

ECSV meeting
29 March 2012

Attendees:

Sanjay Bhatnagar, Andreas Brunthaler, Bryan Butler, Claire Chandler, Laura Chomiuk, Barry Clark, Mark Claussen, Vivek Dhawan, Dale Frail, Eric Greisen, David Harland, Amanda Kepley, Leonia Kogan, Daniel Lyons Heidi Medlin, Karl Menten (MPIfR), Amy Mioduszewski, Emmanuel Momjian, Gustaaf van Moorsel, Steve Myers, Juergen Ott, Frazer Owen, Rick Perley, James Robnet, Jon Romney, Nirupam Roy, Michael Rupen, Bob Sault, Lorant Sjouwerman, Philip Schmidt, Deb Shepherd, Ken Sowinski, Urvashi,

Introduction given by Claire on timeline of important deadlines and other relevant information:

- Call for proposal will be 2 July 2012
 - The deadline for proposals will be 2 Aug 2012
- We must pin down the observing modes we will offer by April 15, 2012.
- The observing modes we offer to the general public will be called something like: General capabilities for full operations
- There will be an extension of the shared risk program for people who want to use capabilities that are not being generally offered for full operations. This shared risk observing will come in two 'flavors' – non-resident and resident. The Non-resident shared risk program will allow users to use less-well tested modes and not have to come to the NRAO for a give period of time. The resident shared risk program will allow users to observe with more risky capabilities but they must come to NRAO for a time (time duration is TBD).
 - Aside from MPR: I would like to understand better what the non-resident shared risk program entails. For instance:
 - What fraction of observing time?
 - Must have the opportunity to evaluate technical requirements and say *NO*. RSRO is painful enough; NRSRO could become a huge burden, since the commitment on the observers' side is so much less.
 - Do all shared risk observations go through the OPT? how about the OST?
 - Both approaches have large implications; we should discuss this when Bryan gets back.
 - What are the restrictions? I would like to lay out clearly what non-resident shared risk can be, to avoid over committing to support every possible mode. E.g., I would be happy to allow fully flexible BIB stacking, but would *not* be happy to allow recirculation, since the latter has huge implications, esp. if we say all NRSRO go through the OPT.

- The basic point is that we need to be careful in what we promise for NRSRO, as well as for general capabilities for full operations.
- Note: people can apply for any configuration at the next deadline, not just D, Dnc & C. The first observations under this deadline would be in D config, beginning 25jan13.
 - Note that this implies we must give data rate & volume limits for ALL configurations, not just D and C. I'll have to think about the implications there -- 1 sec dumps of 2 MHz res'n channels across 8 GHz is 45 MB/s, well above the suggested 15 MB/s maximum for D & C configs. If we stick to this we **must** allow frequency averaging, for standard wideband observations (let alone spectral line) with 1sec averaging, as is apparently wanted for B and A configurations. [Sometime we should really justify that 1sec -- factors of 2 matter here! -- but that's another discussion.

Michael gave a presentation summarizing the capabilities we think we can offer users. He identified the limitation associated with each capability. He also identified what would only be available for shared risk. Notes on this discussion is given below:

- 8 GHz/pol for continuum/limited spectral line observations:
 - Good for blind red-shift surveys
 - Full 64 sub-bands
 - 10% flux calibration should be possible using only 3-bit samplers
 - Although we can't mix 3 and 8-bit samplers at the same time we will be able to switch between sampler modes.
 - At lower frequencies we don't get the full 8 GHz.
 - We will either have to use fewer sub-bands or use the 8-bit samplers.
 - We can either (1) use fewer 128 MHz sub-bands, or (2) allow 64 MHz sub-bands. In either case we should implement these as standard NRAO observing resources in the RCT, and say that *ONLY* such resources can be used for 3-bit observing. With that caveat I think we can manage either of these approaches; I have a slight preference for 64 MHz sub-bands as this gives more flexible requantizer gain settings.
 - ***Need to do more testing to see what is the best thing to offer for each band.***
 - We have never used this mode for science yet and we will have no formal RSRO testing done by the time we offer this to the community. This is a big risk. Lots of issues.
 - We also need to show that CASA can handle 3-bit data. Lorant has volunteered to do this.

- Phased array VLBI
 - We will not have done formal tests before the call for proposal (only limited testing possible). This makes this high risk.
 - Not offering phased VLBA, only phased array VLBI
 - Data would be written to Mk5C recorder and will go into the archive.
 - The slide was also not clear that the "256 channels per sub-band pair" referred to the simultaneously recorded EVLA data, rather than what goes to the Mk5C.
 - Apart from testing the major risk here is the large amount of software that's needed, from sched to the writing of calibration data. The latter have not even been defined, though we have some ideas.

- Independent & flexible 8-bit sub-bands
 - We have done significant testing for these capabilities with RSRO so the risk is less.
 - Karl Menten notes: we are giving people enough rope to hang themselves. We must give people relatively safe settings that work.
 - There will be defaults & significant examples to help users.
 - The primary risk here is in the user presentation and guidance.

- Up to 16,384 spectral channels
 - If we do up to 2K channels per sub-band pair then you only get 8 sub-band pairs, not the full 16.
 - Note: if we offer the full capability, then we will use up our archive resources too fast.
 - This depends directly on the averaging time, as noted below.
 - Using baseline board stacking will enable observations of masers and mixed line and continuum.
 - If we limit the number of sub-bands that can have the maximum channels, e.g., 4 high resolution lines and the rest must be low-resolution continuum, then this will ease the load on the archive.
 - Alternatively, we could just give a data rate and data volume limit. If we do this it has to be put into the exposure time calculator.
 - We have not tested baseline board stacking outside of the factors of 2 steps but OPT allows factors of 3 and 4, etc... This has to be made consistent with the understanding that we haven't tested anything beyond factors of 2. We may want to just limit the OPT options until this is fully tested.

- Up to 5 independent 8-bit sub-arrays
 - There hasn't been a lot of testing from the software side – we haven't even done one scientific test of this yet, first one is scheduled today or tomorrow. There are implications from beginning to end in the software.
 - Users will have to set up a separate SB per sub-array.
 - We must have reasonable defaults

- Prioritize the testing of this:
 - Highest priority: 8-bit samplers only, 3 fixed sub-arrays only, continuum only, no baseline board stacking.
 - Moderate priority: 3-bit samplers to increase the bandwidth.
 - Lower priority: full capability as described in the slide Michael presents.
- Andreas argues that it would be good to be able to use sub-arrays to observe at a lower frequency and be able to transfer the calibration to a higher frequency band with the other antennas. This will be considered RSRO, not to be offered as a standard mode.
- Deb to clarify – no Sub-arrays in the basic call?
- Special fast (sub-second) dump modes
 - The issue is that these high data rates are extreme – we will max out our archive resources if we let too many people use these high data rates.
 - These modes have been tested only briefly – only with Casey for his science (over the course of a week) and solar observations. High risk although nowhere near as high risk as VLBI and 3-bit, IMHO. But also less scientific bang for our commissioning buck.
 - Claire recommends that this will be a shared-risk item – no dissention. Users will not be required to come here for 3 months to use this mode but we don't guarantee this.
- Dump rate restrictions
 - Limits:
 - Limit without special justification (20 MB/s). MUST ensure that ALL NRAO defaults meet this specification. After discussion between Michael, Bryan and James that this is a bit high, probably go to 15 MB/s.
 - Absolute limit with shared risk proposals but without a resident requirement: 60 MB/s (with good science justification).
 - If we try to go beyond 60 MB/s then we would require a residency with major testing.
- Missing bits (move to resident or non-resident shared risk):
 - Make sure pointed mosaicing is easy.
 - Revisit priorities if possible:
 - Highest priority operationally is OTF mosaicing.
 - Frequency averaging is the second highest priority from a capabilities standpoint.
 - If we stick with 15 MB/s for all configurations available in this call, incl. A config, frequency averaging becomes much more important, and must specifically be allowed for 3-bit observations.

- The rest should remain shared risk, probably resident shared risk.
- Further discussion:
 - New capabilities require significant checking of the schedule blocks. This will be an operational challenge. We are looking to supplement our user support during this next proposal deadline. All staff will have to help with the user tickets.
 - One other point, Karl Menten expressed strong interest in a recirculation x2 mode as used by Mark C. for AGB stars, since this gives the widest possible bandwidth with interesting spectral resolution. He has several surveys in mind.
 - We should have words about lowband as we did in the last proposal call (Frazer should provide details).
 - We need a policy decision on whether we should allow folks to take data which we do not believe can be reduced in a timely fashion.