

SCIENCE IPT

Progress with Commission and Science Verification

Overall the month of February was a disappointing one. The weather continued to be unusually poor, even for the time of year, with the AOS often in cloud for at least part of the night. (At present we close the shutters on the antennas if the humidity is greater than 95%.) Rain and snow induced problems with the antennas with water getting into the electrical equipment and other components. We also lost time due to a range of other events, including absurd things like the contractors who are installing the fibres digging through the live ones (which they themselves had previously installed). There were problems with power in the AOS technical building and additional antenna faults not obviously associated with the weather. Software problems, mostly associated with the handling of data from the correlator, also took up a lot of time and greatly restricted the range of tests that we were able to perform. We did nevertheless manage to make some progress in several areas.

The anomalies in the pointing of DV01 were confirmed to be due to stresses at the interface to the foundation which had been trapped when it was set down. It is hoped that a slightly modified setting-down procedure, plus possibly some lubrication of the “ridges”, will be sufficient to prevent this in the future. The cumulative pointing errors after big elevation excursions seen on PM03 were found to be caused by the “acceleration compensation” feature of the metrology system. This is not necessary and will no longer be used. There still appear to be some excess errors in the azimuth pointing on PM03 which need further investigation.

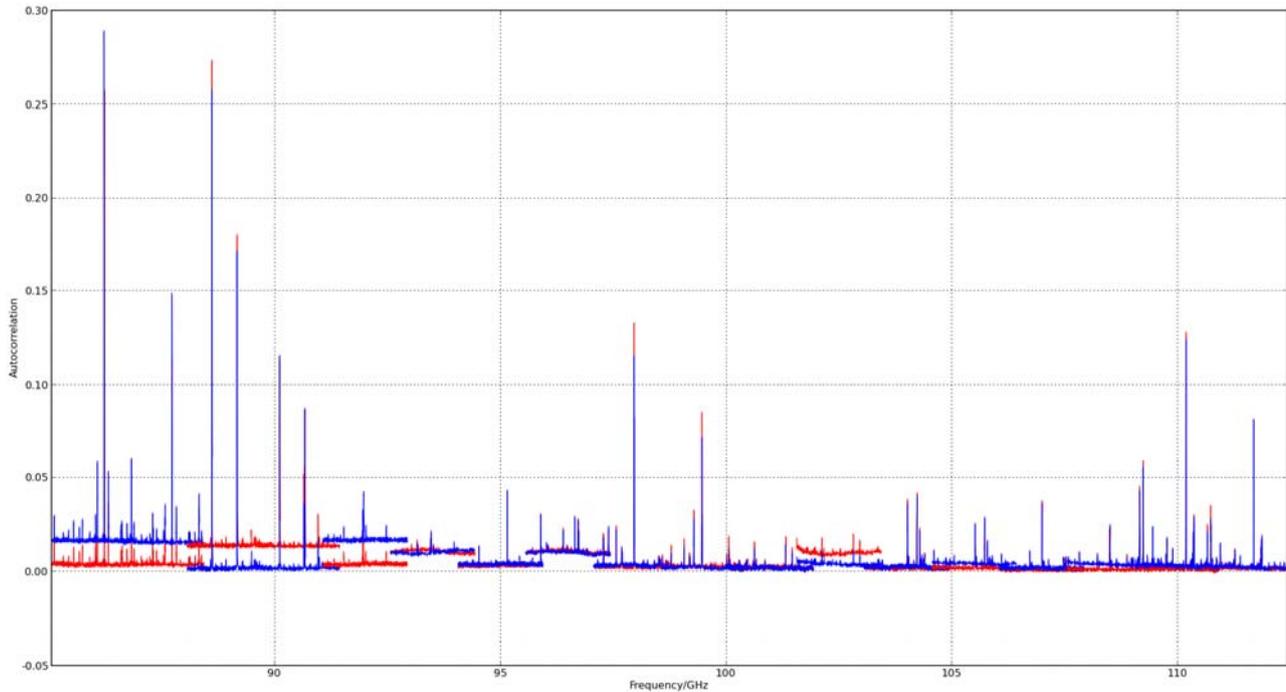
Techniques for making a variety of antenna tests, including measurements of large- and small-scale surface errors using astronomical sources and tests of tracking accuracy and of switching performance, were devised and tested. The later involve relatively rapid sampling of the interferometer output and this revealed a pattern of periodic “glitches” in the phase which are being investigated. We also measured the performance of the line length correctors under a range of conditions. So far these seem to be working satisfactorily but we need much better conditions and short baselines to see whether the performance meets our requirements.

Some initial observations were made using one of the “full Stokes” polarization modes. This basically works and the instrumental polarization seems to be at roughly the level expected, but there are clearly some anomalies in the scaling of the outputs from the correlator which need to be sorted out.

Towards the end of the month there were visits from Computing IPT staff: Rodrigo Amestica came to work on the problems with the correlator software, and the group responsible for the “quick-look” software came to get first-hand experience and feedback from the scientists. These visits were very productive despite the disruption caused by the earthquake.

With version 7.0 of the software we are able to exercise the full end-to-end sequence of using the Observing Tool to generate an Observing Block, executing the observation automatically and extracting the data from the archive and analysing it to produce an image. We are now able to do this with all the basic features of a standard imaging sequence included – initial pointing and amplitude calibration followed by observations of the source of interest interleaved with phase calibrations. We were able to process the results of such a sequence to produce an image but with only three antennas and such poor conditions it is of course not something that we want to show off.

Here instead is a scan of the Band 3 window which was produced as part of the “tunability” tests.



This shows the familiar rich spectrum of the Orion molecular cloud. The blue and the red traces are the two polarization channels. In general the baselines are encouragingly flat but there are obviously offsets in the zero levels in many cases.

Unfortunately our concerns about the readiness of the antenna stations which are needed for the “Initial Commissioning Array”, due to be complete by 1st Jan, were well founded. The roads and foundations were in a useable state by the middle of February but the delays in bringing the power distribution system into operation dragged on and this was not completed by the time of the earthquake, which will inevitably mean further delays. Only after we have moved the antennas to the short baselines will we be able to start the quantitative tests on phase stability, antenna surfaces and so forth. Beyond that, the major concern continues to be that the slow delivery of front-ends and calibration devices will prevent us making tests with a realistic number of antennas in time for the readiness review planned for October.

ASAC

There was an ASAC telecon on 3rd Feb where progress was presented, the state of the cost-saving exercises was described and there was preliminary discussion of document on the Proposal Review Process. Preparations for the face to face meeting in Tokyo continued.

Staffing

After a month’s delay caused by bureaucratic ineptitude, Diah Gunawan joined the team as a Commissioning Scientist. We were disappointed when the two strong female candidates for the remaining Commissioning Scientist posts decided to take up other opportunities but we are proceeding with an offer to a third candidate.