ECSV Discussion
22 May 2012, at 10am in room 317.

Attendees:

Michiel Brentjens, Andreas Brunthaler, Mark Claussen, Vivek Dhawan, Barry Clark, Eric Greisen, Cornelia Lang, Minnie Mao, Josh Marvil, Drew Medlin, Heidi Medlin, Amy Mioduszewski, Emmanuel Momjian, Kristina Nyland, Frazer Owen, Rick Perley, Nirupam Roy, Michael Rupen, Lorant Sjouwerman, Deb Shepherd, Ken Sowinski, Ravi Subramanya, Gustaaf van Moorsel, Joan Wrobel,

Minutes:

Cornelia starts her RSRO stay today! She will be working on the 3-bit system. Welcome Cornelia!

Correlator and general system health (Ken)

- Michael has returned after being gone the past few weeks. Yippee!
- The broken baseline board in the correlator is being repaired today.
- Phased array testing:
    - Narrow band phasing works. We have been having problems with wide-band phasing but a potential fix is in place and needs to be tested.
    - Tests to record data with the Mk5C continues. We can record 256 MHz/pol with 2 GB/s and this is what we need for VLBA work. We should be able to get up to 512 MHz/polarization and 4 GB/s.
- 3-bit testing:
    - There are 18 antennas with all 8 3-bit samplers, 3 more antennas have only 4 samplers.
    - Next week, 1 antenna will have a pair of the new Hittite samplers that are expected to be much better than the old ones. Once installed, we will do a comparison with the old-style (Teledyne) ones.
    - 80-90% of the installed samplers work. We are still plagued with samplers that do not work for one reason or another.
    - The 3-bit sampler level setting appears to be working but not as fast as it could be.
    - Stability looks pretty good, not as good as an 8-bit sampler but good enough to transfer phase calibration, etc. Some examples of cross talk between samplers on a board are seen. Bottom line: the 3-bit samplers, when they work, are reasonably good but not perfect.
    - We can set up 3-bit programs in the OPT but it requires some hand editing now. MCAF, Telcal and CBE needs to be set up correctly and this is getting sorted out.
    - The calibration process using switched power still needs discussion.

- There is still some Pdiff compression, e.g., changing the power levels on the 3-bit samplers changes the Pdiff. This needs to be characterized and sorted out.
- Compared to the 8-bit system, the 3-bit system with "good" samplers has a 10-15% sensitivity loss. This is something we will have to just live with.

Interesting test results and summary of tests planned (Rick)

- Michiel is here for 10 days working on holography scripts to make sure his holography software works properly and holography projects can be set up semi-automatically.
  - The current procedure is that 3 ants are used as control antennas. Of the remaining antennas, ½ are stationary and ½ are scanning.
- In April a Ku band holography run was done in the day-time – the weather was clearly bad and prevented getting good maps.
  - We may want to do 2-3 hour chunks of data to try to avoid changing conditions.
- Rick has been working to characterize Ku and X-band efficiency and Tsys. He was using Cygnas A but this has a flux density error – he needed a different source so he used Venus. Rick observed Venus last week and he is working with Bryan to get the appropriate flux density.
- Rick's big flux density project is finished. He has the final expressions for flux density as a function of frequency derived. He will compare this with Planck results on a few sources to see how well we agree.
- Bottom line: How far off are we from the Baars scale? Answer: 2%.

Summary of RSRO activities by Andreas Brunthaler.

- Andreas has been here for 1 year now and this is his last ECSV discussion.
- Science programs Andreas has worked on are:
  - Observed M33 and NGC 1382 in continuum, recombination lines and methanol masers.
  - L and C band galactic plane surveys, 2x2 deg field in D config. Formaldehyde, excited OH, continuum, recombination lines and methanol masers in C band. Cont, HI and OH in L band.
    - Next they will get B configuration data and combine the D and B array data for final images.
  - Some VLBI tests were done and that worked well.
  - More recently, high sensitivity array observations of H2O masers in Andromeda are being made to measure proper motions. Observations will continue for a year to finalize the galaxy proper motions.
  - Several observations of Sgr A* in the galactic center have been made. The first triggered observations with the VLBA were done and the first joint ALMA, JVLA observations were done last week as part of a mega campaign.

- Commissioning accomplishments that were done as a result of these observations include:
    - Astrometry quantification: we can get as high as 5 mas astrometry accuracy in A array at high frequencies (~2% of the beam).
    - Andreas developed a mosaicing script that can be included as a CASA task that helps the user set up a mosaic observation.
    - Complicated line setups with the correlator were commissioned and these can now be included as part of the general capabilities for the next call for proposals for the user community. This includes baseline board stacking to give variable resolution spectral lines, line & continuum observations at the same time, and some recirculation setups. All have been extremely valuable for EVLA commissioning.
    - In addition Andreas has pushed the data rates into the archive, helping to uncover and solve several critical problems.

Documentation – PLONE demo if desired

- Gustaaf gave a summary of how to use PLONE.