Further Ahead

2012

- By the end of 2011 we need to have the Cycle 1 capabilities defined and characterized
- The goal for 2012 has to be to complete the commissioning of the full “Baseline ALMA”.
- Note that this does not mean 66 antennas fully equipped – adding more antennas should become a straight-forward process – but we aim to demonstrate all the key capabilities by the end of 2012.
- The goal should be to have these in the Call for Proposals for Cycle 2.

“Inauguration” Capabilities

1. Regular operation with ≥ 50 fully-equipped[1] antennas. (This includes both 12m and 7m antennas.)
2. All antenna stations complete, providing synthesis mapping with high fidelity using the full set of array configurations.
3. Simultaneous operation of ≥ 4 subarrays possible.
4. Capability for combining data from the12m array with data from the ACA including “zero-spacing” data, and multi-configuration images
5. Linear and circular polarization, including mosaicing of sources that are larger than the primary beam.
6. High time resolution observations, e.g. of solar flares.
7. All major software systems available[2] and working in a way that allows astronomers who are not synthesis experts to use ALMA[3].
8. Accurate calibration of all the above[4].

Footnotes

1. Fully-equipped means a minimum of four receiver bands – typically bands 3, 6, 7, and 9 plus some of 4, 8 and 10, plus a full set of electronics, radiometers and calibration devices.
2. Some capabilities will still be under development at this stage – e.g. on-the-fly aperture-synthesis mosaics, high-precision polarization maps of extended sources, and some of the less popular correlator modes.
3. At this stage ALMA staff will still be performing a lot of the data verification but the users will receive the images ready for analysis and interpretation.
4. The goals set for the calibration of ALMA data are very stringent and we may not achieve all of them by this point, but we must be doing a lot better than is currently achieved at these wavelengths.

Commentary

- Of these, I suspect that the simultaneous observing in several sub-arrays may be the most difficult to get working properly.
- There are numerous other technical items that will no doubt take a great deal of work to get right:
  - High dynamic range / fidelity images
  - Calibration accuracy
  - Astrometry i.e. milli-arcsec position accuracy (and below)
  - Efficiency, data quality, finding and fixing the rare glitches

Interface CSV to Operations

- CSV has certain specific deliverables:
  1. A telescope with defined observational capabilities, “verified” by observations of known objects
  2. Documented procedures for observing, calibrations and tests
  3. Trained scientists who know how to use the system and understand it in some depth
- The interface between Commissioning and Operations is however not just that:
  - In order to achieve 3, the Operations team are heavily involved in commissioning
  - Conversely it is essential for morale, justice, etc., that the CSV scientists play a full part in the Early Science observations and data investigations, and that their work is visible outside Chile
  - Therefore continuing to run the science activities as a single team as far as possible – especially at the OSF.

Transition

- Activities that are essentially the same as CSV will continue throughout the life of the observatory:
  - Trouble-shooting
  - Trying out new techniques
  - Improving the quality, efficiency, reliability, etc.
- So the aim has to be that we make this a merging process, moving people and skills into the operations team at an optimum rate, rather than an abrupt transition.
- Tricky, but should be possible