Progress on 2006 Committee Recommendations

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Report Format

• The 2006 EVLA Advisory Committee report was arranged in four sections:
  – Management
  – Hardware
  – Software
  – Operations & Commissioning

• This status report is organized similarly.
• In what follows, committee recommendations are given in regular font, and progress/current status is in italics.
Management

• Develop metrics for project performance for review by NRAO and external stakeholders. Examine descope options to understand real savings.
  – *Project approach to earned value documented.* (McKinnon)
  – *Performance metrics computed on a periodic basis.*
  – *Cost savings of viable descope options are understood.*
  – *No need to implement descope options at this time; user community will be consulted before options are implemented.*

• Develop more detailed risk and contingency analyses. Schedule risks for correlator, software, and commissioning seem high; quantify via DOE formalism.
  – *Risk management plan developed and implemented in accordance with guidelines of the Project Management Institute.* (McKinnon)
Management

- Develop formal test, verification, and integration plans.
  - Plan for integrating the correlator into the EVLA M&C system is under development by the EVLA Computing Division.
  - Test and verification plan for prototype correlator has been written by DRAO staff.
    - Reviewed and under revision by NRAO. (Rupen)
  - Hardware acceptance test and operational checkout procedure implemented for antenna return to array.
  - Module quality assurance procedures developed to verify performance. (Durand)
  - Correlator installation plan developed.
  - Will develop additional plans as needs arise.
Management

- Define scope and terms of reference for EVLA science advisory group.
  - Terms of reference developed for Science Advisory Group for EVLA (SAGE). Include:
    - Make recommendations regarding definition and implementation of observing modes and first science programs.
    - Dissemination of information pertaining to project status.
  - First meeting held on May 22-23, 2007. (Lo)

- Develop and review a clearer statement of software deliverables and priorities.
  - Of the priorities discussed at last year’s meeting, only those designated as “priority 1” are EVLA project requirements.
  - All priority 1 requirements can be achieved.
Hardware

- Monitor correlator situation closely and add schedule contingency in commissioning. Success-driven schedule of correlator team is beginning to compress.
  - Correlator situation much improved: Problems identified in board fabrication and chip testing have been resolved.
  - Canadian partner has taken steps to expedite schedule by merging production stages. (Dewdney)
  - Adoption of new connectivity scheme provides contingency to Canadian partner that potentially could be used to expedite schedule further.
  - Progress monitored through semi-annual face-to-face meetings, weekly teleconferences, and numerous design reviews.
  - May need to develop plans for extended transition-mode observing.
Hardware

• More clearly define the role of correlator on-the-sky testing.
  – **Prototype correlator is now a 10, instead of 4, station correlator that is a subset of the final correlator.**
  – **Role of on-the-sky tests, in priority order (Rupen):**
    1. **Test correlator hardware prior to committing to full production.**
    2. **Integration and testing of EVLA M&C software.**
    3. **Investigate issues in RFI excision and wideband calibration.**
    4. **Earlier science capability.**
Hardware

• Implement well-documented interface control to address concern regarding data handling and throughput at correlator.
  – Companion study by EVLA M&C is underway.

• Complete OMT refinements to avoid impact on schedule.
  – *Cool-down problems resolved and fabrication method selected for L-band OMT.* (Hayward)
  – Good progress on C-band OMT.
  – RF design of S-band OMT is complete.
  – *Prolonged development and staffing shortage have delayed installation of last, new, X-band receiver.*
    • Still have observing capability with interim, narrowband, X-band receiver.
Hardware

- Verify performance of round trip phase (RTP) system with additional testing.
  - Concern originally arose over phase instabilities detected in visibility data.
  - Laboratory and on-antenna tests conducted in January 2007.
  - Phase instabilities attributed to thermal instabilities in a few local oscillator modules and the antenna vertex room, not the RTP system.
  - Resolution of thermal and phase instability issues is underway, and final refinements to RTP design are being made. (Jackson)
  - In the meantime, phase instability can be addressed observationally with close calibration.

- Develop a plan for digitizer comparison and selection.
  - Original project plan called for adoption of ALMA sampler design.
  - Cost and technical concerns forced investigation of alternatives as a risk mitigation measure.
  - Investigated designs based upon commercially-available digitizer chips.
  - Chip vendor selected and recently approved by NSF. (Jackson)
Software

- E2E/EVLA explore collaboration with ALMA computing group to address apparent staffing shortfall in Scientific Support Systems.
  - In addition to apparent staffing shortfall, NRAO management recognized needs to provide common “look & feel” of software to users of EVLA and ALMA and to minimize long term software maintenance and development costs.
  - General outline developed for joint development of software tools by EVLA, E2E Operations Division (EOD), and ALMA. (Butler)
    - Proposal and archive tools managed/developed by EOD.
    - Observation preparation tool managed/developed by ALMA.
    - Observation scheduling tool managed/developed by EVLA.
  - Implementation plan is underway.
Software

- Management structure and interaction between E2E, EVLA Scientific Support Systems (SSS), and Operations is not clear.
  - EVLA Computing reorganized under leadership of Bryan Butler.
  - Organization chart developed showing interaction between E2E Operations Division (EOD), SSS, and Operations. (Butler & Radziwill)
- E2E must bring new resources to cover budget shortfall in SSS. Existing EVLA project contingency should be left to address broader project/hardware issues.
  - EOD is providing support for proposal submission tool, data processing pipeline, data archive, and algorithm development. (Radziwill)
  - Contingency is reserved for broader project issues, which could include software development.
    - Most change board requests to date are hardware-specific.
    - Additional requirement to provide common look & feel software increases project scope and poses additional risk that will be jointly addressed by EOD, EVLA, and NRAO Operations.
Software

• NRAO should invest more in algorithm development.
  – *Overall approach to Observatory-wide algorithm development outlined in memorandum dated June 2007.* (Fomalont)
  – *Algorithm development carried out by scientific staff and collaborations. Facilitated by the EOD.*
  – *EOD is contributing $180K to algorithm development and seeking external funding on behalf of EVLA.* (Radziwill)
  – *External collaborations:*
    • *Multi-frequency synthesis and wide bandwidth imaging with ATNF.*
    • *Others include University of New Mexico, Naval Research Laboratory, Long Wavelength Array, and Radionet.*
    • *National and regional computing facilities.* (Radziwill)
Software

• Fully document M&C design and interfaces before further development begins.
  – *Top level design document for EVLA M&C system was completed in preparation for the M&C design review in December 2006.*
  – *Interface control documents exist for all EVLA hardware modules, module interface service and data ports, and module interface software framework.*
  – *M&C interfaces to the correlator are being documented in a correlator test and integration plan.*
    • *Virtual correlator interface is well-defined; current focus is on its implementation.*
Software

- Raise visibility of RFI technical development and update status in the near future.
  - **RFI technical developments in progress:**
    - Routine measurement and suppression of RFI from electronics modules.
    - Modifications to receiver designs.
    - Numerous technical memoranda on post-correlation RFI excision techniques.
  - **Correlator RFI capabilities include detection of time-variable RFI and post-correlation RFI excision in correlator backend computer.**
Software

- Involve more external testing and user feedback on CASA. Demonstration at next meeting.
  - Extensive internal and external testing of CASA is underway. (McMullin)
    - Internal, EVLA-specific, CASA test conducted in December 2006.
  - Staged release of CASA is planned.
    - Allows ALMA and EVLA staff to gain experience.
    - Ensures CASA staff can make progress on completing suite of basic functionality and critical algorithm development without being overly distracted by CASA user support.
    - Beta release on September 30, 2007.
  - CASA demonstration at this meeting.
Operations & Commissioning

- Review operations plans more closely within NRAO.
  - Draft EVLA operations plan written.
  - Discussed at NRAO User’s Committee meeting.
  - Details of current status to be presented by Ulvestad.
- Hire a postdoctoral fellow to perform antenna performance checkouts.
  - Done. Brigette Hesman joined the staff on July 2, 2007.
- Develop a hiring plan for additional staff for EVLA commissioning.
  - Plan developed by NRAO-NM AD.
  - Offers extended to, and recently accepted by, two new scientists. (Chandler)
Operations & Commissioning

- Create EVLA postdoctoral fellowships to get astronomers involved with the instrument as soon as possible.
  - A special EVLA postdoctoral fellowship program has not been established.
  - NRAO has, and will continue to, hire postdoctoral fellows with explicit functional duties.
  - Candidates can be identified through the Jansky fellowship program.
    - Look for scientists with EVLA-specific research interests.

- Aggressively engage the user community in test observations in support of commissioning activities.
  - Preliminary plan developed for outside users to participate in commissioning. (Chandler)
  - SAGE suggested a program of long-term visits by community experts, to include time allocation in exchange for participation in onsite commissioning.