

## **9. SCIENCE IPT**

### **9.1 Commissioning and Science Verification**

It is disappointing to be again starting this report with comments on the weather, but unfortunately that has once more been the most critical topic of the month. There was a modest snow-storm on 1<sup>st</sup>/2<sup>nd</sup> June, followed by a period of high winds on 5<sup>th</sup>/6<sup>th</sup> and then a much more severe storm from the 15<sup>th</sup> until the 20<sup>th</sup> which shut down all activities at the AOS. Partial recovery of operations was achieved by the 23<sup>rd</sup> but some antennas were still out of action at the end of the month. Although this inevitably limited the amount of testing we were able to do, the biggest concern from the point of view of the CSV program is that the bad weather further delayed work on the temporary power system which is in turn holding up the acceptance of the antenna stations needed for Cycle 0. The power and antenna stations remain the most critical item in terms of readiness for the start of observing.

There was a period of good observing conditions between the 7<sup>th</sup> and the 15<sup>th</sup> and in this time and at the end of the month a fair amount of progress was made on Science Verification observations. In particular we did more work on the mosaic images of the Antennae Galaxy, on the multiple proto-star system IRAS 16293, on the red-shift  $z = 4.7$  quasar BR1202 and on the Galactic Center. We expect to be able to release some more SV data sets at about the end of July. We also made quite good progress with the survey to find sources that are suitable for use as calibrators – both for phase referencing and as secondary amplitude calibrators.

We continued working with software version 8.0.3 and progress in getting this to a stable and fully checked-out state is encouraging, although it has not yet been possible to carry out the planned formal acceptance tests – those were weathered-out each time that they were scheduled. In particular it appears that the most recent problems with writing the data and storing it in the archive have been resolved. Meanwhile Computing has been working on version 8.1 and we expect to focus on testing that during July. Version 8.1 contains full support for operation of the ACA, including the correlator. An extensive test campaign on this was undertaken during June and a lot of progress was made despite the fact that essentially all the work had to be done in simulation mode because of the weather.

Technical areas worked on included offset pointing, the stability of the amplitude calibration loads, investigations of spurious spectral features and instrumental polarization. Progress was also made on “phase transfer” – using phase calibration measurements at one band to correct the data taken in another band. The problem with the erratic behaviour of the inclinometers on the Vertex antennas returned with the very cold conditions - it was first seen at the same period last year – and this part of the metrology system has been disabled on those antennas. This is not a blocker for observing under good conditions but the pointing performance will be affected when it is windy. We are also concerned about the “locking” of the local oscillators. Despite the installation of detailed tuning tables by the Array Systems Group this is still not reliable at all frequencies and there are a few spots where many receivers cannot be locked. The problem appears to be at the interface between the Front End and Local Oscillator systems and it may also involve the optical-fibre LO distribution. The fact that so many sub-systems are involved makes it a more difficult problem to resolve than it would be if it were in a single area.

Science IPT members from the Executives continue to work on antenna testing at the three vendor sites. This was of course also disrupted by weather as well, but there was nevertheless good progress in preparing more antennas for acceptance.

### **9.2 ASAC**

There was an ASAC telecon on June 8<sup>th</sup> where the main topics were readiness for Cycle 0, proposal review and the proposed new ASAC terms of reference.

### 9.3 Staffing

We were pleased that Samantha Blair, who has been “friend of the telescope” at the Allan Telescope Array at Hat Creek, has accepted our offer of a Commissioning Scientist post. Further offers to bring the team up to full strength are in progress. Jackie Hodge completed her three-month visit from MPIA and Katherine Johnston also returned to Europe during June but she will come back in July for the second part of her tour. These post-doc placements arranged through the EU science office have worked out well. Daniel Espada was with us from the EA ARC and Ed Fomalont arrived for a further tour accompanied by a NA postdoc, Nuria Marcelino. Finally Arancha Castro-Carrizo joined us for a three-month stay under the collaborative agreement we have with IRAM.

### 9.4 Outreach

A very enjoyable ALMA workshop on "Multi-wavelength views of the ISM In high-redshift galaxies" was held at ESO Vitacura. There were 82 participants registered. Shown here are those who braved the weather (which has not been good in Santiago either) for the conference picture in front of the ALMA office building.

