

EVLA Advisory Committee Reports

Mark McKinnon
Project Manager



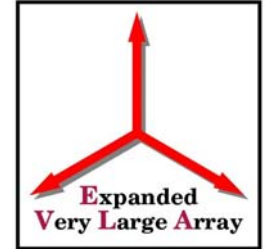
Outline



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- Panel membership
 - Meetings
 - Responses/Actions on Recommendations



Panel Membership



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- Tony Beasley (ALMA) – management (chair)
 - Sean Dougherty (NRC) – science
 - John Dreher (SETI) – systems engineering
 - Marco de Vos (NFRA) – software
 - Glenn Miller (STScI) – software
 - Gianni Raffi (ESO) – software
 - Mark Reid (CfA) – science
 - Luis Rodriguez (UNAM) – science
 - Alan Rogers (Haystack) – electronics, systems engineering
 - Stephen Scott (CalTech) – software
 - Tom Soifer (CalTech) – management
 - Steve Thorsett (UCSC) – science
 - Jacqueline van Gorkom (Columbia) – science
 - Sander Weinreb (JPL) – electronics, systems engineering
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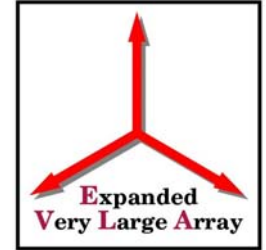
EAC Meetings



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- June 10-11, 2002
 - September 8-9, 2003
 - December 14-15, 2004
 - May 8-9, 2006



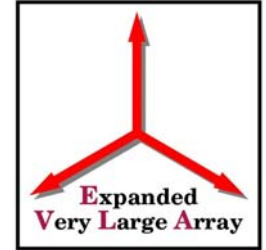
Actions on 2002 EAC Recommendations - 1



- Use project contingency to build EVLA 2's low frequency system or E-configuration
 - Not enough funds in contingency
- Submit EVLA 2 proposal as soon as possible.
 - Proposal submitted in April 2004
- Consider RFI from complete systems point of view
 - Divided L-band amplifier into two gain blocks so that a filter can be inserted to suppress DME signals and avoid amplifier compression
 - Conducted intermodulation assessment to maintain high dynamic range
 - Developed post-correlation scheme for RFI subtraction (many EVLA memos)



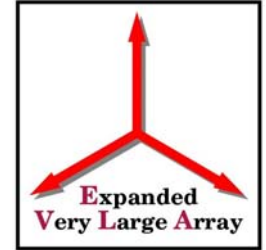
Actions on 2002 EAC Recommendations - 2



- Use of surface-mount and chip microwave integrated circuits (MMICs) is highly-recommended to reduce costs.
 - Surface-mount components and MMICS have been used as suggested. Costs reduced
- Project lacks overall M&C design and software engineering approach
 - Overall M&C design is underway
 - Engineering approach adopted to gather requirements, create a design, and proceed to implementation.



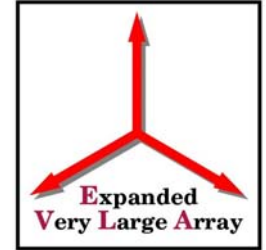
Actions on 2002 EAC Recommendations - 3



- e2e program is too general, lacks presence of active radio astronomers, and doesn't require deliverables on a regular basis.
 - AIPS++ and e2e reorganized to give projects (EVLA and ALMA) more direct control of the work
 - e2e and AIPS++ project scientists appointed
 - Scientific and software requirements documents written. Milestones derived from requirements.
 - Active users group (NAUG) meets regularly to set programmer priorities



Actions on 2003 EAC Recommendations - 1



- Study options that will lead to completion of the low frequency upgrade
 - Technical solution not sufficiently well developed to warrant a proposal for funding
 - Low frequency upgrade removed from EVLA 2 proposal
- Submit the EVLA 2 proposal as soon as possible
 - Submitted April 2004
- Investigate lowering receiver noise temperature by installing polarization-forming hybrid after the LNAs.
 - Investigated. Difficult to meet polarization requirements



Actions on 2003 EAC Recommendations - 2



- Interferometry Software Division has responsibilities to many projects. Ensure that EVLA project needs are met.
 - Majority of post-processing software is common to ALMA and EVLA. Coordinated effort makes sense.
 - EVLA has representation in all areas of post-processing development.
 - Plan developed to define deliverables, acceptance criteria, and schedule for testing and reviews
- Improve interferometer algorithm development, with attention to RFI issues.
 - Ongoing effort of Project Scientist tests concepts of post-correlation RFI excision
 - Foster communication between groups at other observatories



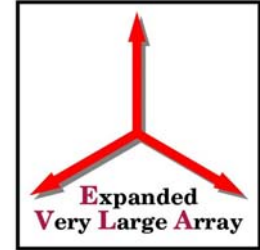
Actions on 2003 EAC Recommendations - 3



- Develop contingency plan to mitigate correlator risk
 - Test and verification plan implemented for pre-production behavioral simulation of correlator chip
 - Additional computer tools used to ensure that digital implementation of the chip is the same as the behavioral simulation.
- Better define the interface between M&C and the correlator
 - M&C requirements and functional specifications for the correlator backend developed
 - Ongoing meetings conducted with Canadian partners to specify and develop the M&C/correlator interface



Actions on 2004 EAC Recommendations - 1



- Overrun in contributed effort from the operations budget to the EVLA project
 - \$2.1M charged to the project
- Inadequate resources for EVLA e2e effort
 - 10 FTE years (\$1M) provided by the project.
 - e2e Operations Division created for entire Observatory
 - Redirection of Observatory resources to e2e
 - Additional resources from AUI under consideration
- Complete refinement of L-band OMT design
 - Ongoing. Test results presented at recent FE CDR



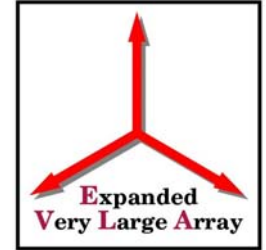
Actions on 2004 EAC Recommendations - 2



- Conduct a careful scientific trade-off study of descope options
 - Scientific study of descope options will be undertaken in FY07, if necessary.
- Bring younger NRAO staff into debugging and commissioning activities.
 - Additional, younger staff actively engaged.
 - Additional staff to be hired in FY07.



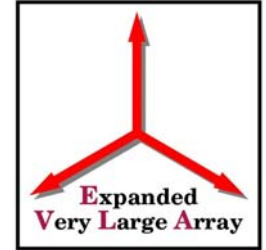
Actions on 2004 EAC Recommendations - 3



- For system tests, two sets of antenna electronics need to operate simultaneously in the electronics lab
 - Excellent suggestion. Can currently simulate 2 central reference sources and 2 LO fiber links in the lab.
- Scope of the M&C system, its science requirements, and interfaces are not clearly defined
 - M&C design document is nearing completion. Includes internal interface definition.
 - Software development plan completed (identifies task description, developers, and timeline).
 - Completed report characterizing information distributed in M&C system.



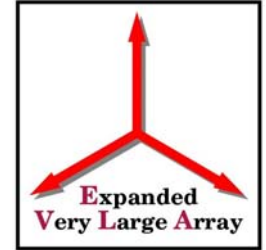
Actions on 2004 EAC Recommendations - 4



- No standards for M&C design and coding.
 - Biweekly code reviews.
 - CVS used for source and version control.
 - Maven for build environment. Standard nightly code builds.
- No M&C test and integration (T&I) plan
 - In transition from VLA to EVLA, EVLA antennas work must work with existing M&C system
 - Longstanding T&I procedure in place and being used
 - Will develop formal T&I plan for correlator in the final M&C system.



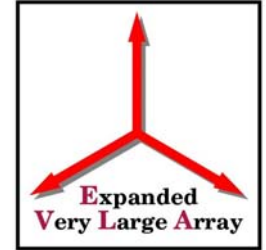
Actions on 2004 EAC Recommendations - 5



- Adequate design of the e2e system is lacking.
 - e2e high level design is complete.
 - More resources assigned to e2e, and High Level Architecture (HLA) team has started the detailed subsystem design.
- Identify and prioritize EVLA-specific requirements for post-processing so that required resources can be identified
 - Post-processing requirements common and unique to ALMA and EVLA have been identified (e.g. wide-field imaging and calibration).



2006 EAC Recommendations - 1



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- Develop more quantitative metrics for project performance for review by NRAO and external stakeholders.
 - Perform a more detailed analysis of contingency and risk
 - Develop more formal testing, verification, and integration plans
 - Better define the role and responsibilities of a science advisory group



2006 EAC Recommendations - 2



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- Clarify the priority of software development items.
 - Closely monitor the correlator delivery schedule. Make contingency plans for a longer transition period if correlator is delayed.
 - More clearly define the role of correlator on-the-sky testing
 - Review and simulate data handling and throughput between correlator and M&C



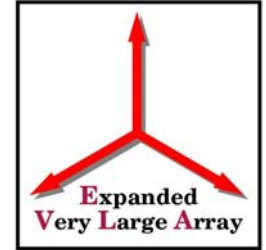
2006 EAC Recommendations - 3



- Complete the refinement of the L-band OMT design as a high priority
- Develop a plan to objectively evaluate competing designs for the 3-bit, 4Gbps digitizers
- Explore collaborations with the ALMA computing group to reuse ALMA scientific support systems (SSS) software
- Set a realistic schedule for defining the role and structure of the new e2e Operations Division



2006 EAC Recommendations - 4



- Reserve project contingency for project/hardware issues. Additional resources for SSS should be provided by the e2e Operations Division.
- Completely document the M&C design and its interfaces
- Raise the visibility of RFI within the project
- Involve more user input and external testing of CASA.



2006 EAC Recommendations - 5



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- Closely review operations plans within NRAO
 - Hire a postdoc for antenna performance checkout
 - Develop a hiring plan for EVLA commissioning staff
 - Consider developing a commissioning postdoc program in NM
 - Aggressively engage the user community in test observations