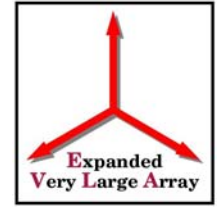


Transition Operations

Claire Chandler



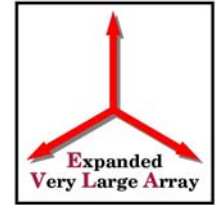
Project Book requirements



- Transition requirements relating to Science Operations:
 - the fraction of time for scientific observations shall be maintained at 60% or greater
 - a period of shutdown ≤ 3 months acceptable if necessary
 - the VLA shall remain VLBI-capable
 - this capability may be removed for up to 8 months if necessary
 - the Pie Town link is not required
 - various other operational requirements on software to enable EVLA antennas to be included in VLA observing with minimum impact on either Operations or the Users

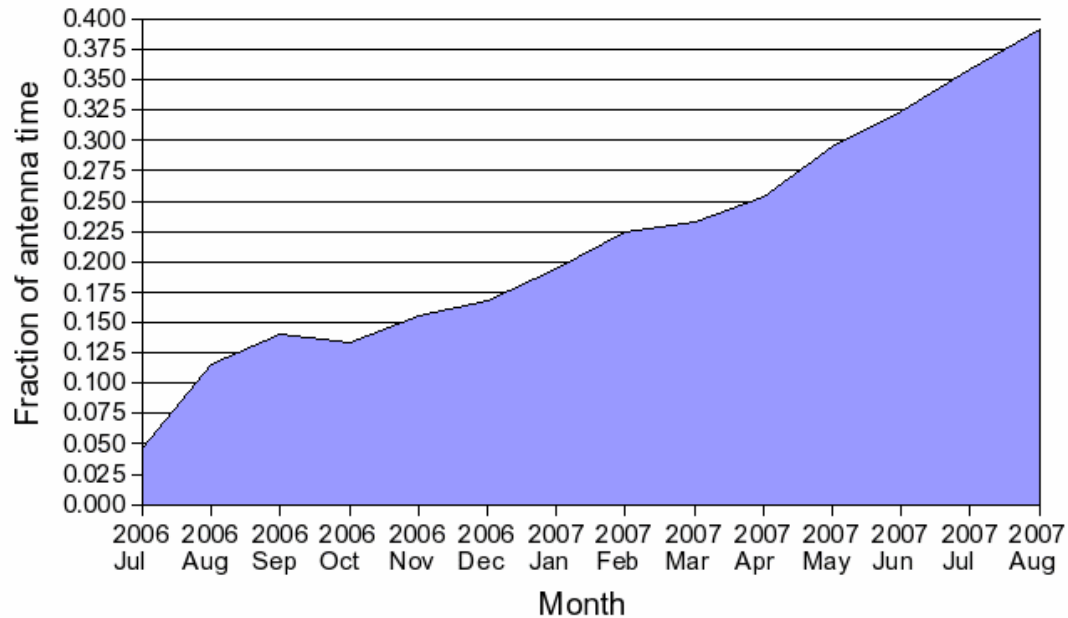


EVLA antenna usage



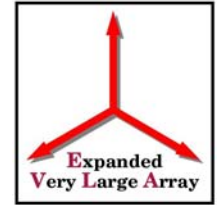
- Currently the EVLA antennas contribute almost 40% of the total antenna hours; by early 2008 the EVLA antennas will constitute half the array

EVLA antennas used in astronomical observations

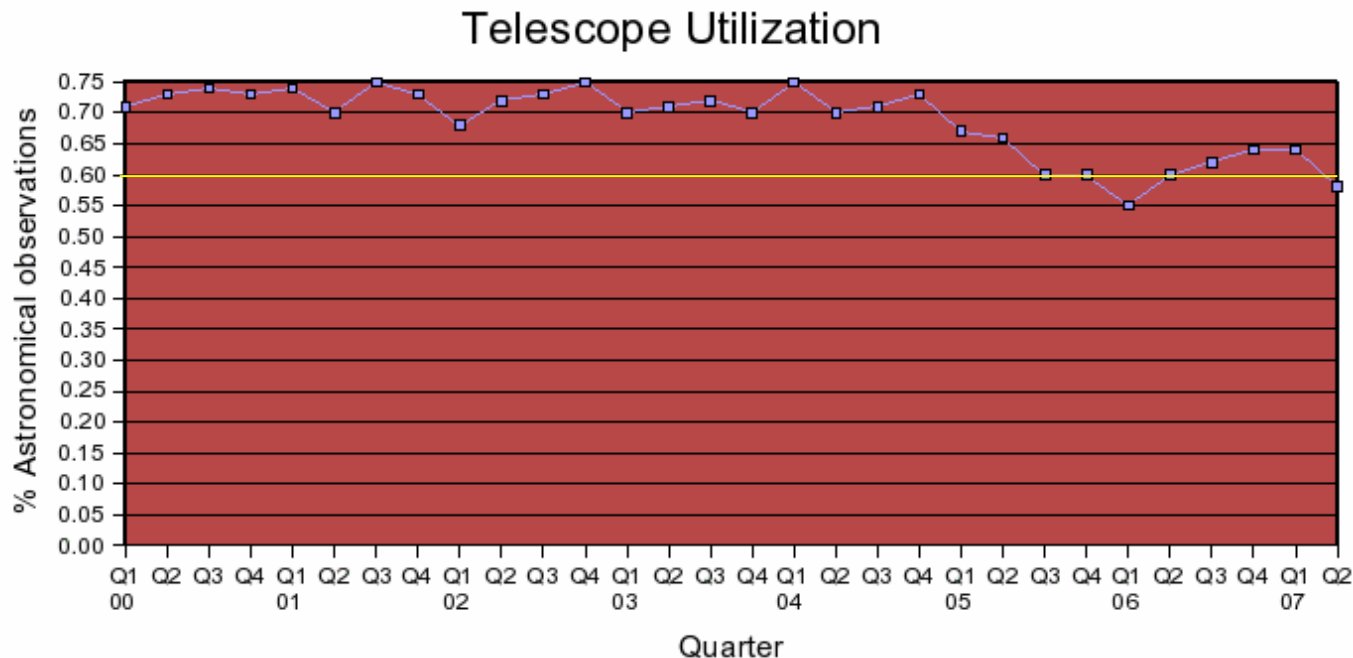




Telescope utilization



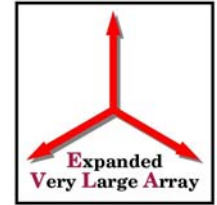
- Fraction of time for scientific observations is being maintained at ~60%



- No extended periods of shutdown expected at this time



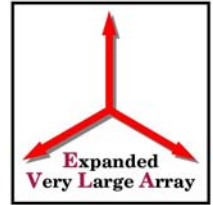
VLBI, Pie Town Link



- VLBI capabilities maintained while the VLA Modcomps ran the online system
- VLBI capabilities were not available initially with the EVLA M&C System, but phased array and single-dish modes are now being commissioned
- The Pie Town link was maintained through A-configuration 2006. It is no longer in operation, and will require hardware development for the link to work with the EVLA; it is not part of the EVLA project



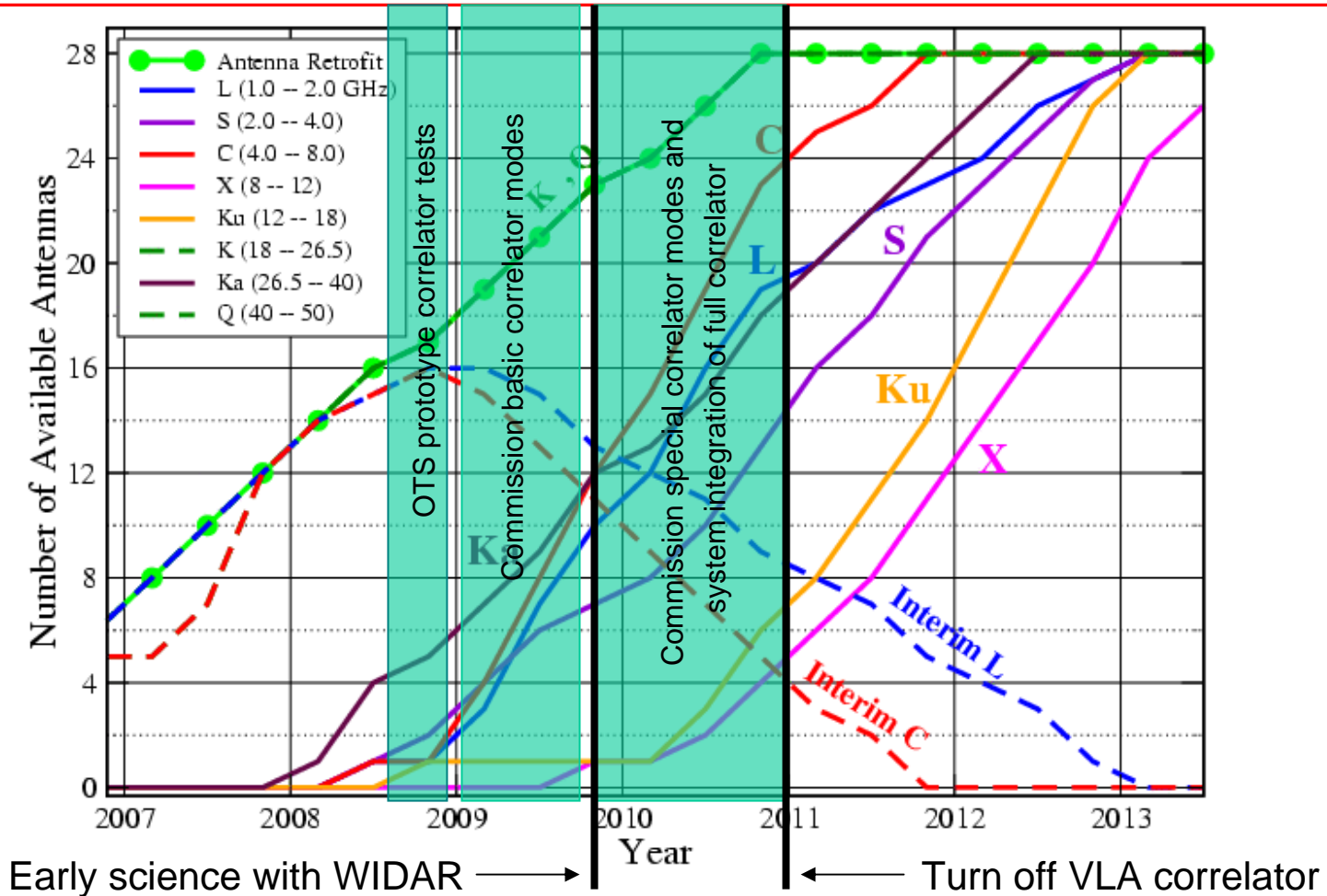
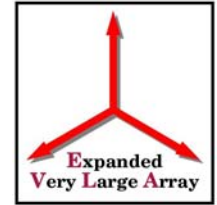
Inclusion of EVLA antennas in regular observing



- Recommended by the Users Committee in 2006
- Began August 1, 2006, on a shared-risk basis
- New EVLA antennas undergo several acceptance tests prior to inclusion in the array:
 - Electronics
 - Operations
 - Tests of scientific performance are not currently required for inclusion in astronomical observations
 - Scientific effort has focused on diagnosing electronic and software problems
 - Formal scientific performance verification tests beginning Q4 2007

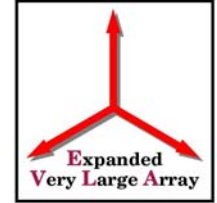


EVLA antenna/band availability





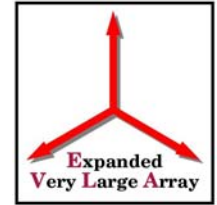
General capabilities



- Currently 11 operating EVLA antennas
- Expanded tuning ranges
 - L-band: 1.2-2.0 GHz (interim receiver; limited by old OMTs)
 - C-band: 4-8 GHz (interim receiver; polarization purity is poor outside 4.5-5.0 GHz due to old OMTs)
 - K-band: 18-26.5 GHz
- New frequencies available with existing VLA bandwidths/correlator set-ups; IFs separated by up to 4 GHz may be currently observed simultaneously at C, K, and Q bands; expanded instantaneous bandwidths available for early science in 2009



General capabilities, cont.



- Observation Preparation
 - An Observation Preparation Tool (OPT) is being developed for the EVLA that will be the sole means of setting up the WIDAR correlator
 - JObserve remains the main tool for preparing VLA observations, but it does not know about the expanded tuning ranges available with the EVLA and there are no plans to upgrade JObserve; users must contact NRAO staff for help in setting up non-standard observations during the transition
- Declining capability at 15 GHz, since the 15 GHz receivers will not be included in the EVLA antennas until close to the end of the project, and the number of VLA antennas is steadily decreasing



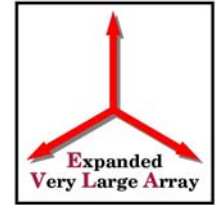
Data quality



- Large fraction of EVLA antennas means that data quality is an extremely important issue
 - Amp/phase problems on EVLA antennas seen last year are now mostly eliminated, data quality is very good
 - There are caveats of which users need to be aware
- Current issues are temporary, and a result of the Observatory being committed to operating the VLA during construction of the EVLA
 - Specific “transition system” that comes at some impact on ease-of-use



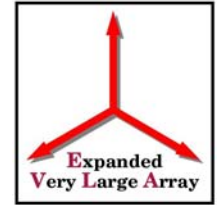
“Transition system”: software



- Operating both VLA and EVLA antennas simultaneously has until June 27, 2007, meant operating two loosely-coupled “on-line” systems: the Modcomps for the VLA, and Linux-PCs for the EVLA
- This resulted in issues related to:
 - Synching of the two systems (e.g., pointing, mosaicing modes)
 - Availability of observing modes in the EVLA system
 - No Doppler tracking on VLA-EVLA baselines
- Implications for users:
 - Increased data inspection and flagging required
 - Change in procedures for spectral line observations



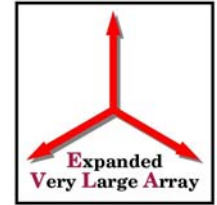
Impact of Modcomp retirement



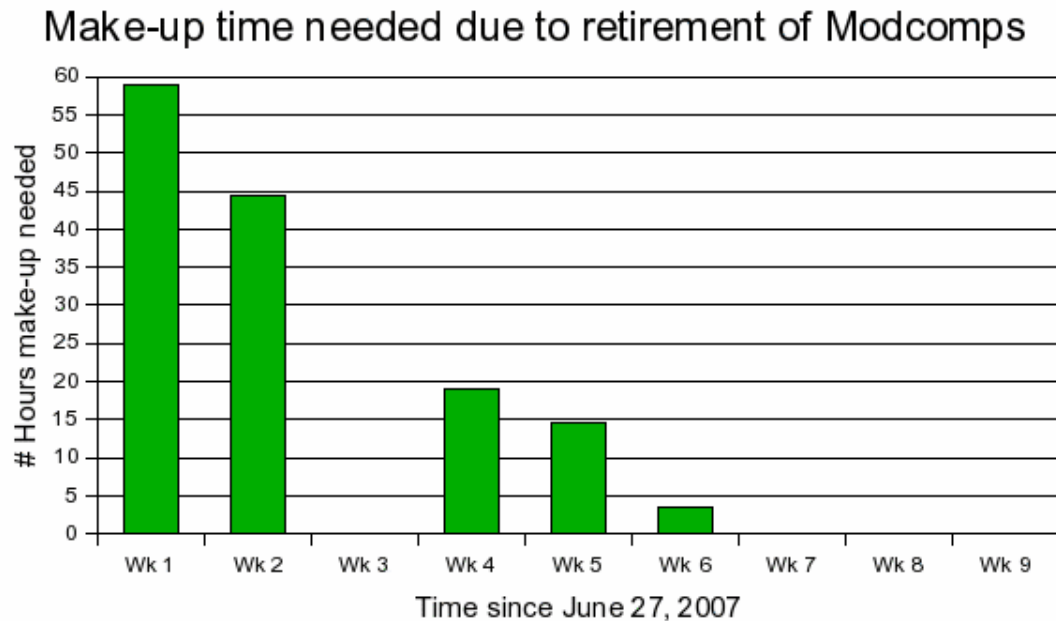
- Modcomps retired June 27, 2007
 - Many problems initially, including incorrect uvw's; archival data have been corrected, PIs informed
 - All astronomical projects checked for data quality using a standard procedure by NRAO staff for a period of 5 weeks; criteria:
 - loss of no more than 30% (45% for fast-switching mode) of data compared with a 26- (L,K), 24- (P,C,Q), or 16- (U) element array after flagging
 - all essential calibration data present
 - good phase stability (subject to weather and observational set-up)



Modcomp retirement, cont.



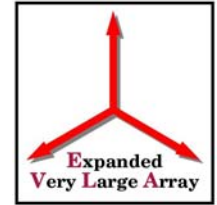
- 140.5 hours of make-up time has been scheduled this configuration



- Data quality is now consistently good, and we now only check data when there are reports of system failures



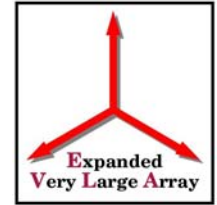
The “EVLA returns” web page



- Some issues relating to “transition” software remain
- All software and hardware issues are listed on the “EVLA returns” webpage, at <http://www.vla.nrao.edu/astro/guides/evlareturn> and in the following slides
- Impact forecasts distributed with current status report 2 weeks ahead of proposal deadlines



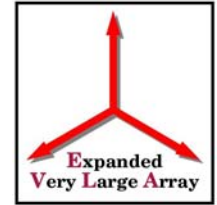
Transition software, remaining issues



- Doppler tracking on VLA-EVLA baselines probably works, but cannot be tested due to VLA hardware issues that also limit Doppler tracking
- Doppler tracking does work on EVLA-EVLA baselines and has been used in astronomical observations
- No antenna positions have been determined yet using the EVLA M&C System
 - limits astrometry
- Correlator offset in spectral line mode due to correlator controller (specific to the transition)
 - a problem for deep integrations
- 31DEC06 or later version of AIPS needed for data reduction



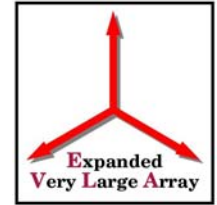
Availability of observing modes



- All commonly-used “standard” modes are available
 - standard interferometer
 - reference pointing (but some issues with observations in “durations” rather than LST stop times)
 - raster modes: mosaicing, holography, fast switching
- Some modes have yet to be fully commissioned
 - planets
 - VLB phased array
 - single-dish VLB
 - Solar
 - multiple subarrays
 - tipping scans



“Transition system”: hardware



- Issues on VLA-EVLA baselines related to:
 - Badly mismatched VLA/EVLA bandpasses, resulting in loss of coherence on VLA-EVLA baselines for continuum observations, and for FILLM-created “channel 0” data
 - Fluke synthesizers on the VLA exhibiting phase jumps on the slightest change in frequency, so on-line Doppler tracking cannot be used and calibration is required at any change in frequency
- Implications for users:
 - New procedures for data reduction needed, including baseline-based corrections for continuum observations, and bandpass corrections prior to forming new “channel 0” for spectral line
 - Change in observing procedures for most observations



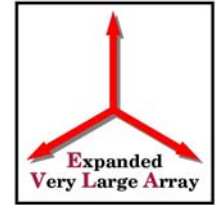
“Transition system”: hardware



- Future prospects:
 - Problems will remain as long as there are both VLA and EVLA antennas
 - Note: both software and hardware “transition” issues generally affect only VLA-EVLA baselines; VLA-VLA and EVLA-EVLA are good



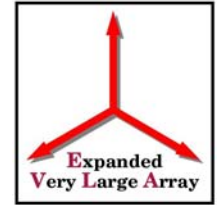
Future observer impact



- New capabilities and availability
 - expanded tuning ranges at L and K-bands already available
 - expanded tuning range at C-band, albeit with poor polarization purity, already available
 - enables observations of excited OH (6 GHz) and methanol (6.7 GHz); a special call for exploratory proposals was made on March 30, 2007, to facilitate observations in the A configuration
 - IFs separated by up to 4 GHz at C (4.0-8.0 GHz), K (18.0-26.5 GHz) and Q (40-50 GHz) bands can be observed simultaneously
 - Ka-band will be made available for astronomy when there are 5 telescopes outfitted, early 2009



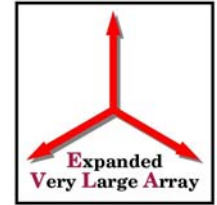
WIDAR on-the-sky tests, configuration schedule



- Current schedule for beginning prototype correlator acceptance tests coincide with move to D config., end of June 2008
- We are considering extending D config. as needed to ensure sufficient time for the on-the-sky tests
- We are considering reversing the direction of configuration cycles from $A \rightarrow B \rightarrow C \rightarrow D$ to $D \rightarrow C \rightarrow B \rightarrow A$ to accommodate scientific commissioning, possibly with shorter cycles than the traditional 4 months



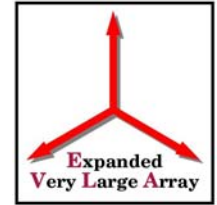
Other developments supporting users



- Proposal Submission Tool, archive access
 - As of the October 2, 2006, proposal deadline, the online Proposal Submission Tool has been the only means by which we accept proposals for the VLA
 - All data obtained for proposals submitted via the PST are available to the PI and CoIs by logging in to the online archive via the NRAO User Database, without needing a separate passcode
- Images available in the archive Fall 2007
- Synthesis Imaging Workshops annually, coordinated with the NAASC



EVLA papers



- “Excited-state OH Mainline Masers in AU Geminorum and NML Cygni”
 - Sjouwerman, Fish, Claussen, Pihlstrom, & Zschaechner (Ap. J. Letters, in press)
- “EVLA Observations of the 6035 MHz OH Masers in ON1”
 - Fish (Ap. J. Letters, submitted)