

REPORT TO THE ASAC

30th June 2008

INTRODUCTION

This is extracted from other reports and that covered the period from the beginning of May to the first week of June and has been updated where relevant.

Key events during this period were the provisional acceptance of the OSF technical facility building, the successful acceptance review of the AOS facility and the design review of the first antenna (MELCO #1). Other significant results and actions were:

- The first delivered Front End (engineering model) passed onsite acceptance tests and subsequently the Front End and Back End electronics have been set up together in a mock receiver cabin in the AIV lab and, for the first time, signal continuity was established for an ALMA production Front End, Back End and (2-station) correlator.
- Following the May Management IPT meeting, a JAO "diagnostic" panel was formed, with two external members, to review the status of all three FE integration centers in order to assess what needs to be done to get each center as soon as possible on line and to recommend to the ALMA Director the necessary changes. The first center reviewed, in early June was the North American center. The EU center was reviewed on 19/20 June. Results were presented at the June Board meeting.
- The outcome of an independent investigation of the fatal car accident was presented in a report, and more safety measures are being put in place. A meeting with the contractors at the site has been held to inform them.
- The HR department is progressing well in its hiring plan for the JAO construction and operations positions, and in preparing the annual personnel performance evaluation. There is agreement on an approach of how to optimally employ Construction, CSV and Operations staff in a matrix style and details of this are being worked out.
- More activities were deployed to improve the connection with the local Atacama communities and to comply with the legal requirements for environmental protection.

Concerns are in the area of:

- Schedule. There is a continuous slippage in the delivery or completion dates of key ALMA milestones. There has been an average delay of 16 months over the period of 28 months since Jan 2006. Details were presented at the Board meeting with a discussion of a plan on how to proceed.
- Generator Power. We have constant power interruptions at the AOS and ALMA Camp facilities, resulting in lost work and delays to the AIV Group and some frozen water lines at the AOS. This is causing grave concerns for safety of equipment and personnel.

PROJECT MANAGEMENT

The Management IPT

The discussion and decision making function of the Management IPT has been reactivated by face-to-face meetings and regular teleconferences. In addition to the four JAO Construction Key Personnel (Director, Project Manager, Project Engineer, and Project Scientist), the three Regional Project Managers and their Deputies, the Head of Science Operations (L.-A. Nyman) and the Head of Technical Services (R. Prestage) were invited to join the meetings. A meeting was held on May 7 – 9 at NRAO, Charlottesville, to discuss matters of the Photonic LO, Front End Integration, maintenance of the construction schedule, and safety and security at the site, among others. Bi-weekly teleconferences were held on May 1 and May 22 to follow up the action items and discuss newly arising issues.

The Photonic LO

Although the development is ongoing and making some progress, a significant technical risk remains in the Central Local Oscillator (Laser Synthesizer, LS) and the system to measure and correct the change of the fiber lengths from the Central LO to the Receiver Front End on individual antenna (Line Length Corrector, LLC) with the current Photonic scheme. On the other hand, the alternative LS and LLC that have been developed by ALMA-J appear to be superior in the basic performance and their operability, but their full engineering to bring them into the ALMA system requires additional time and effort and cannot be ready for the start of the AOS interferometry next year.

To resolve this technical risk and schedule difficulties, the Management team has chosen the following course of action:

1. Keep the current technical baseline to deliver the Central LO Assembly 1 on schedule (September 2008).
2. Ask B. Shillue and H. Kiuchi to make a memo on feasible technical options with merits and demerits for the future installation of the LS+LLC system (after Central LO Assy 1).
3. The Management team will acknowledge the memo and make a road map for the ALMA LO system with time and budget allocation, noting that the option for ordering two more LSs to TeraXion expires on July 20th.

Front End Integration Issue

The project has achieved an important milestone when the first Front End Subsystem (engineering version) passed acceptance tests on site at AOS. However, the Front End Integration is experiencing a big and still continuing schedule slip. The Management team visited the North American Front End Integration Center (NA-FEIC) to meet with the people and see its status, and found that the FEIC is not in a commissioned state yet. The technical requirement and the manpower/time requirement for defining and establishing FE system integration have been underestimated, and the FEIC appears to be struggling. This is a big danger for the project, because the NA-FEIC is the forerunner to establish the procedures and the tools needed for the FE system integration and verification, which are then applied to the FEICs in Europe and East Asia. To further investigate the source of the problem and seek advice for possible solutions, the Management team called a team of experts, Front End Integration Diagnosis Team, to look into the problem (see below). The Management team had further meetings with the FE Diagnosis team and visited FEICs in East Asia (June 16-17 in Taiwan) and in Europe (June 18-20 in Oxford) to further explore issues that need to be solved.

Front End Integration Diagnosis Team

Members: W. Wild (SRON, chair), R. Blundell (SMA), N. Whyborn, T. Hasegawa

Charge:

- a) Diagnose the technical readiness of the FEICs and help it to be fully commissioned.
- b) Advise on the management structure of the three FEICs in their commissioning and the subsequent FE integration activity.

The team visited the NA-FEIC (June 2-3), EU-FEIC (June 19-20) and EA-FEIC (TBD), and will return the diagnosis to the management in a brief report.

Maintenance of Construction Schedule

There is a constant slip in the construction schedule. So far, the counteractions against delays have been taken by the JAO Project Manager communicating with the IPT leads. The Management team sees that a part of the problem may be that the schedule is owned by the IPT leads and not by the Regional Project Managers. The bi-weekly regular revision of the Integrated Project Schedule (IPS) in the PMCS keeps the IPS up to date, but this makes it

difficult to realize the schedule variances in a longer time span. To address these problems, the Management team has decided to implement the following actions/changes:

1. Improve the credibility of delivery milestones -- The Regional Project Managers discuss with their contractors/in-house teams to get true (neither political nor contractual) schedule making use of the actual experience accumulated so far.
2. The schedule of major deliverables (e.g., antennas) is owned by the Regional Project Managers -- They take counteractions (with contingent resources if needed) for recovery.
3. Reference IPS -- We will have the reference IPS to be updated twice a year. The bi-weekly schedule revisions are expressed as variances from the reference IPS. The Management team has a goal to have the first reference IPS in November.
4. The procedure for the schedule changes or detecting issues --- TBD by the Management team.

PROJECT ENGINEERING

1) Highlights of Recent Events

Prototype System Integration at ATF

A constraint on the ATF extension you saw at last month's report (the availability of the central Local Oscillator for work at AIV in Chile) has been removed, and the ATF has been unconditionally extended to 01 September.

Chilean Activity

The first Front End has passed on-site acceptance tests!

The Front End and Back End electronics have been set up together in a mock receiver cabin in the AIV lab and, for the first time, signal continuity established for an ALMA production Front End, Back End and (2-station) correlator. This is both very exciting and a significant achievement by Chile-based staff. Please see the report from G. Duvall included below.

A first few antenna transport brackets were accepted in Chile on 13 June. These brackets are urgently needed to ready both the Vertex and ACA 12-m antennas for their first transport. Many more brackets are at the OSF but are not ready for acceptance.

A meeting to reach acceptance of the first antenna transporters took place around 20 June. Conditional acceptance was granted although there are some discrepancies relating to the capacity of the cooling circuit (not a problem during winter) and with starting at altitude, which will require further work by the company. A waiver has been agreed on the maximum speed when unloaded, which is a little slower than expected. There is a tentative plan to transport the #2 Vertex antenna out of the hanger in July and to commission the transporter fully carrying an ACA 12-m antenna in August.

A meeting on the design verification results of the first ACA antenna took place in June. In most ways the antenna performs very well. ALMA-J has identified a significant problem with the unexpected sensitivity of the surface shape to radiant solar energy, giving a surface error that is outside spec under some combinations of sunlight and other observing conditions. More data on some aspects of the pointing performance is also needed to complete the acceptance.

The ACA 12-m antenna schedule has therefore been restructured in the following way:

ACA#1 (the antenna that has the best characterized surface, and facing the holography transmitter) will remain in the SEF and continue to be studied by ALMA-J and MELCO, primarily to understand and correct the surface problem. The acceptance of the ACA #1 antenna might occur in October.

ACA#2 will complete acceptance testing toward an acceptance meeting by early August. That acceptance would be conditional upon completion of design verification in ACA#1. This would

allow AIV to proceed with integration work on an antenna on the shortest time scale consistent with having very high confidence in almost all areas of antenna design.

ACA#4 would be prepared for transport and testing at the AOS in August, so that risk of latent flaws can be greatly reduced before the warranty period expires. The aim would be to characterize performance in the environmental parameter space not yet tested: lower air pressure and cold temperatures. After testing, the antenna would be returned to the SEF for completion by ALMA-J and MELCO, and ultimately acceptance in late '08.

The Vertex #1 antenna repairs are scheduled to be completed in June, allowing pointing and surface tests to take place during July onwards.

AIV staff have been given clearance to start to occupy the OSF-TF offices, thereby relieving overcrowding in the interim lab. They are working toward establishing initial use of the OSF-TF lab facilities for AIV by the end of August.

AIV staffing numbers at this time:

- o 32 staff at work full time
- o 3 hired (SW) and starting July
- o 11 offers have been made to Technicians
- o 6 Engineers are anticipated in near future (CVs in hand, short listing now)
- o 3 more ads have been publicized (Science, Admin, Doc/Web Specialist)

Project Activity outside Chile

The acceptance testing of the first suite of software for AIV use took place in late May with quite heartening results! While not quite as functional yet as expected, the software is a great improvement and displayed a much more solid robustness than earlier releases. We are looking forward to this upgrade arriving in Chile in the middle of '08.

The Laser Synthesizer and Master Laser CDR took place on 16-18 June. The test readiness review for the first (prototype) Calibration Devices is scheduled to take place at that same time. The ACA 7-m antenna PPDR is being prepared for early September.

2) Concerns

FE schedule for delivery of #2 as a fully qualified article continues to slip. It seems likely we will face a decision in the latter half of '08 on whether or not to ship it earlier with incomplete qualification. Among many factors, the decision will need to consider the consequences on FEIPT if the design qualification work is further delayed by shipping it prematurely, and the consequences on AIV and Commissioning if the FE is shipped later than the delivery of a second antenna.

The late delivery of the second holography system will almost certainly cause scheduling conflicts in July and August, as all of ACA#1, ACA#2 and Vertex #1 vie for the use of the first receiver.

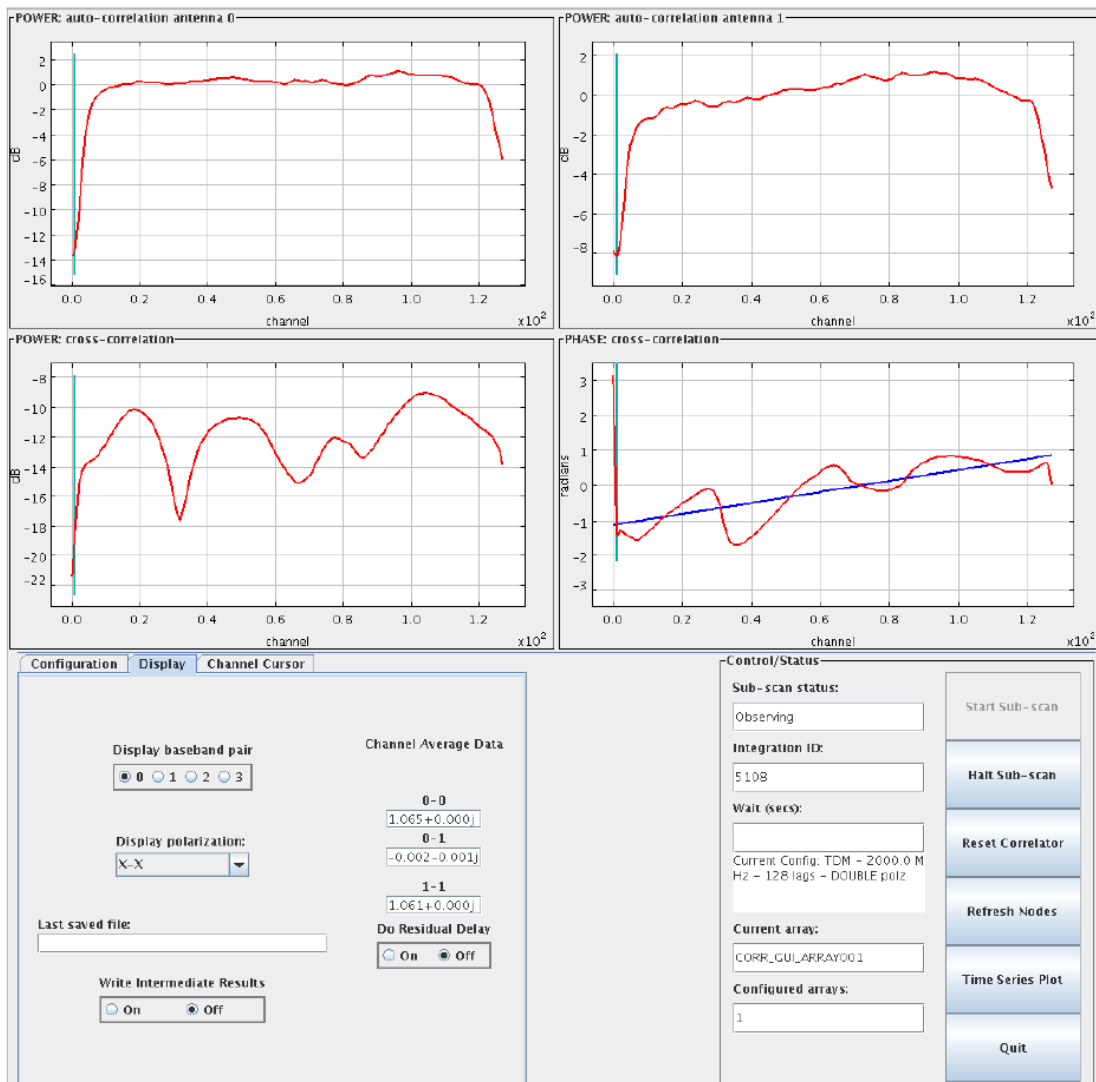
Gene Duvall reporting on AIV lab results, May 23rd

The integration of Backend, Computing, Correlator and Frontend near production equipment was accomplished on Friday at 6:32pm. The engineering release Frontend delivered last week and the near production release Backend Analog, Digital and Test racks and 2-Antenna Correlator delivered last month and parts of software were connected together and configured to deliver a Band 3 receiver signal through to CorrGUI software interface. This is the first time a production Frontend was connected to production Backend and the first time a production FE was connected to a production type Correlator via BE.

The AIV Computing team setup an STE in the AIV lab to be available 24/6. This was released Thursday and contributed significantly to the integration success.

Configuration notes:

- 1) The FE LabView GUI was used to configure the Band 3 cartridge. There is no 1stLO at ALMA OSF so the Band 3 WCA was not locked on a reference but instead left in a stable mode as suggest by FEIC team. The LNA, SIS and Power amplifiers were turned on for the integration test and off to confirm signal path connectivity.
- 2) PSI software was used to configure the Backend equipment.
- 3) Correlator engineer routines were used to adjust delays to remove a phase slope introduced by small differenced in cable lengths and a possible TE problem in the Correlator/DRX interface.
- 4) CorrGUI was used to configure the Correlator and retrieve real time correlations.





AIV team in front of the Front End

SCIENCE IPT

Building up the Commissioning Team

There has been only modest progress here. That is to say we are still eagerly awaiting the arrival of the first two Commissioning Scientists on ~1st August and a further one on ~1st Jan. The NAOJ have appointed Dr. Tsuyoshi Sawada as an ALMA Commissioning Scientist and we look forward to his arrival in Chile, probably in October this year. The second NA appointment remains stalled while the issues relating to status of international staff in Chile are resolved. We are hoping to have confirmation of an additional NA post-doc to join us from 1st Sept.

ATF Testing

The software implementation and testing continues to gather momentum. Most of the capabilities needed for early tests of system in Chile are now in place and the software is now generally very robust, which is a big relief. Some of the ancillary equipment on the antennas continues to be unreliable, but it still seems realistic to keep the ATF running until at least 1st Sept, and that is now the plan. The pros and cons of extending beyond that will need to be reviewed in July.

Technical

We continue to provide support to a wide range of technical activities such as the antenna and receiver acceptance activities, meteorological instrumentation and CASA testing. Investigations

of the imaging performance of the configurations and of polarization issues continue. Recently a good deal of effort has been taken up by an investigation of the beam scanning measurements made at the NA Front-End Integration Center, which show a number of anomalies.

Out-reach

This has been a busy period with many Science IPT members giving ALMA-related talks at conferences and workshops. We also support the EPO efforts by, for example, meeting with groups of journalists visiting the site.

SCIENCE OPERATIONS

Hiring

Candidates for the DSO system and operations astronomer positions were interviewed. Job offers are in the process of being made to two system astronomer candidates and four operations astronomer candidates.

Science Operations IPT

The SciOps IPT held a f2f meeting in Santiago on May 15-16. Issues discussed:

- Setup of helpdesk
- Setup of ALMA Science web pages
- Operations software tools and composition of the new extended SSR group
- Acceptance of software
- Tests of software tools
- Timelines for delivery of operations software from CIPT
- Hiring of staff for DSO and the ARCs

Reports and presentations on EPO, AIV and CSV were given.

eSSR (extended Science Software Requirements group)

CIPT has decided to replace the old SSR group which provided science requirements to CIPT with the extended SSR, which will consist of two subgroups: operations software led by Lars-Ake Nyman and commissioning software (including control) led by Alison Peck. The members of the group will include staff from operations and CSV, subsystem scientists and staff from CIPT. The eSSR will provide requirements and input on test reports to CIPT, as well as input to the annual software CDRs.

ALMA meetings and presentations

The Head of DSO gave presentations on ALMA data processing and the status of ALMA construction at the AccessNova meeting on high-speed networks in Chile, held in Pucón.

ADMINISTRATION

Operations Overview

Reliable power continues to consume the majority of the ADM Facilities Group time. We have had continual power interruptions at the AOS and ALMA Camp facilities, resulting in lost work and delays to the AIV Group. An adequate temporary solution to power resulting from the delay in a permanent power solution has not been developed timely. This is causing grave concerns for continued construction and operations efforts. ADM is taking the lead in working towards a

reliable and efficient temporary solution to this crisis. We are seeking options to purchase power, generate additional power or a combination of both. An extraordinary ESO Finance Committee meeting must be scheduled to approve funding for the temporary solution. The transfer of assets from Construction to Operations continues to experience delays. ALMA Operations will be working with Systems Engineering and Quality Assurance to prepare a formal transfer process. The AOS and OSF technical buildings are scheduled to be transferred soon.

The CMMS (the system being purchased to keep track of the status of equipment and parts) and kick-off meeting was held in late June. The ADM General Services Manager will represent ADM for our participation in warehouse and asset management requirements.

The quarterly Heads of Administration Meeting was held in May with several issues on the agenda for discussion and resolution. The main issues included the HR recovery fee, insurance, Tri-Lateral Agreement, and reconciliations.

The One ALMA campaign (a scheme to make the ALMA organization operate as much as possible as a single entity despite its underlying tripartite structure) is ongoing with areas identified and procedures under development. We plan to implement some of the procedures in June as well as continue to develop the program.

Staffing

This month ADM Operations hired five additional Facilities Administrative Assistants to control services and perform other administrative duties at the site. ADM is fully staffed as per the ALMA Operations Plan, with the exception of the Budget Controller position on hold until next year.

There are several contract staff indicated in the Ops Plan that we want to change to Local Staff Members. These positions include maintenance personnel, civil works (operators) and reception. Justification for this change is due to changes in the Chilean laws for contract employees. Another reason is for efficiency gained working with regular staff. Finally, the safety and security gained by training mechanics and operators to work in and around our technical equipment and facilities.

Contracts

The contracts process for ALMA Operations is well advanced with several contracts carrying over from Construction. This month we began a new contract with Direct TV to improve service at the site.

TECHNICAL SERVICES

Richard Prestage started work in Chile on 3rd June.

Hiring

Offers have been made for the first Antenna Group Supervisor and Maintenance Group Supervisor.

Recruitment is underway for additional System Administrators; these positions are critical to support the rapid expansion of the networking and IT infrastructure at the OSF and AOS.

Revised job descriptions have been agreed for the first Antenna Group Manager and Electronics Group Manager positions, which will be recruited as international hires. This recruitment process will commence immediately.

Maintenance Planning

The first CMMS (Computerized Maintenance Management System and Inventory Control System) workshop was held at Siveco Headquarters in France in the week of 23rd June. This was attended in person by ESO and key JAO staff, with additional attendance by video.

Department of Technical Services will set up a working group with representatives from the IPTs and Executives to start the process of refining the overall ALMA maintenance plans.

EDUCATION AND PUBLIC OUTREACH

Global ALMA Website

Edition of the content of the future ALMA website and meetings with the tender, in order to follow-up the programming phase of the renovation of the ALMA website. The new website should be online at the end of June.

SciOpsIPT Meeting

The JAO EPO Department made a general presentation of the ALMA EPO WG and ALMA EPO activities during the SciOpsIPT meeting, with a focus on the renovation of the website for general public, the ALMA EPO Strategic Plan, and the Global ALMA Newsletter for Science community. When the new ALMA website for general public and the newsletter are implemented, a more systematic interaction between the ALMA EPO WG and the Head of Science Operations and ARC Managers should be established.

Delivery of local Newspaper “El Mercurio de Calama”: Sunday 25 May

The JAO EPO Department handled the edition of a general and very positive article about ALMA in the local newspaper “El Mercurio de Calama”, Sunday 25 May. Under coordination with the JAO EPO Department, a massive delivery was held in the locality of San Pedro de Atacama and Toconao and the newspaper was delivered to more than 1,000 local readers.

Community Relations

- Meeting in Museo Gustavo Le Paige, San Pedro de Atacama

The ALMA Director, Project Manager, Executive Officer and EPO Department coordinated a meeting with the Director of the archeological museum in San Pedro de Atacama and the archaeologist Flora Vilches, specialist in ethno-astronomy. The museum will elaborate a proposal for the implementation of a collaborative program between ALMA and the museum in the field of ethno-astronomy, with a special emphasis on involving local people in research and gathering of knowledge.

- Meeting with Toconao community

The JAO PR Officer and Executive Officer met with the president of the indigenous community of Toconao and an architect from the municipality of San Pedro in order to address some issues of concern including: visual impact of the guard-house and the Vertex building and access to the ALMA site.

Participants also discussed long-term cooperation between ALMA and the community of Toconao in the development of astronomical tourism and the strengthening of science and English education.

In the future, regular meetings between ALMA and the community of Toconao will be scheduled, in order to encourage collaboration and work out the details of the implementation of the initiatives mentioned above.

- Meeting with Social Workers

In order to “professionalize” the relationship between ALMA and local communities, the JAO EPO Department and Executive Officer organized a call for tender with social workers specializing in community relations in the II Region. Initially, the idea was to commission diagnostic research using an ethnographic approach to gauge community perceptions, expectations and needs in ALMA’s area of influence. After reviewing different proposals from organizations specialized in corporate social responsibility and community relations, we decided to proceed as follows:

The JAO EPO Department and the Executive Officer will oversee the work of two sociologists specialized in education during the months of June and July. These consultants will assess the current status of science and English education in Toconao and propose a program for improvement. The decision to begin with a very concrete program was motivated by the realization that palpable results are the best way to show ALMA's commitment to local communities and address the skepticism that many things have been promised, but few delivered.

In the medium-term, requests to get information from Chilean authorities regarding the allocation of ALMA funds to the II Region will be renewed. Once we get reports of past project results, these will be analyzed to craft a more strategic and efficient use of funds. Consultants might be hired to train local people in grant writing since this has been identified as an obstacle to access funds in a timely fashion.

Media visit on site:

- French National Radio France Inter: 5 May