

Background

- EVLA construction project ends Dec 2012
- First call for post-construction proposals: I Aug 2012
- Call covers D (25 Jan-22 Apr 2013), DnC (26 Apr-13 May 2013), C (24 May-19 Aug 2013) configurations
- Must define the capabilities by May; earlier is better!
- Should:
 - -Show the full scientific power of the JVLA
 - -Fulfill our promises to the community, and to NSF
 - -Be realistic: we are still constructing, commissioning, & learning

Today's proposal

- •Emphasize both basic capabilities & flexibility
- •Strive for 90% of the science for 10% of the work
- •Be realistic: what we believe we can do, primarily in terms of correlator and software efforts
- •Under-promise, over-deliver



The Proposal

8 GHz/pol'n for continuum observations

- •POP item
- •First open call using the 3-bit samplers
- •Continuum only:
 - -128 MHz subbands
 - -Full pol'n products → 2 MHz channels
 - -Dual pol'n products \rightarrow 1 MHz channels
 - –Single pol'n products \rightarrow 0.5 MHz channels
- •Flux scale good to ~10%
- •Can't mix 3- and 8-bit samplers



Phased array VLBI

- •POP item
- $^{\circ}2$ x 1-128 MHz/pol'n independently phased and written to Mk5C recorder
- •Cannot use multiple subarrays
- •Cannot use the rest of the correlator for other work
- •Cannot stack Baseline Boards
 - -256 channels per subband pair, spread over pol'n products
- •Cannot transfer phase from one subband (or subband bandwidth) to another

Independent & flexible 8-bit subbands

- •Up to 16 subband pairs per baseband pair
- •Fully tunable, but cannot cross 128 MHz boundaries (inherent in correlator hardware/firmware)
- •Doppler setting per baseband (as current OSRO)
- •Independent subband bandwidths, 31.25 kHz-128 MHz
- •Independent choice of pol'n products (1, 2, 4)
- •Independent channelization (next slide)



Up to 16,384 spectral channels

- •Flexibly distributed across pol'n products and subbands
- •Up to 2,048 channels per subband pair (dual pol'n)
- •Implemented through Baseline Board stacking
- •Not available when using 3-bits, subarrays, fast dumps, **VLBI**



Up to 5 independent 8-bit subarrays

- •Completely independent in terms of baseband & subband tuning, bandwidths, channelization, dump
- •Observer must submit separate SBs for each subarray, explicitly specifying the antennas to be used in each
- •Cannot use phased array, 3-bit samplers, Baseline Board stacking (i.e., no more than 256 channels per subband pair, distributed across all pol'n products)
- •Some restrictions on number of antennas per subarray (must use <=8 sets of up to 4 antennas each)



Special fast (sub-second) dump modes

- •8-bit only
- •Continuum only: I28 MHz subbands, full pol'n products with 2 MHz spectral channels
- •Table of possible modes
- •One subarray: possibilities include...
 - -2 GHz → 6 ant @ 10msec, 15 @ 50msec, 28 @ 200msec
 - -I GHz → 9 ant @ 10msec, 20 @ 50msec, 28 @ 100msec
- -128 MHz → 28 ant @ 10msec



Special fast (sub-second) dump modes

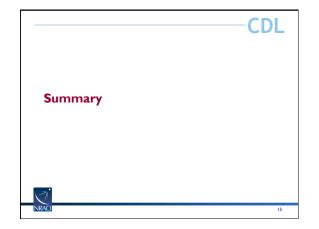
- •Three subarrays (10, 9, 8 antennas):
 - -256 MHz @ 10msec
 - -I GHz @ 40msec
 - -2 GHz @ 80msec
- •High data rates require special justification
 - -28 ant, 128 MHz, 10msec → 77 MB/s, 270 GB/hr
 - -Three subarray modes → 48 MB/s, 170 GB/hr

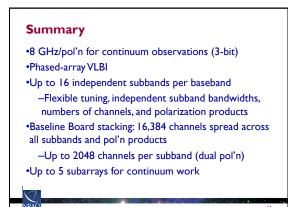


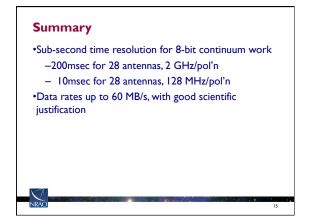
Dump rate restrictions

- •Retain 3-5sec dump limit for now for standard observations
- •Flexibility and channelization options → switch from dump time to dump rate restrictions
- •Limit without special justification: 20 MB/s (70 GB/hr, 140 TB/cfg)
- •Absolute limit without RSRO: 60 MB/s (with good scientific justification)



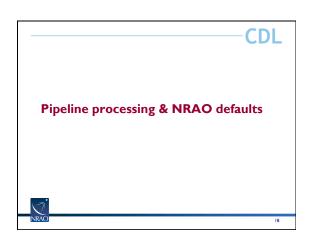








•No frequency averaging – may need this for data rates, certainly by the bigger configs
•No recirculation
•No wideband phased array
•No pulsars
•No Doppler tracking, or Doppler setting per subband
•No OTF mosaicking
•No commensal transient detection etc.
•Only 16 sb/bb



Pipeline-able modes •NOT the same as "regular observing" (non-RSRO) modes •Could define set of standard NRAO resources which must be used for a script to be pipeline-able

