PASEO Meeting

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Observatory Science Operations and the NM Array Science Center

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Atacama Large Millimeter/submillimeter Array Expanded Very Large Array Robert C. Byrd Green Bank Telescope Very Long Baseline Array



Overview

- Outline of talk
 - Motivation for Observatory Science Operations
 - OSO scope and organization
 - The NM Array Science Center and its relationship to OSO
 - Structure and staffing of the ASC
- Conclusion
 - Support for the user community and science support for the EVLA and VLBA is being provided by the NM Array Science Center
 - The ASC benefitting from observatory-wide OSO development
 - Staffing of the ASC currently focused on commissioning of the EVLA, will be redistributed to user support and pipeline development and operation in FY11/FY12



Optimizing Science Return

- NRAO Mission Statement:
 - The National Radio Astronomy Observatory enables forefront research into the Universe at radio wavelengths
- How to optimize the scientific return of NRAO's suite of instruments?
 - Engage as much of the astronomical community as possible
 - Provide a unified front to users to simplify access to NRAO telescopes
 - Make telescopes easy to use
 - Provide as close to science quality images and other finished data products as our resources will allow
 - Do the above at the lowest possible cost, taking advantage of economies of scale, minimal duplication of effort, and leverage investments from one telescope to the next
 - Unify science operations across the Observatory under Observatory Science
 Operations



Where OSO fits within the Observatory







OSO scope of services

- OSO scope of work: user-facing science operations
 - Proposal preparation, submission, and review process
 - User portal, helpdesk and face-to-face visitor support
 - Observation preparation support and scheduling block validation
 - Archives and the Virtual Astronomical Observatory
 - Data processing
 - Software development
 - High performance computing
 - Pipelines
 - Algorithm R&D
 - Science community web
 - User education and training
 - Science user outreach
 - Observatory metrics and statistics



OSO Organization

- OSO services provided by a combination of centrally-managed, sharedservices staff, and telescope-specific, site-managed staff
- Management
 - OSO Head: responsible for managing Observatory-wide shared services, and for ensuring OSO standards across the Observatory
 - Steering Committee: comprises representatives from each Science Center, chaired by the OSO Head; sets standards, objectives, and shared services goals
 - OSO operations at the NRAO sites/centers: managed by the Science Operations Leads at the various sites
 - NM Array Science Center Head
 - NAASC Science Operations Lead
 - GBAD or Science Operations Lead
 - Direct line reporting to Ads for day-to-day operations and dotted line accountability to OSO Head

Implementation planned for FYII, many work elements already in progress

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NM Array Science Center

- Provides primary interface between the telescope, telescope operations, and the user community for the EVLA and VLBA
- Counterpart to the North American ALMA Science Center and Green Bank Science Operations, delivering:
 - OSO-related services
 - User support to educate and support the user community in preparing proposals and observations, reducing data, and achieving science goals
 - Data services aimed at delivering pipelined data products, with quantified data quality analysis, to PIs, CoIs, and users of archival data
 - Data processing software and algorithm development
 - (*Data archiving* currently under the EVLA construction project, will move to the NM ASC longer term)
 - Telescope support to ensure the effective operation of the telescopes in meeting the scientific needs of the community



VLA vs. EVLA

- NRAO has been providing some of these services throughout the VLA's history; what's new about the EVLA?
 - Expectations
 - Users expect more than uncalibrated visibilities
 - Comparable instruments (e.g., ALMA) are promising more; users should have a similar experience using all NRAO instruments
 - Sheer data volume will require some level of processing before the user receives the data/data products
 - Need to broaden the user-base and accommodate non-expert users
 - Science is multi-wavelength; capabilities of the EVLA will dramatically increase the applicability of radio techniques to astrophysical problems
 - Must prepare to deliver the highest quality data products, requiring minimal further processing, that our resources allow
 - These services are required in order for the EVLA to reach its scientific potential



Structure of the ASC

JRA

• ASC is structured to provide clarity and visibility to the functions performed by scientific staff in NM Ops, and enables more effective oversight and management of the different areas

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 •User portal •Helpdesk •Proposal preparation and submission •Observation preparation and SB verification •User documentation •Science web •Face-to-face support •User training •PST/OPT software scientific support 	 EVLA pipeline development and maintenance VLBA pipeline development and maintenance Pipeline operation Data product verification Archive software scientific support 	 EVLA scheduling VLBA scheduling Proposal handling and support 	 Calibration Array performance Development and support of special observing modes Software requirements Data quality assurance Commissioning and science verification Technical documentation Specs for future EVLA development 	 Calibration Array performance Development and support of special observing modes SCHED maintenance International VLBI coordination Data quality assurance Commissioning and science verification Technical documentation Specs for future VLBA development

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Other ASC groups matrixed across NRAO



- The CASA group shared between EVLA and ALMA in both its funding and development priorities; 9 out of 13.5 CASA staff reside in Socorro (3.5 in Charlottesville, 1 vacant position)
- The Algorithm Research and Development group uses expertise from across NRAO to focus on algorithm issues for the EVLA



Staffing of the ASC

- Groups define line management, but some functions are matrixed: e.g., all staff will respond to helpdesk tickets in their area of expertise
- Staffing plan assumes an increase of 6 FTEs in FY11, uncertain



The ASC and OSO

- Functions within the ASC are aligned with observatory-wide functionality
- OSO functions will be coordinated with counterparts at the NAASC and GB via the OSO Head and the OSO Steering Committee, which includes the ASC Head



OSO/ASC development progress

- Proposal submission and handling
 - Observatory-wide (EVLA,VLBA, GBT) system in use
- Proposal review process
 - Proposal for a reorganization of NRAO's time allocation process
- User Portal
 - <u>https://my.nrao.edu</u>
- Helpdesk
 - Kayako system adopted for EVLA, VLBA, CASA, NAASC
- Obs Prep and SB validation
 - Telescope specific, EVLA and VLBA
- Archives
 - ALMA's NGAS architecture adopted for EVLA

- Virtual Astronomical Observatory
 - VAO recently funded by NSF, NRAO will host 3 FTEs
- Data Processing
 - CASA working well
 - Algorithm Research and Development Group organized
- Science Web
 - <u>http://science.nrao.edu/</u>
 - Observatory metrics and statistics
 - Reorganized and automated science metrics for Quarterly Status Updates
- OSO implementation plan and WBS almost complete
 - Planned implementation 10/1/2010

Conclusions

- Observatory-wide Science Operations is being implemented to optimize science return for NRAO instruments
- Many work elements already underway
- The NM Array Science Center provides the interface to the user community and scientific telescope support for the EVLA and VLBA
- Current priority for ASC is EVLA commissioning, shifting to user support and pipeline development/operation over the next 2 years

