

ANATAC TELECONFERENCE

17:00-18:00 UTC, Friday, 16 April
(10 in Tucson, 11 in Soc, 13:00 in CV/GB)

ANATAC Agenda, Friday 16 April:

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| 1. ANATAC membership: | Darrel Emerson |
| 2. ANATAC ALMA Budget Investigations: | |
| i. Current Status: | Larry D'Addario |
| ii. Proposal for completion of budget investigation: | Marc Rafal |
| 3. Other ANATAC investigations & issues: | All |
| 4. Detailed action list | |
| 5. Next meeting? | |

Present: Barry Clark, Larry D'Addario, Darrel Emerson, John Payne, Dick Sramek, Dick Thompson. Marc Rafal attended for the latter part of the meeting.

1. ANATAC membership: with Lee King's retirement, we are now short of mechanical engineering expertise. Darrel will organize a replacement, first contacting Lee. (This was also discussed at the OTC meeting earlier today.)

2. ALMA Budget review.

Prior to the meeting, Fred Lo had given the following instructions to Darrel, to pass on to ANATAC:

From Fred Lo:

"The most urgent matter is to have a current budget review of the NA ALMA project, since in some sense we still do not have a budget estimate that is current and reliable. Also importantly, it is important to review the NA ALMA R+D and construction activities from a pro-active point of view, providing (suggesting) corrective or recovery plans whenever there are issues of technical, budgetary or schedule difficulties."

(a) Existing ANATAC budget review progress.

Larry: status of ongoing ANATAC budget review of ALMA technical activities. We limited our efforts mainly to FE, LO and computing. BE, antennas and site either look ok anyway, or were not worth our time investigating because of things outside our control. Between us we've carried out interviews with leaders of the LO, FE and computing groups. Some questions raised requiring following up, which hasn't yet happened. No report written yet. However, results are now stale. Larry says what's needed is real auditing, but we're not qualified to do that.

Barry Clark: we can't do anything constructive just looking at WBS sheets. All of us are to some degree at sea with WBS.

However, we can work from lists of milestones to see if milestones are realistic. May be more useful.

Darrel read out Marc's document, "Programmatic Audit."

Larry comments that Marc's costing is for production. Larry says we're not yet ready for construction yet, as we're still in the development stage..

Dick S.: everything is being reworked now, so what we investigated last year needs to be done again in any case. Dick says the good news is that (from Marc Rafal's memo) it will be a new group doing it. There should be strong interaction of the new group with ANATAC. The timing is not right. New paperwork won't be ready in time. It seems to be being written and reviewed at the same time. Maybe it would be better to start in July and do the job quickly.

We agreed that ANATAC should present its summary of results so far to the new group. We'll then have a meeting with the new group. Larry agreed to spend a couple of hours putting our results together, with a single cover sheet of explanation. Larry was told to be sure not to spend more than 2 hours on the task.

(b) **Marc** joins the ANATAC meeting near the end of our gathering.

Marc says: We're getting an inkling from foundation that there will be an **external review in less than 1 year**. Likely an **NRAO review from NSF** within 2-3 months. We need to prepare for that, and this **Programmatic Audit** is a step towards that.

Darrel will circulate Marc's "**Programmatic Audit**" note to the ANATAC. [*Attached at the end of these notes. DTE.*]

3. OTHER ISSUES:

Dick T. suggests we may want to look at the LO issue. Is the problem solved?

John P. Our earlier meeting recommended looking at alternate methods for doing the round trip correction. The gross problems are now understood: Optical circulators have bigger dispersion than was suspected. We haven't yet reached final goals. We do have block diagram for round trip, replacing circulators with other components. Alternative scheme would be single-laser approach. John thinks it would be good to circulate block diagram to committee, and have Bill report to the committee on this. Last residual problem is to demonstrate (says John) that there's no fringe jumping in the face of mechanical & acoustic disturbances. Larry says not all the engineering has yet been done, where there remains some risk and uncertainty. Dick T.: the probability of it not working is now quite low. Dick T. says it would look bad if ANATAC had ignored this issue.

Larry: there are other things. Biggest problem is the digitizers, says Larry. Supposed to have 4 dual-channel delivered, but only 2 delivered, and they have serious

problems.

For the lasers, we had alternative scheme. BUT for digitizers, we are COMPLETELY dependent on Bordeaux group and have no alternatives.

Larry: also, cold multipliers are not performing as expected. Quintupler not meeting specs.

Dick Thompson made the excellent point that ANATAC needs to look more generally at ALMA technical issues: if some fundamental problem were later found that ALMA had missed, it would be highly embarrassing! It is also consistent with Fred's charge (see above) that ANATAC be proactive in this way.

4. ACTION LIST

John Payne will arrange a teleconference with Bill Shillue for next week. Bill will present the LO and round trip phase correction scheme. Block diagrams will be circulated beforehand, so that the ANATAC committee can make critical comments. ANATAC agreed that not more than 1 hour should be spent by Bill preparing for this.

John Payne and Larry D'Addario agreed jointly, to put together a list of possible technical problem areas within ALMA. They agreed to do this on a timescale of about one week. Suggestions are invited from other ANATAC members.

Larry will put together a summary of the ANATAC ALMA budget investigations so far, with a 1-page explanation sheet. (To spend <2 hours on this task.) This would be distributed to ANATAC, before being passed on to the new Programmatic Audit group. A joint teleconference will eventually be arranged with that group.

Darrel will distribute Marc's material, write the minutes of this meeting, and organize some mechanical expertise for the group.

5. Future meetings.

We will aim to have about one telecon per month, with email discussions in between.

DTE, 2004-04-16.

NRAO/ALMA Programmatic Audit

(Notes prepared by Marc Rafal for discussion within ANATAC, 2004-04-16)

In response to concerns about schedule and cost for ALMA, the AMAC has recommended an external review of programmatic for the construction phase. While the AMAC envisions a project wide review in approximately a years time (coincident with the completion of the PMCS implementation), the NSF may well choose to review the North American project independently and sooner.

A detailed plan for the implementation of the PMCS system is now complete. The ALMA Board, at its March meeting, approved the plan and funding for its implementation. Implementation of the system will occur over the remainder of this calendar year. The PMCS system will provide a comprehensive set of tools for documenting and analyzing a detailed schedule and cost baseline, collect detailed status information from the IPTs and generate reports for use by the IPTs, management and project oversight.

PMCS is an important set of tools but can only document the planning reported to it. In preparation for populating the PMCS cost and schedule databases, and to prepare for upcoming external reviews, it is necessary to conduct an internal audit of the state of planning and cost estimates within each of the IPTs. This audit is complementary to the more technical review conducted by the ANATAC.

The NRAO/ALMA Programmatic Audit will focus on the following issues:

- Plans leading to production readiness
- Production plans
 - Make/buy decisions
 - Outsourcing utilization
 - Staffing plans
 - Schedule assumptions
- Estimated Cost to Completion
 - Basis of estimates
 - Identification of cost uncertainties
- Identification of Risk areas
 - Schedule
 - Performance
 - Cost
 - Dependencies (from other project elements)

A Programmatic Audit Panel will work with each group responsible for development and production of ALMA hardware to review current planning and recommend additional planning steps. The panel will work with the IPTs to optimize production planning and insure a consistent level of detailed planning across all IPTs and groups. Based on any revised planning, updated cost estimates will be developed.

Following completion of the audit, the panel will write a report to the NRAO Director on the current state of planning and provide a best estimate of the schedule and cost *at completion* for the NRAO deliverable to ALMA.

The Programmatic Audit Panel will consist of (tentative):

Darrel Emerson (Chair)
Marc Rafal
Bill Porter
Jeff Zivick
Richard Simon

Additional support staff may be utilized to carry out specific investigations for the panel.

The panel will complete its work on or before July 1 2004.

Note: The schedule for this activity is in conflict with the evaluation of the antenna proposals. More detailed planning among the whole panel will be required to fully scope the effort and schedule its completion.