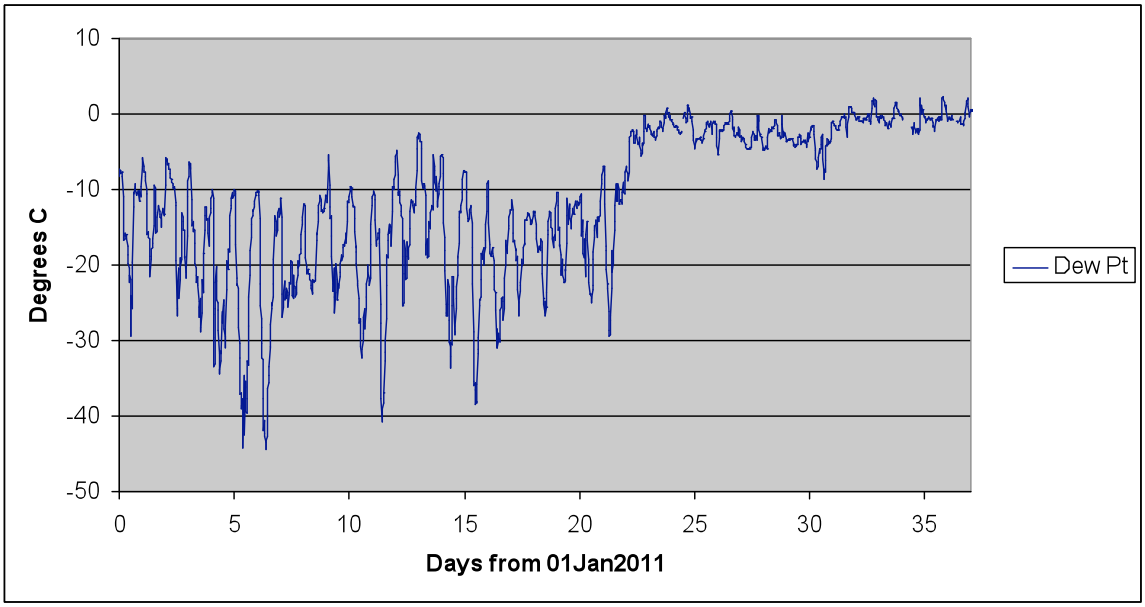
SCIENCE IPT

Commission and Science Verification

I am sorry to say that very little progress with commissioning was made during January. The deployment of software version R8.0 has taken a lot longer than has been expected and of course the poor weather has delayed us substantially.

From an observing point of view the state of the weather is most directly indicated by the dew point temperature – low values mean dry air. Here is the plot for the year 2011 up until the time of writing. It can be seen that up until about the 22nd of January there was a strong diurnal cycle, typically with relatively good conditions during the second half of the night. Unfortunately there was often light snow in the early evenings during this period which meant that we had to close operations until the morning when the antennas could be inspected to make sure that there was no serious build up of snow or ice. As a result quite a few nights were lost in this period. On the 23rd very wet conditions set in with close to 100% humidity and often more than 10mm of precipitable water above the 5000m site(!). No "live" testing has been possible since then and we have instead been learning what we can do with the system while the antennas are in simulation mode.



It turns out that in simulation mode we are able to work on some important issues such as the compatibility between the Scheduling Blocks generated by the Observing Tool and the underlying control software, and useful progress has been made there. Probable causes for some of the other major outstanding issues with R8.0 have been found by Computing and in most cases patches have been installed, but we cannot test these until the weather improves. In general terms it is clear that the deployment of R8.0 has been far from satisfactory and as a result Computing IPT have already decided to make some changes in the upgrade process. There will be a further "lessons learned" exercise as soon as we have reached a satisfactory level of operation with the new system.

Because of the poor weather and software problems we were not able to complete the long-baseline (~600 meter) tests during January. DV03 was brought down to correct its surface errors and to refurbish the cryo-cooler, and DV09 was moved into the compact array to give us eight antennas again. When DV01 goes up after its refurbishment we will put it on a "phase 1" pad so we can resume the long-baseline testing.

In general the antenna reliability was reasonably good although we are still seeing the errors that are believed to be associated with noise on timing signals and there have again been failures of the sub-reflector mechanisms.

There has been progress of a sort on the astigmatism issue in that careful tests have eliminated the holography system from the list of possible causes. We now need to investigate the secondary mirror and its alignment.

A periodic instability in some of the Band 3 receivers was found to be associated with activity in the monitoring circuits. It turned out that the receivers affected still had a pre-production version of these circuits, which had a known weakness that can apparently account for the instability, although the detailed mechanism is not understood. These will be replaced as soon as is practical.

There has been a very strong positive response from the community to the request for suggestions for Science Verification targets, with well over 50 suggestions received at the time of writing. We have chosen some targets for the first observations, which cannot of course start until we have good conditions and the software in a satisfactory state.

We have been studying the best configurations to use for Early Science. The problem of choosing the best combinations of existing antenna stations for modest but variable numbers of antennas is a very different one from doing the initial design, where one can choose the exact locations of the antenna stations that give optimum coverage with 50 antennas. Frédéric Boone (CESR) has been generating the designs and a tiger team has been analysing their properties. We expect to have a satisfactory initial selection done by the end of February.

Science IPT members from the Executives continued to provide a substantial amount of effort in support of antenna testing at the three vendor sites.

ASAC

The committee met by telecon on 19th January and had further discussions on the plans for Early Science as well as the proposal to phase-up ALMA for VLBI observations.

Staffing

Ed Fomalont completed his extremely valuable tour as NA ARC liaison during which he somehow managed to make vital contributions across the whole range of areas that we are working on. Vincent Pietu has joined the Commissioning team from IRAM for a three-month visit. Anaelle Maury, an ESO ALMA Fellow, arrived from Garching for a second stint on the team.