

the Site and the corrective actions. Furthermore, monitoring points are being defined to oversee the quality of power supplied to different elements of the Observatory.

Concerning acceptances, a tracking tool to oversee progress and completion of acceptance activities is being prepared together with PA.

Discussions held with CSV scientists on the use of available data from recent observations for System Verification test reports. The data will be analyzed, reduced and included in the relevant test reports. Additional observations will be potentially required from the CSV team to accomplish the full extent of System Verification needs. Progress in this area is advancing slowly due to the progress on CSV and the limited resources.

Concerning staffing, Maurizio Miccolis has joined the JAO System Engineering team reinforcing the areas of Software, Data Management, EMC and Electronics. After a long international search for the NA SE IPT Lead position, one NRAO internal candidate and senior engineer of the ALMA BE Photonics LO group, Wes Grammer, has been appointed and will start in late November.

In the reporting period, apart from the group participation in the AAER 2010, the following acceptance and technical reviews have been conducted:

- Antenna Station N604 ACRV - Accepted
- Front End SN19 TRR - Authorized to begin tests
- Front End SN12 PAI - Authorized for shipment
- Front End SN05 PAI - Not authorized for shipment
- Amplitude Calibration Device SN14 and SN15 PAI - Authorized for shipment
- Central Local Oscillator Article 1 Phase 2 PAS - Conditionally accepted
- Fiber Optic Wrap SN 116, 122, 136, 137, 138, 142, 143, 154 PAS – Accepted
- DV10 Antenna ACRV - Conditionally accepted

8. PRODUCT ASSURANCE

8.1 PA Quality Inspections

Inspections of workmanship are routinely performed on all major subassemblies both before delivery from the manufacturer and after receipt at the OSF. During October, the following inspections were performed:

- Workmanship Inspections for one FE, three FOW, six FESS and seven ACD units.
- In-process Inspections for the AOS and OSF power and fiber trenches, and one Antenna Station.

8.2 Acceptance Events

Acceptance Events are organized and tracked by PA and include test readiness reviews, shipping approval meetings and final acceptance meetings. The following are among the events that took place in the last month:

- ACRV Meeting held for Vertex Antenna DV10.
- Conditional use agreement completed for ACA Antenna PM01.
- TRR completed for FE SN-019
- PAI Meetings held for FE SN-012, FE SN-005 and two ACD units.
- PAS Meeting held for CLOA1 and eight FOW units.

- Piloting streamlined acceptance processes for Back End Antenna Articles (PAI) and Fiber Optics Wraps (PAI and PAS).
- Working to close out the Vertex Maintenance ACRV event after completion of action items raised at the original event. This will allow the eventual full acceptance of the ten Vertex Antennas currently delivered under conditional use agreements.

8.3 Audits

Process audits are implemented to evaluate the conformance of manufacturing area or production group to the standards applicable to their area. The following took place in October:

- Audit in progress for the Band 3 CCA.
- Process Audit Report released for the EU FEIC.
- Process Audit Plans in development for the OSF and AOS activities.

8.4 General PA Activities

- New Quality Engineer with electrical engineering background started in Chile.
- Another offer is pending and PA is working with HR to setup three interviews for new candidates in Chile in an effort to meet the budgeted staff level of seven engineers for the JAO PA.
- Piloting streamlined acceptance processes in two areas.
- Four MRB meetings held.

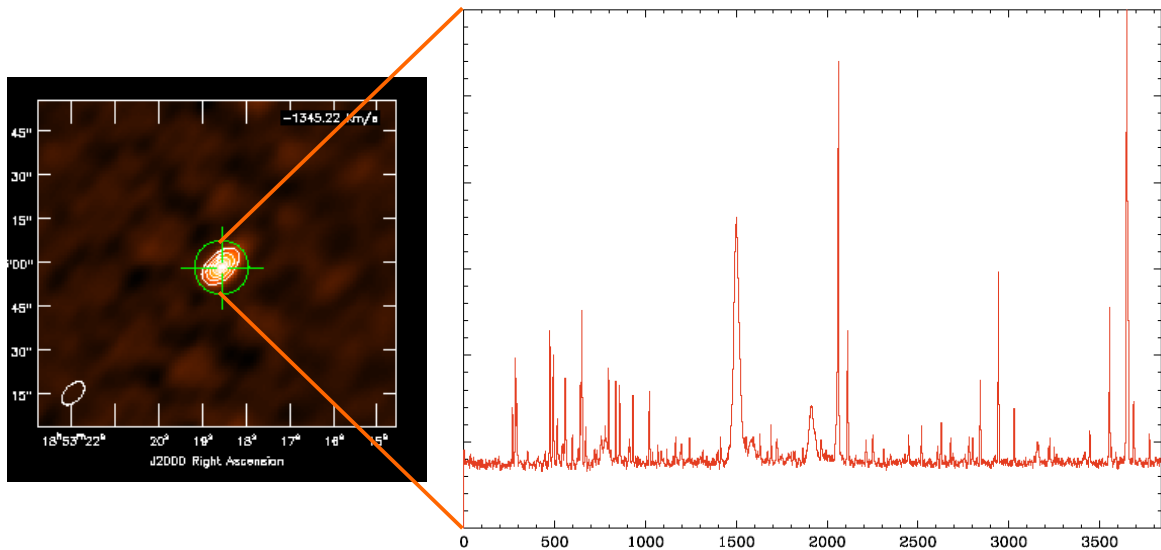
PA is working with AIV to make adjustments to the defect tracking tool (JIRA) to modify the data entry fields in an effort to improve the ability to extract useful metrics.

9. SCIENCE IPT

Commission and Science Verification

Although a great deal of effort went into preparing and attending the reviews during October, there was good progress on both technical issues and on the initial stages of Science Verification. The antenna availability improved markedly with the average fraction unserviceable falling to below 10% for the first time. The number of faults also declined significantly from the high rate in August although it is still true that on average several hours are lost each night due to software faults or hardware failures. The communication problem with the Vertex antenna control computers was finally solved by installing a new software “driver”. Several other repeating problems are still occurring and are being worked on intensively. The most frequent of these appears to be associated with the distribution of timing signals.

As an example of data coming out of the system, and a reminder of the key role that ALMA will play as a spectroscopic instrument, here is the “hot core” G34.26+0.15 with the image on the left (currently it is essentially unresolved with the present short baselines) and a nearly 2 GHz wide segment of the spectrum, showing the rich chemistry in this object, on the right.



(credit: Tony Remijan)

Technical problems worked on included astigmatism, which seems to be present at different levels in all the antennas and is apparently arising in the optics, receiver-dependent pointing offsets, the antenna tracking performance, the drifts in the zero points of the inclinometers on the Vertex antennas, phase stability, amplitude calibration and many more. On the software side, the Observing Tool has continued to receive a lot of attention. We were pleased that a problem has been resolved that was preventing us from taking data in the “full-Stokes” mode, where we obtain all the polarization information in the signals. This has enabled us to get back to investigating the instrumental polarization and addressing the complications caused by the different orientations of the two types of Band 7 cartridge (pre-production and production). The correlator software still prevents us from making high spectral-resolution observations (i.e. from using the frequency domain modes) with more than about 6 antennas. We are very much looking forward to the arrival of R 8.0 of the software at around the end of the year which, it is very much hoped, will resolve this problem.

Some other activities have been in the area of “ancillary equipment” – e.g. weather and cloud monitoring – and on tests of the “fast-scanning” techniques for single-dish observing. We are also studying the array configurations that will be used during Early Science and how these can be fitted to the availability of antenna stations. In Europe the responses to the call for Development Studies is being analyzed and in North America a call was prepared and released.

Staffing

We are delighted that the CSV team has been strengthened by the arrival of three additional scientists: Takeshi Kamazaki and Kengo Tachihara have joined us from NAOJ and Tim van Kempen is on secondment from the University of Leiden. We had strong support from the NAASC during this period with Tony Remijan completing another tour as ARC liaison, his place being taken by Ed Fomalont, and extended visits by Crystal Brogan, Todd Hunter and Al Wootten. From East Asia we had Yu-Nung Su visiting, while Aya Higuichi has taken over as the ARC liaison from Masaaki Hiramatsu, and from Europe we had Eelco van Kampen as a visitor. All this has of course been very stimulating and everyone has contributed to the recent progress with some very important issues coming to the forefront as a result of these people’s presence. At times we have been somewhat stretched to organize the flow of tasks and provide sufficient mentoring to get everyone up to speed quickly: inevitably the visitors sometimes rediscover for themselves problems in the system that are already known, but for which the fix is not yet in place. The other important aspect of the visits is of course the fact

that these people are able to take back to their home institutes a much better understanding of the “real” ALMA and we get many positive comments as to how valuable this is.

10. COMPUTING IPT

At the end of October G. Raffi retired from ESO as European CIPT leader. He has been central to the international CIPT collaboration from the very beginning, before ALMA was even named or funded (from the first Eu/NA software meeting in 1999). The ALMA project in general, and B. Glendenning in particular, is very grateful for his dedicated service for over a decade in enabling and directing the very effective work of the CIPT. J. Schwarz (ESO) will replace him in an interim basis while his permanent successor is sought.

In October the principal activity was preparation for software release R8, due to be delivered to the Project in December and to be deployed operationally at the AOS/OSF in January (it may however be tested in Santiago by DSO starting in December). Besides the general integration and test work at the Standard Test Environments in the Northern hemisphere, there were two missions to the OSF to test aspects of the correlator software (to support multi-quadrant operations and to test that the correlator data processor computer cluster redesign supports the required data rates). In addition, a mission to test the latest features of the Telescope Monitor and Control Database (TMCDB) were tested. We intend to use the TMCDB for AOS operations starting with R8.

CASA release 3.1 was scheduled for the middle of October, however it was decided to hold the release for a few weeks to resolve some performance issues that were discovered with ALMA data and were causing CSV problems (WVR data and channel-average data were filled into a CASA measurement set as spectral windows with a small number of channels, which triggered a bug in the I/O caching algorithm so that I/O was optimized for few channel access rather than few thousand channel access (the main visibility data), causing a ~50x performance degradation).

An important bug in the operational deployment of the Oracle part of the ALMA Archive was discovered in October. A third-party library was incompatible with the version of Java in use, which caused frequent dropped connections and subsequent poor performance of this part of the Archive (principally affecting the storage of monitor data). It is not yet clear whether there are additional problems. The other major Archive problem (actually in the ALMA Common Software Subsystem) is that the distribution of bulk data from the correlator occasionally loses its connection. Efforts to both debug this problem and to work around the conditions that cause it are in progress but not yet concluded.

An initiative to improve the scalability and usability of operational GUIs for ALMA following a recommendation of the November 2008 Director’s review of ALMA Computing had it’s kickoff meeting in Paris (French institutes INRIA and CNAM are contributing effort to this activity).

CIPT staff participated in various capacities at the CSV, Early Science Readiness, ASAC, and AAER meetings in Chile.

11. SCIENCE OPERATIONS

The Science Operations Readiness Review

The Science Operations Readiness Review took place on October 11th-12th. The panel members were George Helou (chair), Jessica Chapman, Michitoshi Yoshida and Mark Phillips (absent because of illness). The review was successful with very useful input from

the panel. Several critical issues were identified and useful suggestions were given. A preliminary report was submitted on November 10th.

Charter, agenda and presentations can be found on:
<http://wikis.alma.cl/bin/view/DSO/SciOpsRR2010>

The SCO Auditorium was used successfully for a large meeting for the first time.

The Science Operations IPT f2f meeting

The Science Operations IPT had its 13th f2f meeting in Santiago on October 5th-6th. The meeting concentrated mainly on preparations for the Readiness Review, and detailed discussions were held on science operations policies, the proposal review process and preparations of the ALMA user community for Early Science (call for proposals, web pages, documentation etc.). It became clear that policies, procedures and their implementation need to be discussed in detail, and a workshop on Science Operations policies will be held on November 4th-5th.

DSO activities

Hiring

Job offers were sent to the four Operations Astronomer candidates. So far two of them have signed the contract, one has declined and one is in the process of signing the contract.

Two very good candidates for the Proposal Handling Team Lead astronomer position were identified by the selection board. They were invited to Santiago for f2f meetings. A job offer was sent to one of the candidates, who eventually declined because of personal reasons. A job offer is now being prepared for the second candidate.

Support to AIV and CSV

The support to the AIV/CSV activities by the Array Operations Group and the DSO astronomers continued.

Software

The Operations Software Coordination Group as well as the groups on individual software subsystems continued their biweekly telecons. A planning meeting between the CIPT, Science Operations, CSV and AIV will be held in Socorro on January 24th-25th.

Other

DSO staff participated in various outreach activities, conferences and workshops.

Science Operations presentations were given in the AAER and ASAC meetings in October.

ARC activities

NA ARC:

Hiring activities:

Schott Schnee (HIA) and Stuartt Corder (ALMA/Chile) started their positions as members of the NAASC scientific staff, while Ed Fomalont and Jim Braatz joined the NAASC from other NRAO divisions.

JAO support:

Tony Remijan finished a two months tour of CSV support, and Al Wootten, Crystal Brogan and Todd Hunter traveled to Chile to provide several turnos of support. The NAASC data reduction "Tiger Team" reduced and produced reports on several CSV test datasets and wrote a wiki for how to reduce ALMA data CASA, for internal CSV use. The Tiger Team

evaluated the imaging performance and drafted a memo on an ALMA Early Science configuration.

The NAASC staff attended the CSV Status Review and ASAC meetings in Chile, and participated with the JAO in the Science Operations Readiness review. We participated in the final selection and face-to-face interviews for the ALMA "Proposal Handling Team" lead.

Software Development & testing:

Much work was done on CASA in preparation for release 3.1 in November. Work on development targets for 3.2 began. The CASAguides "recipes" (<http://casaguides.nrao.edu/>) were tested and made current with CASA release 3.1 (to be deployed with the release).

Continued development of the ALMA helpdesk, including developing detailed fail-over plans, an evaluation of the world-wide availability, support for Japanese language module, and reporting metrics.

Conferences and workshops:

Planning continues for NAASC participation in the January AAS in Seattle WA, including an ALMA Special Session: "Observing with ALMA" on January 12th and ALMA Observing Tool demonstrations, and on the NAASC/NRC workshop entitled "ALMA: Extending the Limits of Astrophysical Spectroscopy", to be held January 15th-17th 2011 in Victoria, BC (see <http://www.almatelescope.ca/Spectroscopy2011/>), which includes a day of tutorials on ALMA Early Science and the ALMA Observing Tool.

Other:

A plan for community training activities leading up to the first proposal deadline was drafted, to be finalized and released when the final dates are published. A wiki for the NAASC visitors program was generated. The NAASC organized the first staff training activity to be held November 9th-10th in Charlottesville. NAASC staff participated in the production of a PBS special on ALMA, that will be aired in 2011.

EU ARC:

Hiring activities:

- None

CSV and JAO support:

- The third ARC astronomer joined the CSV team for 6 months from September 1st.
- Participation from other ARC astronomers and Fellows from ESO and the ALLEGRO ARC node.
- Participation to Commissioning review and Science Operations Readiness review: presentations, documents preparation.

Software testing:

- Testing of the offline software release 3.1 was carried out at the EU ARC (nodes included). CASA sit-together to reduce ALMA data and Solar data were held at ESO.

Conferences, workshops, tutorials:

- "CASA demo" at IRAM summer school, Grenoble (France).
- Attendance at the IRAM summer school from the new ARC hires.

Talks:

- "How ALMA observes" at the University of Padua PhD school in Asiago (Italy)
- "Science with ALMA" at the University of Padua PhD school in Asiago (Italy)

Other:

- Preparation for the workshop on internal policies.
- Preparation of community days and OT tutorial for the European users
- Preparation of the face to face meetings with the ARC nodes at ESO (November 2010) and with all EU ARC staff (March 2011).

EA ARC:

Hiring activities:

The interviews of three EA-ARC astronomer/scientist candidates were held on October 18th.

CSV support:

Su Yu-Nung (ASIAA) and Aya Higuch are working at OSF/SCO.

Software development and testing:

CASA single-dish project scientist and ALMA-J computing leader attended the ALMA CASA Coordination Group meeting to facilitate coordination between AIV/CSV and CASA interferometry and the single-dish development.

Tutorials and documentation:

ALMA-J users meeting was decided to be held on January 13th -14th, 2011 at Mitaka. Tutorials of OT and CASA were planned in the meeting.

Conferences and workshops

Two ALMA-J science workshops were conducted and EA-ARC astronomer/scientists presented the user support functions of the ARC.

Other:

The EA-ARC manager participated in the CSV status update review and Science Operations Readiness review, and presented user support functions and EA-ARC status in the Science Operations review.

12. ALMA DEPARTMENT OF ENGINEERING

Management

In October the two Instrument Group Manager candidates visited the Santiago offices and the OSF for extended interviews and informal meetings with various staff. Both candidates were very impressive and in the end it was a difficult decision for the selection committee and so as a result an offer will be made to one of the candidates and the other will be considered for upcoming positions to which he is also well suited.

The Interim Head of ADE gave a presentation to the ALMA Annual Review. The presentation highlighted the merging of the DTS and AIV groups and highlighted many successes of the department but also identified the challenges, in particular the recruitment and retention of key staff.

Antenna Group

During October the Antenna Group continued to review and update its procedures and plans.

Recruitment continued to be a major activity with the following status;

- Mechanical Technician. Offer letter was sent, waiting for reply.