete 32 antennas in accordance with the 2009 schedule).
- Water/Power/Sanitation – \$80,000 (for 32 antennas to the 2009 schedule).

Note 3: Subpart (1) – ALMA providing Chilean Manpower

This topic requires further review and discussion. This option although attractive from an initial perspective, can create confusion and project problems. The authorization and control of the labor must not be fragmented or be directed through multiple chains of command. Potential lack of control of the labor force causes apprehension and concern regarding a timely completion of this cost and schedule sensitive project.

Note 3: Subpart (2) – ALMA providing a fully equipped assembly building

Upon further review and investigation VRSI considers this task to be a critical path item that requires detailed interfaces and coordination. VRSI feels it is in the best interest of the project to maintain the responsibility for this site facility as a contract item to VertexRSI. VRSI agrees to work with the requirements of ALMA in the design of such a facility to meet their long term needs.

Certainly there will be additional discussions on this topic during the upcoming CSC visit to VertexRSI.

VRSI believes incorporating the requirements for the long term maintenance facility into the VertexRSI furnished SEF is a cost effective solution to essentially paying for two separate structures. VertexRSI plans to include office, warehouse and storage areas for tools, hardware and equipment. Some of the storage areas can easily be caged for spares and inventory

control. The major topics that require discussion and modification to create an acceptable long term facility would include the following:

- Permanent lighting and electrical outfitting of the building – VertexRSI plans to install minimum overhead lighting and service outlets. The lighting during assembly and erection is planned to be supplemented with temporary and portable light stands.
- Permanent toilet facilities – the SEF is planned with chemical toilets and no plumbing facilities.
- The location of the facility to create the most convenient access from the technical area to a permanent service facility. (Gravity flow of waste water to the sewage treatment plant for permanent toilets etc., may also impact location of the SEF.)
- Floor space required by ALMA for offices, warehouse, spares storage etc.

Note 3: Subpart (3) – ALMA not requiring the removal of the assembly building and restoration of the site.

VertexRSI has evaluated the removal of the Site Erection Facility and returning the work area to a near pristine condition. This effort for 32 antennas is approximately \$200,000 (USD). This removal cost is based on all foundations and slab areas are to remain in place and covered with borrow material from the site excavation. Only the superstructure will be dismantled and removed from site, no concrete removal and disposal is required.

Vertex Quotation Notes:

- (1) The above quotation is valid through 31 October 2004, for both US Dollar and Euro priced items.
- (2) Euro quotes are based on Euro to Dollar conversion rate of 1.2 based on the rate of exchange of 30 April 2004. In the event an ESO contract lags an NRAO contract, beyond 31 October, the Euro values may be subject to re-pricing due to possible exchange rate fluctuations.
- (3) The FFP's shown above are dependent on satisfactory advance funding terms (to be negotiated) in order to secure cost optimized vendor pricing for long-lead materials and components.

Best regards,



J. Rex Vardeman
VertexRSI
301A E. Methvin
Longview, TX 75604

JRV/lc



NATIONAL RADIO ASTRONOMY OBSERVATORY

2496 OLD IVY ROAD CHARLOTTESVILLE VA 22903

TELEPHONE 434-296-0211 FAX 434-296-0255

CONFIDENTIAL

MEMORANDUM

Date: 19 August 2004
To: Heathrow II Contingent
R. Hames
T. Blunck
From: B. Porter

Several months ago, Dr. Lo charged me with organizing the AUI/NRAO ALMA antenna procurement effort. We agreed that success in this procurement was crucial for ALMA. We never got around to defining what success in the antenna procurement meant for us, so I set my own goals which were fairly simple: (1) get the antenna procurement done within the ALMA scheduled time and (2) get the antenna price below \$5 million each (a good price given the lessons learned in the prototype antenna project, and the requirements of the production antenna specs, SOW, and contract terms).

We are close, and I believe the goal is in sight, but there is still significant work to be done to finish this procurement. There are a number of things we **must** have in order to achieve success.

1. We must have a change in attitude by ESO and the JAO toward this procurement. VertexRSI (VRSI) is the *only* viable, responsive, and responsible proposer within our competitive range. ESO and the JAO must stop (consciously or unconsciously) delaying this selection, and begin to help us get to a contract with VRSI (and on their side Vertex Antennentechnik (VA)). If they do otherwise, they are putting the entire ALMA project at risk.

2. We must adopt as our baseline the offer from VRSI for 32 + 32 antennas under an indexed, capped pricing arrangement with an accelerated delivery schedule (final delivery in 2009). Inherent in this is that the ESO must alter their contract terms and conditions to VA as well, i.e., no liquidated damages/penalties, and no bank guarantees. These conditions were added by ESO to protect themselves against non-performance by the contractor; however, the conditions should be expendable in light of (1) a performance guarantee by General Dynamics (which we are negotiating), (2) management of the entire 32 + 32 project by VRSI rather than VA, and (3) management of VRSI by a joint NRAO/ESO team.

Under this indexed, accelerated delivery scenario, the initial contract price should be less than \$5 million per antenna; however, it is recognized that, owing to the inflation indexing, over time the per unit price likely will climb above \$5 million. VRSI has agreed to cap the indexed increase, which will constrain the out-year unit price to not more than ~\$5.4 million. The total AUI contract will be in the \$150-155 million range (that is, if ESO agrees to the scenario outlined above).

3. In order to receive a timely Best and Final Offer (BAFO) from VRSI, we must agree, both within NRAO and with ESO, on every change to the RFP/CFT documents, including all changes to the specification, statement of work, terms & conditions, etc., no later than Sept 1. These changes must be captured in writing and agreed prior to the BAFO issuance.

4. The ALMA project must affirm that the budget will support the total antenna contract BAFO price. Further, the project must define what is the available front load funding we are able and willing to offer VRSI in the contract.

5. The ALMA project must affirm that it is capable of handling the 2009 delivery schedule.

6. We must have Albert Greve released to interact with VRSI about the BUS deflections and stiffness. It is patently absurd for ESO or the JAO to interfere with this effort. We may not *need* Greve to get this work accomplished (apparently, a work-around is possible with Jeff Mangum and Lee King), but we have to get straight with ESO and the JAO on this. This means we must have Greve as a matter of principle to establish evidence of their willingness to work as a true partner with us.

7. We must know with certainty exactly what NSF will require from us in order to approve this contract with VRSI, e.g., do they require the final contract as part of the approval package. Further, we must know by early September what is NSF's approval schedule.

8. We must have a commitment from the Executives and the JAO that they will carry the contract approval through the ALMA Board in time to award the contract by our goal date.

None of these things will be easy to achieve. We must (1) leave Heathrow next week with an agreement with ESO on how we are proceeding and a firm schedule for the next 6 weeks, and (2) have high level support from all parties, including NSF.

We have asked VRSI for a price guarantee extension until the end of November. Indications are they will not offer an extension unless, as a minimum, we offer them a Letter of Intent to Award. Dick Hames has drafted a Letter. VRSI is considering what an acceptable cancellation cost would be in the event AUI/NRAO does not complete the contract. Their required cancellation cost may make the Letter unacceptable to AUI.

Even if we are able to agree to the extension, I propose we absolutely consider it an insurance policy we do not intend to invoke. We need to press forward hard to sign this contract by mid-October.

This has been, and continues to be a most challenging procurement. I am pleased with the way we have organized the procurement (on the AUI side, at least) and how our teams have worked well together. But we must finish strong.

Also, as a preliminary pitch for how this antenna contract should be administered (this is not related to the procurement goals above), I am convinced the relationship with VRSI will run more smoothly if ALMA will appoint a Contract Administration Team (similar to the concept of technical contract management by the antenna IPT) to provide one point of contact between ALMA and VRSI for the entire 32 + 32 project. Given (1) that ESO has provided the Antenna IPT Lead, and (2) ESO's obvious "allergy" to VRSI, it makes sense that AUI would provide the Contract Administration Lead. I would be willing to perform that role.



EUROPEAN SOUTHERN OBSERVATORY

Organisation Européenne pour des Recherches Astronomiques dans l'Hémisphère Austral
Europäische Organisation für astronomische Forschung in der südlichen Hemisphäre

ESO – EUROPEAN SOUTHERN OBSERVATORY
Karl-Schwarzschild-Straße 2 · D-85748 Garching b. München

20 August 2004

Ref.:8045/LET/CP/RFI-gmv

ALMA European Consortium
c/o ALCATEL SPACE
Attn Mr. Eric Zammit
100, boulevard du Midi
B.P. 99
F-06156 Cannes-la-Bocca Cedex
FRANCE

ESO Call for Tenders for the Design, Manufacture, Transport and Integration on Site in Chile of 32 ALMA Antennas - Your Proposal Ref. 8441411 dated 28.04.2004

Dear Mr. Zammit,

Thank you for your submission in response to our call for tenders for the design, manufacture, transport, and integration on site of 32 ALMA antennas, which we have evaluated carefully in close consultation with our partners AUI.

Now that the summer holiday period is over we would invite you to respond to the following points of clarification. Please consider that clarifications or corrections which you might provide in reply to the present letter will only be accepted if they do not alter the essential contents of your Tender, in the same way that acceptance of a Tender containing reservations, or proposed modifications or amendments, is not to be construed as acceptance of these until such acceptance is stated by ESO in writing.

1. Prices

The prices you quote for either 32 antennas in isolation or for 32 antennas on the assumption that AUI also order 32 antennas are substantially higher than the ALMA budget allocation. In your proposal you suggested three potential areas for cost savings: a two step approach in which Antenna 1 is used to qualify the production process and is then followed by serial production, the use of T700 Carbon Fibre instead of Pitch Carbon Fibre, and schedule optimisation. ESO invites you to quantify these suggestions and to propose any other ways, consistent with the Statement of Work and Technical Specifications, by which your prices could be reduced, and to estimate the corresponding possible savings. You are also invited to suggest any modifications to the Statement of Work and Technical Specifications, including changes to the delivery schedule, which could result in significant price reductions, and to estimate the possible savings.

2. Price Revision Formula

ESO called for a firm, fixed price. You have proposed a 'Price Revision Formula', which we fully understand but which is not compliant with the CFT. We would very much appreciate it if you would calculate the theoretical contract price by applying the price revision formula proposed in your Tender to the baseline 2004 price quoted for the duration of the proposed delivery with the indices of the past years.



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Letter to ALCATEL-AEM Ref. 8045/LET/CP/RFI-gmv

20 August 2004

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3. Contract Conditions

You have proposed a substantial list of modifications to ESO's General Conditions and their application in this CFT. ESO invites you to indicate all changes to the General Conditions and their application in this CFT which have an impact on the prices, and indicate the price reductions which would result from these specific changes or relaxations. We would be interested in how a revised schedule, compared to that in the CFT, might lead to a change in the application of the penalty clauses.

4. Production of 64 Antennas

While we have concentrated on the production of 32 antennas for ESO, it would be of value to have revised prices for 32 – taking into consideration the result of 1, 2 and 3 above - on the assumption that you also produced 32 for AUI, and some indications as to how you would achieve a geographical spread of subcontracts acceptable to AUI, which would imply that about 50% of the work was placed in North America or with US owned companies.

Should antennas be manufactured in two separate locations with different subcontractors we would require assurance that the antennas would be identical with complete interchangeability of subassemblies.

5. Technical and Managerial Issues

We felt that the Project Plan was incomplete in several areas, and would appreciate receiving further clarification on the following:

- a. Why is the envisaged design phase so long, and the first antenna so late compared to the requested schedule?
- b. The plans for transporting major sub-assemblies to a pre-assembly point in Europe or to the OSF in Chile.
- c. The facilities, including buildings and services, which will be required at the OSF, indicating what will be supplied by you and what you expect to be provided by ALMA. If a re-arrangement of tasks between your consortium and ALMA would lead to significant cost savings, you should identify the tasks and estimate the savings. You should describe how you will cope with environmental risks, including wind and dust, and weather risks.
- d. The critical path, the schedule risks, and the proposed approach to mitigating them. You should clearly identify the critical subassemblies and the contractors or subcontractors responsible for them. Where necessary, you should indicate specific recovery plans.



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Letter to ALCATEL-AEM Ref. 8045/LET/CP/RFI-gmv

20 August 2004

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- e. The analysis of the pointing and delay errors under wind loading is a concern. You should describe how your simple tilt meter metrology system will correct for wind induced distortions in the yoke structure and azimuthal bearing. More details should be given of the proposed bearing design.
- f. Details of the Verification Plan and the test to be performed, and an estimate of the effort which will be required from ALMA for the acceptance testing, bearing in mind that the Statement of Work called for the contractor to carry out acceptance testing with assistance from ALMA.
- g. How the proposed management structure will function in practice without a strong centralized project office. How day to day issues, below the level of the Steering Committee, will actually be resolved in a timely fashion.
- h. The compliance matrix against the Technical Specifications was not provided in your response, and the methodology used to ensure compliance is inadequately described. In some cases it would appear that ESO is expected to verify compliance. You should describe in greater detail the verification processes throughout the stages of manufacture, assembly and integration.

6. Antenna Evaluation Group Summary

We have provided you with a copy of the AEG Summary. You should describe in detail how you would address the concerns and specific deficiencies identified in that summary.

We have attempted to confine ourselves to the more important, high level, issues and may wish to return to more detailed topics at a later date. Your answers to the above points, however, will assist us considerably in advancing our evaluation and will give us a clearer understanding of the likely final price from your Consortium.

A reply by Monday, 20 September 2004, will be necessary if we are to complete this process on schedule.

Yours sincerely,

Robert Fischer
Head, Contracts & Procurement

cc: DG, ICO, JCR, SST



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Karl-Schwarzschild-Straße 2 · D-85748 Garching b. München

20 August 2004

Ref.: 8046/LET/CP/RFI-gmv

ALENIA SPAZIO S.p.A.
Attn Mr. Vincenzo Giorgio
Head of Sales and Contracts
Strada Antica di Collegno, 253
I-10146 Torino
ITALY

ESO Call for Tenders for the Design, Manufacture, Transport and Integration on Site in Chile of 32 ALMA Antennas - Your Proposal Ref. SG-PP-AI-1257 dated 28 April 2004

Dear Mr. Giorgio,

Thank you for your submission in response to our call for tenders for the design, manufacture, transport, and integration on site of 32 ALMA antennas, which we have evaluated carefully in close consultation with our partners AUI. Thank you also for your extensive written responses to our queries and for your constructive participation in our face-to-face meetings.

Now that the summer holiday period is over we would invite you to respond to the following points of clarification. Please consider that clarifications or corrections which you might provide in reply to the present letter will only be accepted if they do not alter the essential contents of your Tender, in the same way that acceptance of a Tender containing reservations, or proposed modifications or amendments, is not to be construed as acceptance of these until such acceptance is stated by ESO in writing.

1. Prices

The prices you quote for either 32 antennas in isolation or for 32 antennas on the assumption that AUI also order 32 antennas are substantially higher than the ALMA budget allocation. You agreed to continue to explore possible routes to further savings, and in particular to examine your selection of subcontractors with a view to securing lower prices and a more uniform geographical distribution within Europe. We encourage you to continue this work and to submit revisions to your original proposal. You are also invited to suggest any modifications to the Statement of Work and Technical Specifications, including changes to the delivery schedule, which could result in significant price reductions, and to estimate the possible savings.

2. Contract Conditions

We have discussed implications of ESO's General Conditions and their application in this CFT, in particular with regard to delivery dates and the application of penalty clauses. ESO invites you to indicate all changes which have an impact on your prices, and to indicate the price reductions which would result from specific changes or relaxations. We would be interested in how a revised schedule, compared to that in the CFT, might lead to a change in the application of the penalty clauses.



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Letter ALENIA Ref. 8046/CP/LET/RFI-gmv

*20 August 2004
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3. Production of 64 Antennas

While we have concentrated on the production of 32 antennas for ESO, it would be of value to have revised prices for 32 - taking into consideration the result of 1 and 2 above - on the assumption that ALENIA also produced 32 for AUI, and some indications as to how you would achieve a geographical spread of subcontracts acceptable to AUI, which would imply that about 50% of the work was placed in North America or with US owned companies.

Should antennas be manufactured in two separate locations with different subcontractors we would require assurance that the antennas would be identical with complete interchangeability of subassemblies.

4. Technical and Managerial Issues

We have discussed several technical issues extensively and the few outstanding points are not regarded as critical. You may wish, in connection with the prices you offer, to identify the critical path, the schedule risks, and the proposed approach to mitigating them and hence reducing cost.

5. Antenna Evaluation Group Summary

We have provided you with a copy of the AEG Summary. Although you did not manufacture either of the prototypes, you may wish describe how your design and overall approach would address the concerns and specific deficiencies identified in that summary.

We have attempted to confine ourselves to the more important, high level, issues and may wish to return to more detailed topics at a later date. Your answers to the above points, however, will assist us considerably in advancing our evaluation and will give us a clearer understanding of your likely final price.

A reply by Monday, 20 September 2004 will be necessary if we are to complete this process on schedule.

Yours sincerely,


Robert Fischer
Head, Contracts & Procurement

cc: DG, ICO, JCR, SST



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20 August 2004

VERTEX Antennentechnik GmbH
Attn Dr. Karl-Heinz Stenvers
Attn Mr. Klaus Düspohl
Baumstraße 50
D-47198 Duisburg

Ref.: 8047/LET/CP/RFI-gmv

ESO Call for Tenders for the Design, Manufacture, Transport and Integration on Site in Chile of 32 ALMA Antennas - Your Proposal Ref. VA 21 / 03 060 dated 30 April 2004

Dear Sirs,

Thank you for your submission in response to our call for tenders for the design, manufacture, transport, and integration on site of 32 ALMA antennas, which we have evaluated carefully in close consultation with our partners AUI.

Now that the summer holiday period is over we would invite you to respond to the following points of clarification. Please consider that clarifications or corrections which you might provide in reply to the present letter will only be accepted if they do not alter the essential contents of your Tender, in the same way that acceptance of a Tender containing reservations, or proposed modifications or amendments, is not to be construed as acceptance of these until such acceptance is stated by ESO in writing.

1. Prices

The prices you quote for either 32 antennas in isolation or for 32 antennas on the assumption that AUI also order 32 antennas are substantially higher than the ALMA budget allocation. ESO invites you to quantify suggestions for reducing costs and to suggest alternative approaches, consistent with the Statement of Work and Technical Specifications, by which your prices could be reduced, and to estimate the corresponding possible savings. You are also invited to suggest any modifications to the Statement of Work and Technical Specifications, including changes to the delivery schedule, which could result in significant price reductions, and to estimate the possible savings.

2. Contract Conditions

ESO invites you to indicate any elements of the General Conditions and their application in this CFT which have most impact on the prices, and indicate the price reductions which would result from specific changes or relaxations. We would be interested in how a revised schedule, compared to that in the CFT, might lead to a change in the application of the penalty clauses.



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Letter VERTEX Antennentechnik Ref. 8047/CP/LET/RFL-gmv

*20 August 2004
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3. Production of 64 Antennas

While we have concentrated on the production of 32 antennas for ESO, it would be of value to have revised prices for 32 - taking into consideration the result of 1 and 2 above - on the assumption that 32 were also produced for AUI, and some indications as to how you would achieve a geographical spread of subcontracts acceptable to AUI, which would imply that about 50% of the work was placed in North America or with US owned companies.

Should antennas be manufactured in two separate locations with different subcontractors we would require assurance that the antennas would be identical with complete interchangeability of subassemblies.

4. Geographical Distribution of Work

The geographical distribution by countries of origin of the supply of your Baseline Tender for the supply of 32 Antennas to ESO reflects only incompletely the requirements of ESO specified under Article 7 - Subcontractors - of the Special Conditions governing this Call for Tenders.

With reference to Article 7.4 of the same Special Conditions, could you please provide a description of the effort made to satisfy these requirements and the justification why finally they could not be met. You may also wish to suggest how you could eventually achieve a more uniform geographical distribution.

5. Technical and Managerial Issues

We felt that your proposal as submitted was incomplete in several areas. We would appreciate receiving further clarification on the following:

- a. The manufacturing plans and processes, and the mechanisms for management co-ordination of two separate contracts for 32 antennas each, including the commitment and availability of senior staff.
- b. The plans for transporting major sub-assemblies to a pre-assembly point in Europe, USA, or to the OSF in Chile.
- c. The facilities, including buildings and services, which will be required at the OSF, indicating what will be supplied by you and what you expect to be provided by ALMA. If a re-arrangement of tasks between you and ALMA would lead to significant cost savings, you should identify the tasks and estimate the savings. You should provide an on-site assembly plan, and describe how you will cope with environmental risks, including wind and dust, and weather risks. You should also indicate the staff to be supplied from VERTEX Antennentechnik to the OSF and their availability throughout assembly and verification.



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Letter VERTEX Antennentechnik Ref. 8047/CP/LET/RFI-gmv

*20 August 2004
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- d. The critical path, the schedule risks, and the proposed approach to mitigating them. You should clearly identify the critical subassemblies and the contractors or subcontractors responsible for them. Where necessary, you should indicate specific recovery plans.
- e. Details of the Verification Plan and the test to be performed, and an estimate of the effort which will be required from ALMA for the acceptance testing, bearing in mind that the Statement of Work called for the contractor to carry out acceptance testing with assistance from ALMA.
- f. The compliance matrix against the Technical Specifications, and the methodology used to ensure compliance is inadequately described. In some cases it would appear that ESO is expected to verify compliance. You should describe in greater detail the verification processes throughout the stages of manufacture, assembly and integration.
- g. The technical issues already raised with you concerning the Finite Element Model, structural rigidity, performance in winds, and operation in fast switching mode.
- h. The long term maintainability, reliability, and safety of the antennas is a significant factor in the whole life cost. Could you please indicate the measures you have taken to address these concerns and indicate anticipated serviceability levels and likely annual costs.

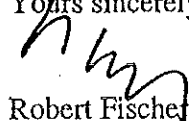
6. Antenna Evaluation Group Summary

We have provided you with a copy of the AEG Summary. You should describe in detail how you would address the concerns and specific deficiencies identified in that summary.

We have attempted to confine ourselves to the more important, high level, issues and may wish to return to more detailed topics at a later date. Your answers to the above points, however, will assist us considerably in advancing our evaluation and will give us a clearer understanding of the likely final price from your consortium.

A reply by Monday, 20 September 2004, will be necessary if we are to complete this process on schedule.

Yours sincerely,



Robert Fischer
Head, Contracts & Procurement

cc: DG, ICO, JCR, SST

ANTENNA PROCUREMENT CRITICAL DATES TO PLACING ESO CONTRACT

Date	Event	ESO, AUI, Board etc
24.08 Tue	AUI-ESO Meeting at Heathrow – agreement on next steps	AUI/ESO
30.08 Mon	AUI receive BAFO from VertexRSI	AUI
30? .08	AUI receive endorsement and guarantee from General Dynamics	AUI
10 7.09 Wed	Submit request for approval of contract to NSF	AUI, NSF
20.09 Wed	Receive responses from Alenia, AEM, VertexA	ESO
21? .09 Tue	CAC makes recommendation on Revised Proposal or revised Call for Tenders	ESO
22.09 Wed	AUI-ESO-JAO telecom or meeting	AUI, ESO
23.09 Thu	European ALMA Board followed by ALMA Board telecons	ESO, Board
1.10 Fri	ESO receives Revised Proposal or revised Call for Tenders, CAC reviews and requests technical evaluation <i>(JET 2)</i>	ESO
6.10 → 1.10 Fri at latest	AUI receives approval to place contract from NSF and prepares written submission to Board	AUI, NSF
11.10 Mon	<u>AMAC in Florence</u>	
12.10 Tue	<u>AMAC continued</u>	
13.10 Wed	CAC receives technical evaluation and decides on recommendation ESO starts to prepare papers for FC, EAB, Board	ESO
13.10 Tue	AUI-ESO-JAO telecom or meeting	AUI, ESO
14.10 Thu	Possible Board telecom to consider input from AUI and oral input from ESO	Board
15.10 Fri	Earliest date for AUI to sign contract	AUI
19.10 Tue	EAB	ESO
19.10 Tue	Deadline for papers to ALMA Board	AUI, ESO, JAO
29.10 Fri	Latest date (?) for AUI to sign contract	AUI

△ synchronise w/ Finance Committee

1.11 Mon	Deadline for papers to ESO Finance Committee	
1.11 Mon	AUI-ESO-JAO Meeting in Santiago	AUI, ESO, JAO
2.11 Tue	Closed and Restricted session of ALMA Board	Board
3.11 Wed	Open and Closed sessions of Board	Board
15.11 Mon	ESO Finance Committee	ESO
16.11 Tue		
17.11 Wed	AUI-ESO-JAO telecom or meeting	AUI, ESO
18.11 Thu	Extraordinary ALMA Board telecom	Board
19.11 Fri	Earliest date for ESO to sign contract	AUI, ESO
2.12 Thu	Board telecon.	Board

Subject: NSF Approval of ALMA Antennas Subaward
From: "Patrick W. Donahoe" <donahoe@ui.edu>
Date: Tue, 14 Sep 2004 19:44:11 -0400
To: "Robert Dickman" <rdickman@nsf.gov>
CC: "Ethan J. Schreier" <ejs@ui.edu>, "Timothy P. Kashmer" <tkashmer@nsf.gov>, "Patricia S. Williams" <pswillia@nsf.gov>, "Fred Lo" <flo@nrao.edu>

Bob,

Attached is AUI's request for NSF's approval of the subaward for the North American complement of the ALMA Project antennas. Our request is based on the recently recieved "best and final offer" which AUI is free to accept "as is", or which is subject to futher negotiation by AUI.

Riccardo's letter provides a comprehensive overview of a VERY complex process. We fully expect there will be many questions and stand ready to assist NSF in its review of our request.

Best Regards,

Patrick W. Donahoe
Vice President
Associated Universities, Inc.
1400 16th Street NW Suite 730
Washington, DC 20036

Phone: 202-462-1676 Fax 202-232-7161
donahoe@ui.edu



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Fax: 202.232.7161

Dr. Robert L. Dickman
National Science Foundation
4201 Wilson Boulevard
Arlington, VA 22230

September 14, 2004

Dear Dr. Dickman,

Pursuant to Clause 6 of the Cooperative Agreement between the National Science Foundation (NSF) and Associated Universities Inc. (AUI) for the management and operation of the National Radio Astronomy Observatory, AUI hereby requests NSF's approval to issue a subaward to VertexRSI for the acquisition of up to 32 twelve-meter antennas for the Atacama Large Millimeter Array (ALMA Project).

1.0 Project Background

The Atacama Large Millimeter Array (ALMA) is an international astronomy facility. ALMA is an equal partnership between Europe and North America, in cooperation with the Republic of Chile, and is funded by the U.S. National Science Foundation (NSF), the National Research Council of Canada (NRC), the European Southern Observatory (ESO), and the Ministries of Science and Technology and of Public Works of Spain. ALMA construction and operations are led on behalf of Europe by ESO, and on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI).

In the late 1990's the ALMA Project grew out of two separate, but complementary, radio astronomy projects: the North American Millimeter Array (MMA) Project and European Large Southern Array (LSA) Project. Shortly before its merger into the ALMA Project, the MMA concept consisted of 40 eight-meter radio telescope antennas. Two consequences of the MMA/LSA merger affecting the antenna procurement were an increased number of antennas of a larger diameter and more demanding technical specifications.

2.0 Prototype Antenna Procurement

Because of the demanding nature of the technical specifications required to meet ALMA science goals, AUI/NRAO and ESO, the North American and European ALMA Executives, respectively, jointly decided to procure separate prototype antennas. The

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technical specifications and statements of work for both procurements were essentially identical and in early 2000 AUI/NRAO issued a contract to VertexRSI, while ESO issued a contract to a consortium led originally by EIE but later by Alcatel. Delivery of the prototypes was scheduled to occur on October 20, 2001 for Vertex and 6 months later for the Alcatel consortium. Both VertexRSI and Alcatel were significantly late in delivering their antennas to the ALMA Test Facility (ATF) located at the VLA site in New Mexico. The VertexRSI prototype was provisionally accepted (i.e. with a “punch list”) on March 20, 2003 with final acceptance on October 1, 2003. Provisional acceptance of the Alcatel antenna occurred on December 12, 2003 with work still continuing on punch list items.

One of the features of each prototype contract was for the contractor to deliver, at the time when complete design documentation was delivered, a “pro forma” cost estimate for the antennas in a production environment. In Vertex’s case, this cost estimate was delivered in October 2001. Another feature of the AUI/NRAO contract was the possibility to proceed straight to production based on a sole-source negotiated procurement. A further feature of the prototype contracts was that each Executive owned the design and all related documentation from the prototypes and reserved the right to have the antenna produced by another vendor.

To determine whether the antennas met technical specifications, a joint (AUI/NRAO and ESO) Antenna Evaluation Group (AEG) was established to test both antennas using commonly agreed upon methodologies.

Due to the significant delivery delays of both antennas, and the resulting delays in the AEG testing, as well as the desire to obtain the best available price, AUI/NRAO and ESO jointly determined to forego their options to solicit “straight-to-production” bids, in favor of separate competitive procurements.

3.0 Production Antenna Procurement

In February 2003, the ALMA Board approved a resolution stating that AUI/NRAO and ESO should “procure the production antennas to a single design which has been prototyped and evaluated.” Additionally, in May 2003, the ALMA Board endorsed the ALMA Executives’ plan to seek competitive bids, to technically evaluate them jointly and to place the resulting contracts in accordance with their respective procedures and processes. To this end, during the summer and fall of 2003, the Executives developed a single set of production antenna Technical Specifications and a single Statement of Work that would be utilized in the separate AUI/NRAO and ESO procurements.

3.1 Similarities and Differences in Procurement Approaches

While it had been long agreed that identical Technical Specifications and Statements of Work, as well as joint technical review processes, would be common to both procurement processes, the Executives did have certain important differences in the approach to the procurement. Among these differences were (1) the restrictions on bidders, (2) the

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manner in which results of the antenna evaluation were factored into the technical evaluation, (3) interactions with the vendors during the proposal evaluation process, and (4) the differing business terms and conditions.

In its procurement solicitation, AUI/NRAO required bidders to demonstrate that they had made a significant contribution to either of the prototype antennas. In AUI/NRAO's opinion, this was the best way to meet the intent of the ALMA Board resolution to have a production antenna design which had been prototyped and evaluated. The solicitation notice indicated that this restriction did not necessarily preclude companies other than VertexRSI and Alcatel from participating because subcontracting and forming consortia remained possibilities. The emphasis on prototyping was deemed to be important, not only because of the challenging technical specifications, but also because of AUI/NRAO's belief in the importance of the linkage between the experiences gained in prototype design engineering and in production engineering and manufacturing methods. ESO chose to attempt to mitigate the engineering and manufacturing risks by providing bidders drawings and design documents for both the VertexRSI and Alcatel prototype designs.

ESO followed its procurement regulations that generally exclude bidders from non-ESO-member nations. AUI/NRAO's procurement had no restrictions on the geographical location of its bidders.

While both AUI/NRAO and ESO agreed to form a Joint Technical Evaluation Team (JTET) to assure that all proposals were reviewed on a common basis, ESO's procurement process required that the JTET first evaluate all proposals and produce a report for ESO without incorporating the Antenna Evaluation Group's prototype testing results, while AUI/NRAO's procurement process included prototype experience as a factor in proposal evaluation. After delivery of this initial JTET report for ESO purposes, the AEG report was provided to a core team of the JTET that produced a report addendum incorporating the prototype testing results for use by AUI/NRAO.

Face-to-face visits with bidders are an essential part of AUI/NRAO's bid evaluation process, but the planned face-to-face visits by the JTET with bidders had to be cancelled because of ESO's procurement procedures. To remedy this situation, AUI/NRAO's Contract Selection Committee (CSC) later conducted site visits to VertexRSI.

Finally, while AUI/NRAO's and ESO's business terms and conditions have many common elements, there are also significant differences. A principal example of such differences is that ESO requires bank guarantees and penalty provisions as incentives for performance. Because bank guarantees and penalties are either not available or are impractical in our contracting environment, AUI/NRAO has attempted to keep some degree of symmetry with ESO by including a "liquidated damages" contractual provision in the business terms and conditions. However, as a result of negotiations with VertexRSI, this provision was dropped because of the excessive costs and difficulty in proving damages.

3.2 Preliminary Inquiry and Pre-Request for Proposal (RFP) Vendor Meetings

On September 25, 2003, AUI/NRAO distributed a Preliminary Inquiry to nine vendors that either had indicated an interest in the ALMA antenna project, or were firms of mutual interest to AUI/NRAO and ESO. The inquiry requested a formal expression of their interest in the project not later than October 29, 2003, to which eight vendors responded positively. Vendor Information Meetings were held at both ESO (Garching, Germany) and AUI/NRAO (Socorro/VLA) to provide project information to interested firms prior to the release of the RFP. The Garching meeting was held 16 October 2003; the VLA meeting was held 21 October 2003.

3.3 Request for Proposal Issuance

On December 17, 2003, each Executive issued a solicitation of bid for 32 antennas. Each solicitation also asked for a separate bid for 32 antennas on the condition that an additional contract for 32 additional antennas is awarded to the same proposer.

As part of its solicitation, AUI/NRAO required bidders to submit a non-binding "intent to submit bid" notice no later than January 7, 2004. AUI/NRAO received notifications from VertexRSI, Alcatel and MAN. In mid-January 2004, joint AUI/ESO informational meetings were held in Chile to familiarize potential bidders with the ALMA Operations Site Facility where the antennas would be assembled before being accepted by the ALMA project.

3.4 Proposal Evaluation Process

In preparation for the proposal evaluation process, AUI/NRAO developed an ALMA Antenna Procurement Plan. In addition to documenting the solicitation process, the Plan generally outlined the process to be followed by the Joint Technical Evaluation Team, the AUI/NRAO Business Evaluation Committee and the AUI/NRAO Contract Selection Committee. Finally, the Plan generally outlines the mutually-agreed upon deadlines for AUI/NRAO and ESO to make their final procurement decisions.

3.4.1 Joint Technical Evaluation Team

On April 30, 2004 AUI/NRAO received 2 proposals; one from VertexRSI and one from the ALMA European Consortium (AEC) comprised of Alcatel, EIE and MAN. ESO received three bids, one from AEC, one from Vertex Antennentechnik, a German-based sister corporation to VertexRSI, and one from Alenia Spazio, a company that did not participate in the prototype program. Immediately upon receipt, the pricing information was escrowed and the management and technical portions of the proposals were conveyed to the JTET. From early May to mid-June, the JTET met multiple times in person at US and European locations and met multiple times by phone. On June 15,

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2004, the JTET issued its basic report that did not include the results of the prototype testing and sent it to ESO and AUI/NRAO. On June 17, 2004, the JTET issued an addendum that included the AEG test results and sent it to AUI/NRAO. (Note: ESO did receive the JTET addendum, but did not incorporate its data into their subsequent evaluative processes.) Both the original JTET report and the addendum noted deficiencies with all proposals submitted, both to AUI/NRAO and to ESO. The JTET report, including its addendum, rated Vertex/RSI approximately the same as the AEC consortium.

3.4.2 Business Evaluation Committee

One of the features of AUI/NRAO's procurement process was to closely examine the business and management aspects of a proposal, without access to any pricing information. While the JTET did examine certain aspects of the bidders' management plan, AUI/NRAO additionally formed a Business Evaluation Committee (BEC) to evaluate the AUI/NRAO bidders' management structure, checked business references, analyzed financial stability, and verified responsiveness to business terms and conditions of the RFP. Also, the BEC made some initial inquiries regarding the announcement that General Dynamics would acquire Vertex and its sister companies, and the announcement that Alcatel was in merger talks with Alenia Spazio of Italy. In mid-June, the BEC issued its report to the AUI/NRAO Contract Selection Committee. The BEC rated the business and management aspects of the VertexRSI proposal significantly better than the comparable aspects of the AEC proposal.

3.4.3 Contract Selection Committee

The AUI/NRAO Contract Selection Committee (CSC) was established on March 16, 2004 and was charged with receiving and reviewing the JTET and BEC reports, recommending to the AUI President and NRAO Director the antenna proposer with whom the contract should be pursued, and negotiating the final terms of the contract. After a series of organizational teleconferences, the CSC conducted its first face-to-face meeting from June 23-28 in Charlottesville, Virginia. At this meeting the CSC also opened the price proposals.

After reviewing all aspects of the proposals, CSC members produced independently assigned scorings according to the following criteria:

- Capacity of the industrial setup to reliably produce 32 or 64 antennas over the duration of the project
- Technical performance of the proposed antenna design
- Related experience and past performance of the proposer
- Price Proposal (including business terms and conditions)

As a result of the scorings, the CSC determined that VertexRSI was generally compliant with the RFP requirements although it contained some deficiencies identified by the

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CSC, the JTET and the BEC. The CSC determined that the AEC proposal contained numerous exceptions to the business terms and conditions required by the RFP, failed to provide the required firm fixed price and was not compliant with many of the RFP's Technical Specifications and Statement of Work. The CSC further determined that negotiations with AEC would not likely result in an acceptable proposal. Finally, the CSC judgment was that negotiations with VertexRSI should be pursued to determine whether deficiencies identified by the JTET, BEC and CSC could be remedied in a manner that would result in a proposal that would be acceptable to AUI/NRAO. After briefing the NRAO Director and the AUI Executive Vice President (also President-designate), on June 30, 2004, the CSC initiated negotiations with VertexRSI by the issuance of a series of questions covering technical, management and price issues. The CSC also conducted face-to-face discussion/negotiation meetings with VertexRSI on two occasions resulting in additional questions to be addressed by VertexRSI.

3.4.4 Best and Final Offer

As a result of its discussions and written responses to the questions, in late August the CSC determined that there was sufficient basis to issue a letter requesting that VertexRSI submit to AUI/NRAO its "Best and Final Offer" (BAFO). In addition to requesting that their BAFO response be consistent with the terms of the RFP, VertexRSI was requested to provide cost information regarding options that could offer potential cost savings associated with certain changes to the Statement of Work, Technical Specifications, and business terms and conditions. These potential optional changes were coordinated in advance with ESO and the Joint ALMA Office. The most prominent option was the potential change in the number of antennas that might be procured, necessitated by the significantly higher bid costs than had been anticipated by ESO and AUI. The BAFO letter also stated that AUI/NRAO could accept VertexRSI's BAFO proposal with or without further negotiation.

On September 8, 2004 VertexRSI submitted its BAFO response that was then evaluated by the CSC. Based upon the additional information provided by VertexRSI and assuming the successful resolution of a few unresolved technical items, the CSC determined that VertexRSI had sufficiently addressed the previously-identified deficiencies and that their proposal was now substantially compliant with the RFP's requirements. After scoring the VertexRSI proposal as amended by its BAFO, the CSC decided to recommend to the NRAO Director and AUI President that the antenna procurement be awarded to VertexRSI with terms generally described in the "Contract Summary" (Attachment A).

3.5 Pricing

The following chart summarizes the beginning and ending price history of the proposals received by AUI/NRAO

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Bidder	April 30, 2004 Price		Current Base Price		Comments
	If AUI/NRAO only buys 32	If both AUI/NRAO and ESO buy 32 each	If AUI/NRAO only buys 25	If both AUI/NRAO and ESO each buy 25 with options for up to 32 antennas	
AEC Consortium	\$256.M	\$244.4M	Not Applicable		Not Applicable
VertexRSI	\$209.M	\$185.0M	\$152.8M Floor Price \$172.5M Cap Price	\$136.9M Floor Price \$160.0M Cap Price	*Floor prices include guaranteed price for AUI's first 12 antennas and indexed price for antennas 13-25. See "Contract Summary" Attachment A for details.

Pricing is based on a "cost optimized" delivery schedule with the last antenna delivered in 2010 instead of 2011 as cited in the current version of the ALMA Project Plan. AUI/NRAO believes the additional cost associated with a 2011 end date is at least \$8.8M.

3.6 Funding

AUI/NRAO's ALMA budget will support the acquisition of 25 antennas at VRSI's floor price without using contingency but assuming that the funds for the electronic components for the antennas not built are utilized for the antenna procurement. The acquisition of the full complement of 32 antennas would depend upon the identification of additional funding. A funding profile is contained in Attachment B.

4.0 AUI/NRAO and ESO Procurement Coordination

The original procurement schedule was developed by AUI/NRAO, ESO and the JAO in November 2003 and was most recently re-affirmed by the Executives to the ALMA Board at its June 2004 meeting. The procurement schedule identified July 22 as the date

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at which both AUI/NRAO and ESO would have concluded their respective contractor selections, and initiated each Executive's respective contract approval processes, which would culminate in ALMA Board concurrence. This July 22 milestone was not met.

During July and August 2004 AUI/NRAO and ESO kept each other informed of the status of their respective negotiations. This coordination consisted of almost daily telephone calls between members of the CSC and the ESO Contract Award Committee (CAC), exchange of written materials received from the proposers with whom each Executive was negotiating, and three face-to-face meetings: two in Europe and one in the US.

While AUI/NRAO seeks approval authority from NSF, ESO is still negotiating with its three bidders. ESO's current expectation is that authority to enter into a contract will be granted by the ESO Council Finance Committee on November 15, 2004, which is after the October 31, 2004 expiration date of the proposals received by AUI/NRAO and ESO. Because the prices of certain materials (principally nickel steel and carbon fiber) used in all proposals have risen substantially since the proposals were submitted to AUI/NRAO and ESO, any post-October 31 re-pricing by VertexRSI will reflect the price increases passed on to them by their material suppliers.

In seeking NSF's approval to issue a subaward to VertexRSI prior to an ESO down-select decision, AUI/NRAO recognizes that the original plan to issue contracts simultaneously will not be achieved. However, given the impending price increases for materials, AUI/NRAO believes that proceeding forward is in the interests of the Government and the overall ALMA Project. VertexRSI's best pricing for the acquisition of 32 antennas for AUI/NRAO is predicated on execution of a similar contract by ESO not later than December 15, 2004. (*Note: Vertex's current pricing to ESO also expires on October 31 so an ESO contract executed after that date would be at a higher price reflecting the increased cost of material.*) Based on extensive Executive-to-Executive discussion, it is believed that AUI/NRAO and ESO convergence on a single antenna contractor is highly likely, although not a certainty. In recognition of this lack of certainty, the proposed VertexRSI contract will be structured to have the AUI/NRAO pricing, which is predicated upon ESO issuing a contract to VertexRSI's German sister corporation (Vertex Antennentechnik), revert to a higher pricing that does not reflect the sharing of non-recurring costs if ESO does not issue such a contract. Alternatively, at the direction of NSF, the subaward could be terminated by AUI/NRAO under the "Termination for Convenience" contract clause.

5.0 Other Information

5.1 Joint Antenna Technical Working Group

During the ALMA Executives procurement coordinating meetings, AUI/NRAO and ESO agreed to form an antenna Technical Working Group (TWG) to review a small number of

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outstanding technical questions identified by AUI/NRAO's CSC and ESO's CAC in their evaluation of the designs submitted by the proposers with whom each Executive is negotiating. For example the TWG is reviewing the estimated life-cycle costs of proposed designs. The TWG is also reviewing an apparent discrepancy between VertexRSI's prototype testing measurements and their finite element model. The TWG report is due on September 17, but AUI recommends that the approval process continue in parallel with the technical review and that the contract not be executed until this clarification has been addressed to AUI/NRAO's satisfaction.

5.2 General Dynamics Acquisition of VertexRSI

In June 2004, VertexRSI's parent company, TriPoint Global Communications Company announced it was being acquired by General Dynamics Corporation. The merger has recently been approved by the U.S. Department of Justice, and the formal acquisition is scheduled to take place in mid-September 2004. As part of its due diligence, the AUI/NRAO Business Evaluation Committee was reassured by TriPoint Global that the acquisition would preserve their subsidiary companies, including VertexRSI and its Vertex Antennentechnik, as independent operating units. Additionally, AUI is scheduled to meet with General Dynamics management to discuss its reasons for acquiring TriPoint Global, its short and long term business plans for VertexRSI and management continuity plans. It is AUI's opinion that as a General Dynamic company, VertexRSI will have access to substantially more corporate resources that will enhance its ability to successfully produce the ALMA antennas. As an additional measure of risk mitigation, AUI has requested that General Dynamics provide a performance guarantee for VertexRSI.

6.0 Conclusion

It is AUI's opinion that approval of this subaward to VertexRSI is in the best interests of the ALMA Project. Upon approval from NSF, AUI/NRAO will proceed to conclude final negotiations with VertexRSI. If the final terms and conditions of the subaward differ substantially from the description contained in the "Contract Summary", AUI will notify NSF.

NSF's approval is requested in time to permit the contract to be executed no later than October 31, 2004.

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Please do not hesitate to request any additional information necessary for NSF review and approval.

Best Regards,

A handwritten signature in black ink, appearing to read "Riccardo Giacconi", with a long horizontal flourish extending to the right.

Prof. Riccardo Giacconi
President
Associated Universities Inc.

cc.: F. Lo
E. J. Schreier
T. Kashmer DCCA/NSF
P. Williams DCCA/NSF

Attachment A: Contract Summary
Attachment B: Funding Profile
Attachment C: Draft Antenna Contract

Contract Summary

		Comment
Term	10/31/04 to 12/31/10	Current ALMA Project Plan predicated on 32 nd antenna delivery in 2011.
Contract Type	Floor price with index pricing subject to firm fixed price cap. Build to performance specification.	One half of antennas will be delivered within floor price. Remaining half of antennas subject to indexed pricing not to exceed price cap.
Number of Antennas	25 with options for up to 32.	Options for >25 antennas must be exercised within 4 months of contract execution.
Contract Value for 25+25 antennas	\$136.9M floor price with \$160.0M price cap. <i>Note: For quantities between 25 and 32, the "per antenna" floor pricing price is ~\$4.0M. The per antenna cap price is ~\$6.9M</i>	If ESO fails to execute contract with Vertex Antennentechnik by 12/15/04, AUI floor price becomes \$152.8M with \$172.5M price cap.
Index formula	Blended rate of Consumer Price Index (CPI), Producer Price Index (PPI), Metals Index and Fuels Index.	
Termination for Convenience	Contract may be terminated at the convenience of AUI or the U.S. Government.	
Phased Funding	Authorization to proceed with antenna quantities is exercised in phases as funding from NSF becomes available.	
Options to Changes in Statement of Work and Technical Specifications	Exercising options could yield an ALMA Project savings of approximately ~\$1.0M.	Exercise of Technical Specification and Statement of Work options subject to coordination with ESO and JAO.

Funding Profile September 2004

Budget Calculations:

- The budget for production antennas was set at \$91.06M in year 2000 dollars without contingency
- Annual inflation escalators provided by the NSF are:

Year	Cumulative Inflation Escalator
FY2001	1.04700
FY2002	1.08570
FY2003	1.12370
FY2004	1.16190
FY2005	1.20260
FY2006	1.24590
FY2007	1.29080
FY2008	1.33590
FY2009	1.38400
FY2010	1.43250
FY2011	1.48260

- The lowest pricing option of the BAFO provides a price for 25 antennas for a total floor price of \$136.9M. The table below shows the estimated annual commitment as well as the value of these commitments when deflated into Y2000 Dollars.

Year	Commitment Amount	Value in \$Y2000
2005	30,000,000	24,945,950
2006	28,000,000	22,473,714
2007	28,000,000	21,691,974
2008	27,000,000	20,211,094
2009	12,000,000	8,670,520
2010	11,862,032	8,280,651
Total	136,862,032	106,273,903

Attachment B

The price for 25 antennas is thus \$15.2M Y2000 above the antenna budget. However, the reduction to a total of 50 antennas will generate savings from the reduced quantity of ALMA hardware installed on the antennas. The approximate value of this hardware (and the effort to install it) is approximately \$2.2M Y2000 per antenna, split approximately equally between North America and Europe. The savings in North America for fourteen antennas is thus approximately \$15.4M Y2000. Applying \$15.2M of these savings to the antenna IPT covers the antenna floor cost and returns 0.2M Y2000 to contingency.

**AGREEMENT BETWEEN
ASSOCIATED UNIVERSITIES, INC.
AND
VERTEX RSI**

This Agreement is effective this xxth day of October 2004, by and between Associated Universities, Inc. (AUI), a New York Corporation, and VertexRSI, a TriPoint Global company engaged in the design, manufacture, and assembly of antennas, with a principal place of business at 2600 North Longview Street, Kilgore, Texas, 75662.

WHEREAS, AUI has entered into a Cooperative Agreement with the United States of America (hereinafter called the "Government"), represented by the National Science Foundation (hereinafter called the "NSF" or "Foundation"), designated as Cooperative Agreement NSF AST-0223851, providing for the support of the National Radio Astronomy Observatory (hereinafter called "NRAO" or "Observatory"), and

WHEREAS, the Contractor is willing to perform and capable of performing the work required by AUI and AUI wishes the Contractor, in furtherance of the Cooperative Agreement, to perform that portion of the work hereinafter more fully described,

NOW THEREFORE, in and for the consideration of the foregoing and of the mutual promises hereinafter set forth, the parties agree as follows:

ARTICLE 1 – SCOPE OF WORK

The Contractor shall furnish all of the labor, services, materials, supplies and equipment to perform the work described in Annex A in accordance with Annexes A, B, C, D, E, F, G, H, I, and J, described below, all of which are incorporated herein by reference and made part hereof for all purposes as if fully set out herein.

Annex A – Statement of Work for the Design, Manufacturing, Transport and Integration of the ALMA Antennas (ALMA-34.00.00.00.007-A-SOW, Version A).

Annex B – Technical Specification for the Design, Manufacturing, Transport and Integration on Site of the ALMA Antennas (ALMA-34.00.00.00.006-A-SPE, Version A).

Annex C – Special Terms and Conditions

Annex D – General Terms and Conditions

Annex E – Release of Claims Form

Annex F – Antenna Delivery Schedule

Annex G – Phases and Authorization Amounts

Annex H – Price Indexing Methodology

Annex I – Technical Revisions Options

Annex J – Price Options for the Purchase of an Increased Quantity

ARTICLE 2 – COMPENSATION

Contractor's compensation for the performance by the Contractor of the Scope of Work set out in Annex A in strict compliance with the terms and conditions of this Agreement shall be the total firm fixed price of One Hundred Thirty-Six Million Eight Hundred Sixty-Two Thousand Thirty-Two Dollars and Zero Cents (\$136,862,032.00), subject to any limitations, modifications and Options exercised under the terms and conditions of this Agreement. Payment to the Contractor of this amount shall constitute full and complete compensation to the Contractor for the full and proper performance of the Contractor's undertaking hereunder.

The stated firm fixed price is subject to the successful execution of a similar contract for an identical number of antennas between Vertex Antennentechnik GmbH (VA) and The European Southern Observatory (ESO) on or before December 15, 2004. In the event VA and ESO are unable to execute a contract by said date, the firm fixed price for this Agreement shall rise to One Hundred Fifty-Two Million Seven Hundred Seventy-Four Thousand Sixty-Two Dollars and Zero Cents (\$152,774,062), subject to any limitations, modifications and Options exercised under the terms and conditions of this Agreement.

Request for final payment including all and any sums due and owing to the Contractor shall be accompanied by a Release of Claims in the form set forth in Annex D, executed on behalf of the Contractor by an officer of the Corporation or an authorized representative.

ARTICLE 3 – QUANTITY AND SCHEDULE

The Contractor shall supply Twenty-Five (25) ALMA antennas in accordance with the Technical Specifications and Statement of Work.

The antennas shall be delivered on the schedule set forth in Annex F to this Agreement.

The Statement of Work, Annex A to this Agreement, is hereby modified accordingly.

ARTICLE 4 – CONTRACT PHASES

The Agreement shall be performed in seven (7) phases. This Agreement, upon execution by both Parties, constitutes authorization to proceed with Phase 1 of the Agreement. Authorization to proceed for each additional phase shall be in the form of a written

Change Order to this Agreement. Work performed on any phase or cost incurred without written authorization to proceed from AUI shall be solely at the Contractor's risk.

The seven phases of this Agreement and the amounts authorized for expenditure under each Phase are designated in Annex G to this Agreement.

ARTICLE 5 – PRICE INDEXING AND PRICE CAP

The fixed price for this Agreement shall be indexed as defined and described in Annex H to this Agreement.

The fixed price ceiling for this Agreement, regardless of the effect of price indexing calculations or any other factor, shall be capped at One Hundred Sixty Million Dollars and Zero Cents (\$160,000,000.00), subject to any limitations, modifications and Options exercised under the terms and conditions of this Agreement.

In the event VA and ESO are unable to execute a contract by December 15, 2004 (see Article 2 above), the firm fixed price ceiling for this Agreement shall be capped at One Hundred Seventy-Two Million Five Hundred Dollars and Zero Cents (\$172,500,000.00), subject to any limitations, modifications and Options exercised under the terms and conditions of this Agreement.

ARTICLE 6 – OPTIONS

Options for revisions to the Technical Specifications or Statement of Work and the associated price changes are displayed in Annex I to this Agreement. Desired options must be exercised by no later than December 31, 2004.

Options for the purchase of fewer than thirty-two antennas and the associated prices are displayed in Annex J to this Agreement. Desired options must be exercised by no later than 120 calendar days after the effective date of this Agreement.

ARTICLE 7 – TERMINATION

Work performed on any phase of this Contract or cost incurred without written authorization to proceed shall be at the Contractor's risk. AUI is not obligated to make payment to the Contractor in excess of the authorized payment.

In the event any Contract Phases are terminated, the Contractor shall promptly deliver to AUI the completed work accomplished. The Contractor shall be eligible only for costs allowed under the Termination for Convenience provisions and shall be limited to the funds authorized for any phase.

ARTICLE 8 – ORDER OF PRECEDENCE

In the event of a discrepancy among any of the contract terms, conditions, clauses, provisions, written direction and instructions, and documents (collectively, the 'Agreement'), the following order of precedence shall govern resolution: (1) modifications to the Agreement made in writing and executed by the Parties; (2) the executed Agreement form; (3) the Special Terms and Conditions (Annex C); (4) the Statement of Work (AD-2) (SOW) (Annex A); (5) the Technical Specification (AD-1) (Annex B); (6) the General Terms and Conditions (Annex D); and (7) other documents identified as being part of the Agreement.

ARTICLE 9 – NOTICE

All notices required or permitted under this Agreement shall be in writing and shall be deemed effective upon receipt if served in person, or by courier service providing receipt of delivery, or by facsimile with written acknowledgement of receipt, or by electronic mail with written acknowledgement of receipt, or by certified mail, return receipt requested, addressed as follows:

TO AUI:

William H. Porter, PE
ALMA Business Manager
National Radio Astronomy Observatory
520 Edgemont Road
Charlottesville, VA 22903

Fax No.: (434) 296-0255
Email: bporter@nrao.edu

TO CONTRACTOR:

Brian D. Schrader, PE
ALMA Project Director
2600 North Longview Street
Kilgore, Texas 75662

Fax No.: (903) 984-1826
Email: brian.schrader@tripointglobal.com

A copy of all notices shall be simultaneously sent to the Project Manager of the Party receiving notice.

FOR VERTEX RSI:

Signature: _____
Printed: _____
Title: _____

Witness: _____
Printed: _____

Witness: _____
Printed: _____

FOR ASSOCIATED UNIVERSITIES, INC.:

Signature: _____
Printed: Fred K. Y. Lo
Title: NRAO Director

Witness: _____
Printed: Patrick W. Donahoe

Witness: _____
Printed: William H. Porter