ECSV Discussion
11 December 2012, 10am in the auditorium

Attendees:

Barry Clark, Claire Chandler, Vivek Dhawan, Feng Gao, Miller Goss, Eric Greisen, Chris Hales, Stan Kurtz, Josh Marvil, Amy Mioduszewski, George Moellenbrock, Steve Myers, Robert Mutel, Susan Neff, Kristina Nyland, Juergen Ott, Frazer Owen, Rick Perley, Dave Roberts, Michael Rupen, Deb Shepherd, Lorant Sjouwerman, Ken Sowinski, Ravi Subrahmanyan, Gustaaf Van Moorsel

Minutes:

News:
- Bob Mutel's last day will be 15dec
- David Roberts last day will be 13dec.
- Susan Neff's last day will be 19dec – she will give a report on her RSRO work next week
- Feng Gao's last day will be 21dec – he will give a report on her RSRO work next week
- Chris Hales has just started work as a new postdoc at NRAO, Socorro. Welcome Chris!
- Stan Kurtz is visiting from Mexico for a few days, he is leaving tomorrow.

Correlator and general system health (Michael, Vivek, Ken)
- Correlator Back End (CBE) development and testing:
  - Michael, Ken and Vivek continue to test the new CBE that Martin is developing.
    - The bug where the timestamps in the binary data were 110 years off (!) is fixed now. We are translating the timecodes of the 500 GB of data that was taken before the problem was discovered.
    - We can again run with all bandwidths (a bug in the new CBE (Correlator Back End) was fixed that prevented this).
  - We continue to have occasional missing BDFs (Binary Data Format; e.g., uv data) but the incidence is becoming more and more rare. The last error was on Saturday where we lost 2 scans. Michael believes this problem has been fixed in the current version of the CBE.
  - This new version of the CBE should also be able to configure itself more rapidly but this has yet to be seriously tested.
- Configuration Mapper (CM) developments:
  - Sonja (developer in Pentiction responsible for the CM) will be transitioning off of the EVLA project in a matter of months (exact timing still TBD) and we are trying to get the issues with the CM solved while we still have Sonja. We are currently running with an

older version with the CM because the new CM is not working with 3-bit.

- o This CM is also causing problems with sub-array submittal but we have a work-around for now: submit sub-array SBs manually.
- Other:
  - o Mike has put in a tweak to the deformatter code to try to get rid of delay jumps. Antennas EA03 and 09 have the fix installed. The rest will be outfitted tomorrow assuming all goes well.
    - Please keep an eye out for delay jumps in your data!
  - o The Weather station has been broken for the last 2 weeks.
  - o An S-band fixed-date project that is being run most nights had a run last night that produced no TelCal output. This despite the fact that all previous observations ran without incidence. The end result was that this data set was filled with zeros. Michael and Martin are looking into the problem. They found two datasets with this problem, none others in the past. This problem appears to be linked to the real-time timing code and is being troubleshooted at high priority by Martin.
- 3-bit sampler status:
  - o Hsi-Wei's report on his reduction of his 3-bit Q-band data:
    - I derived the amp gain solution every 2 minute interval.
    - I did not see systemic variation of amp gain of my secondary calibrator.
    - For most antennas, amp gain varies within 5%.
    - For some antennas, amp gain varies within 10% to 15%.
    - The variation looks like not systemic even for EA21.
      - It would be useful to know what the noise in the final image is and how this compares with what is expected theoretically. Deb sent Hsi-Wei a note asking him if he could characterize the noise levels and let us know.
  - o We now need to do a few more things to wrap up the 3-bit preparations for D array (observing starting 25 January 2013):
    - Quantify how strong the calibrators need to be to work at Q band. Lorant and Minnie will do a test to evaluate how bright a calibrator needs to be to work well.
      - The test SB is in the queue.
    - We need a big push to get the Documentation in a good state for our users. The focus will be on K, Ka, Q band continuum observation (this is all that was offered for general observing in January; lower frequency continuum and spectral line observations with the 3-bit system will be shared risk or resident shared risk).
    - We need to take a careful look at how the noise integrates down with frequency. This should be scheduled in the next week or so.

- Phased array:
    - Feng Gao will have a test to observe with the phased VLA+VLBA+GBT on Saturday. He will be using a single sub-band, standard continuum that works well for phased-VLA+VLBA.
    - Vivek et al. are doing a check to make sure that VLA phasing and referenced pointing work as expected. This seems to be working at the basic but more checks need to be done.
    - We still need additional work to support the VLBA phased array in the: OPT (Observing Preparation Tool), Vex2OPT (software that converts SCHED output to a file that can be read into the OPT to create an SB for the phased VLA) and model2script (software that takes OPT output and creates vla control and correlator control files). This is all part of the e2e verification.
- Sub-arrays:
    - Sub-array observations are working but they must be manually submitted. Sonja is working on the problem in the CM (see above).
- Fast dumps testing:
    - Fast dump tests to support Casey's science are progressing. We have achieved 10ms dumps with 2 sub-bands. This has pushed our data rates to 80 MB/s! Getting beyond this data rate still causes trouble: Some CBE nodes worked and some didn't (e.g., some nodes are able to process the data at these fast speeds and some nodes get bogged down).
        - *Note: We promised that we would hit 75 MB/s by the end of construction and we have now met this milestone.*
    - Casey Law is looking at his test data taken under 80 MB/s to ensure that the data themselves have no problems.

Testing coordination and best LST ranges for tests (Joan):
- The optimal test window continues to be 4-7 LST, regardless of weather.
- Weekday tests continue to be difficult to do given that we still have high pressure from WIDAR, 3-bit, phased array, and sub-array testing.
    - Try not to set up your tests in the weekday but it is possible if necessary.
- Weekend daytimes are still needed for science. We will be having a science Friday this week to try to 'discharge' some of the daytime science SBs.
    - It will be very difficult to get test time during the weekend daytime. Its not impossible but do everything you can to avoid this time. If you absolutely cannot run your test any other way except during a weekend day, contact: Deb, Michael, Vivek, Joan.

Software status:
- Report from Dave
    - Details on the software development are available at:
      https://builder.aoc.nrao.edu/meetings/sssNotes20121211.html

- o Some highlights:
- o Deployed a new version of PST to webtest
- o Changes to Help text were made to GOST based on the last round of testing.
- o The RCT Spectral Line UI was released to Michael & Juergen last week and tested.   The underlying functionality appears to be working for the most part (lines are where they should be), but the UI needs some clarification for our users.   It was not clear from the testing if Doppler setting worked as it should have.
- o Michael is working with the developers and Lorant to make some final changes.   New version ready for testing tomorrow.

CASA (Steve, Juergen):

- CASA 4.0 release went out.   Yesterday Juergen distributed a release notice to the community with a detailed list of what has been changed.
   - o Finalizing the documentation for that (casaguides by Juergen and Miriam need to be moved to the top-level locations).
- We are now working on testing and developing a stable CASA 4.1 version.
- Frazer gave Steve a Linear polarization P-band dataset so Steve would be able to calibrate the data in CASA and see if this works and then start to create a regression script and then a 'casa-guide' for our users on how to do this.   However, he won't have time to do this before he leaves on sabbatical so Deb will have to get someone else to do this.

RSRO Sub-array report (Bob Mutel):

- Robert Mutel focused his efforts on Sub-array and pipeline testing.   He will have a report available soon.   Some highlights of his sub-array testing are given below:
- Sub-array tests
   - o Robert did 4 tests on 15, 16 and 29(x2) Nov in S & C bands (2 GHz bandwidth).
   - o The SBs were hand-edited and manually-started at slightly different times.
   - o It took a few tries but sub-arrays worked for one of the tests on the 29th.
   - o The focus has been on the C-band data: Correct noise levels are being achieved in the C-band sub-array data.   They are getting spectacular science results (finding mJy level pulses) that could never have been done before with the old VLA system.
   - o
   - o The S-band data is being affected by severe RFI.   The final noise is within a factor of 2 of what it should be – this should be better and this problem is being tracked down.   Rick notes that Ants 7 & 19 at S-band are much more noisy than they should be.

- o Robert will be leaving Saturday and will continue to work on RSRO activity with his students (especially pipeline testing).
- Note: Rick will have a technical meeting on Thursday to discuss issues with S-band.

RSRO report (Dave Roberts):
- Dave has been working on 2 aspects of polarimetry:
    - o First to try out the AIPS Faraday rotation synthesis code on SS433 (C-band).
        - ▪ C-band is not ideal but the tests show that this works remarkably well, seeing how the source structure varies with increasing Faraday depth. Dave has been working with Eric and Frazer and he is very satisfied with the results. They have found some minor bugs in AIPS that have now been fixed.
    - o Dave has also been looking at the Polarization response of the system with the 3 and 8-bit samplers at K-band. They used one source, 3c84 (30 Jy, mostly unpolarized). He found the cross gains, D-terms, in the standard way: the 8-bit D-terms are smoother in frequency space than at 3-bit. There are 'wiggles' at 3-bit. Overall levels are exactly the same. If these small ripples are consistent in time, then they can be calibrated out.
        - ▪ George said that it looks like there might, indeed, be a standing wave in the 3-bit components and this should be investigated more.
    - o Dave reduced the 3c84 data and he derived and removed the D-terms and found that this removed the polarized signal, as expected. However he found residual sidelobes seen in the sqrt(Q^2+U^2) image – This is almost certainly caused by the fact that 3c84 is slightly polarized at the 1% level and the D-terms solution assumed it was completely unpolarized.
    - o All in all, Dave is pleased with the polarization performance of the 3-bit samplers and there are no obvious problems that he has seen.
    - o The next step in the plan is to do a full on 3-bit polcal. Dave, Katy and Ann Mao will work on this. Chris Hales is also interested in continuing with this characterization.
- Vivek notes: :
    - o There is a maximum of 1 percent difference in the D-terms between 3 and 8-bit samplers. This means that there is a small amount of contribution of the cross-talk due to the samplers but this is stable in time and so can be calibrated out.

Reminder: CfP documentation update:
- Note: Robert Mutel suggests that we need a CASA tool kit tutorial (like a casa-guide for EVLA data) – Robert will send an e-mail to Juergen, Steve/Bryan and Deb.

- Please, everyone, start on your documentation now if you haven't already done so!

CfP documentation status
*Update for the Jan 2013 CfP (Semester 13B) – **as of 11 December 2012***

Documentation preparation for the call for proposals (Everyone)
- Call must go to CV on 21 December (Friday before Christmas). Documentation content due date will also be 21 December at the latest (but please try to get it in sooner!).   The documentation must be reviewed and made consistent before 4 January (when the call goes out).

The proposal overview will be located at:
- https://science.nrao.edu/facilities/vla/proposing/vlapst2013b
    o Deb & Claire will be mostly responsible for this

Gustaaf asked for additional documentation updates in a Guide to VLA observing – these are due on 21 December. The link to that content is: https://science.nrao.edu/facilities/vla/docs/manuals/obsguide/modes.   Gustaaf has asked that the following pages are updated by those indicated below:
- 8- and 3-bit samplers Continuum – Heidi/Claire
- Spectral Line – Juergen **– DONE** *(old version needs to be reverted to previous state still – B=Gustaaf)*
- High Frequency Observing – Mark
    o *Mark will start on this on Wed, 12dec12*
- Low Frequency Observing – Emmanuel
- Very Low Frequency Observing - NEW: leave for now (Gustaaf, temp content)
- Polarimetery – Steve
- Mosaicking – Steve
- RFI - Emmanuel (content still being ported, leave for now)
- Moving Objects - Bryan (NEW - would be nice to have some content)
- VLBI at the VLA – Amy

The OSS for 13B will be at:
- https://science.nrao.edu/facilities/vla/docs/manuals/oss2013b/
    o Everyone will be responsible according to the proposed assignments identified below.
    o **P-band** will be added to the OSS in two ways: as an intro section giving the status of the system for 13B and added through out the OSS. Frazer will be providing the content for the sections – please see him if P-band info must be added (as indicated below). If you think P-band info (or even just a sentence or footnote) might need to be included and it is not indicated below, please talk to Frazer to see how to approach it.

- o **P-band** will also need to be added to the Exposure calculator and associated documentation.

- Various sections of the OSS:
  - o Rick
    - 3.1 Resolution (+ P-band)
    - 3.2 Sensitivity (+ P-band)
    - 3.3 EVLA Frequency Bands and Tunability (+ P-band)
    - 3.6 RFI (+ P-band)
    - 3.9 Imaging (with Urvashi checking this)
    - 3.10 Cal and Flux Density Scale
    - 3.11 Complex Gain Calibration
    - 3.15 Snapshots
    - 3.16 Shadowing and Cross Talk
  - o Urvashi
    - 3.9 Imaging – check what Rick has done
  - o Emmanuel
    - 3.2 Sensitivity (+ P-band)
  - o Steve
    - 3.4 FoV
    - 3.12 Polarization (Note: *no* P-band polarization will be offered for shared risk)
      - Rick add his table of the polarization fraction and angle on the standard sources, equivalent to what is in the old VLA guide at: http://www.vla.nrao.edu/astro/calib/manual/polcal.html This is most relevant for actual observing.
    - 3.17 Combining configurations and mosaicing
      - Link to the mosaicing guide in 4.5.2 & 4.18
  - o Claire
    - 4.8 Data processing
      - Provide link to Juergen's updated CASA documentation.
    - 4.9 Travel Support
    - 4.10 Student Observing Support Program
    - Add a section on pipeline products.   (Maybe just link to an evlaguides page)
  - o Vivek
    - 3.8 Positional accuracy
  - o Frazer
    - 1.3.1 New Capability for 2013B: Low-Band Status (about 20 receivers, continuum and single field only) *- done*
    - Provide P-band content for all sections identified above, answer all P-band questions.
    - Link to P-band evlaguide page

- Susan Neff will provide content for data processing while Huib/Minnie will convert this to plone and update as needed (evlaguide content is not due for the CfP but we should start on this before Susan leaves)
- George
  - 3.11 Complex Gain Calibration
- Michael
  - 3.5 Time Resolution & data rates
  - 3.7 Sub-arrays
  - 3.13 Correlator Configs *- working*
  - 3.18 Pulsar observing
- Jon/Amy
  - 3.14 VLBI
- Joan *- DONE*
  - 4.1 Obtaining Observing Time on the EVLA *- DONE*
  - 4.2 Director's Discretionary Time *- DONE*
  - 4.5 Fixed date and dynamic scheduling *- DONE*
- Gustaaf *- DONE*
  - 4.3 Helpdesk *- done*
  - 4.6 Observations and remote observing *- done*
  - 4.13 Reservations for the EVLA site and/or DSOC *- done*
  - 4.14 Staying in Socorro *- done*
  - 4.15 Help for Visitors to the EVLA and DSOC *- done*
- Lorant *- DONE*
  - 4.4 Observing Preparation *- done*
  - 4.7 Data Access *- done*
- James/Bryan
  - 4.12 Computing at the DSOC
- Deb
  - 1 Introduction
    - 1.1 Purpose of Document *- done*
    - 1.2 The Expanded Very Large Array Project History *- done*
    - 1.3 VLA Science Opportunities
      - 1.3.1 General
      - 1.3.2 New Capability for 2013B: Low-Band Status (Ensure this is set up for Frazer) *- done*
  - 2 Overview of the VLA
  - 4.16 On-line information about the NRAO and the VLA *- DONE*
  - 5 Publication guidelines *- DONE*
    - 5.1 Acknowledgement to NRAO *- done*
    - 5.2 Dissertations *- done*
    - 5.3 Preprints *- done*
    - 5.4 Reprints *- done*
    - 5.5 Page Charge Support *- done*

- - 6 Documentation *- **done***
  - 7 Key Personnel *- **done***
  - 8 Acknowledgements *- **done***

- Other documentation (outside of the OSS)
  - Claire
    - Draft Call for Proposals
    - Pipeline
  - Joan
    - Config plans web page
    - Including LST availability plots
  - Michael, Emmanuel, Juergen, Deb *- **DONE***
    - General Observing Setup-Tool (GOST) – Includes in-line help (button taking people to the separate help file)
  - Deb
    - GOST documentation *- almost done*
    - TUNE tool, includes in-line help
  - Deb/Claire
    - Shared risk observing web page
    - RSRO web page update, include low-band
    - ECSO web page
    - Main Proposal Preparation and Submission page: overview about how to submit a proposal (like a quick-start guide), directing people to different tools and links depending on what type of proposal they will be writing and what to do in each tool if asking for shared risk, RSRO or ECSO.
    - Update the CfP with any last minute changes.
  - Gustaaf
    - FAQ update, add FUnaskedQs discussed at tech review meeting
  - Jon, Amy
    - Phased VLA for VLBI
  - Juergen
    - Spectral line observing guide – *ALMOST there.* As of 5dec12, what we need for the CfP is complete. This still needs updates of the screen shots for the OPT but these won't be ready for a while. Refer to the OPT documentation in this version and then finalize when the OPT is released.
    - GOST Spectral line documentation *– **DONE***
    - CASA documentation *– **DONE***
  - Mark
    - PST documentation update - https://my.nrao.edu/nrao-2.0/secure/Help
      - *Dana and Mark will work on this just before the PST is released.*

- Exposure Sensitivity calculator (+ P-band)
  - *This can be started as soon as the P-band numbers are in (Dave is working on this and Mark has more numbers to give him today (Tue)).*