

Software Overview

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



Software Scope

- Software to control and monitor antennas and correlator; includes software for operators, engineers, staff scientists
- Software system to make access to instrument and data easy for astronomers
- Post-processing software to allow the instrument to reach its full potential

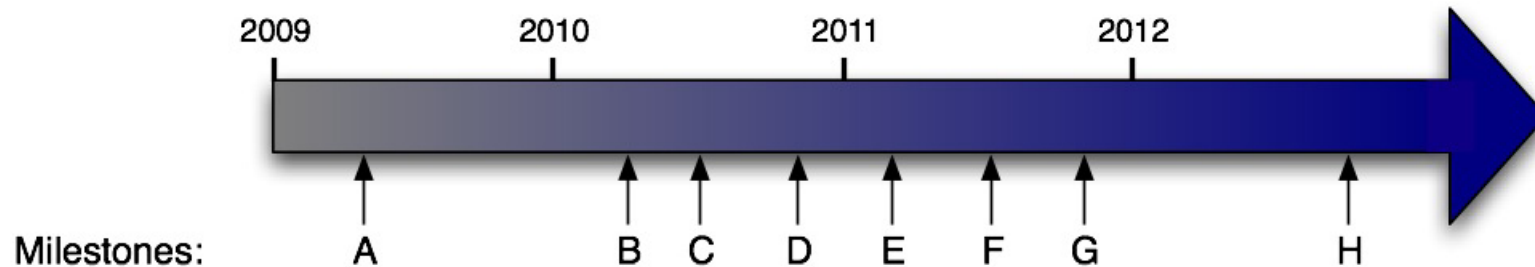
Requirements

We have detailed requirements documents (all available on the web as computing memos) in the following areas:

- Real-time (M&C)
- E2E (SSS)
- Engineering
- Operations
- Post-processing

Requirements have priority and timescale

Remaining Milestone Schedule



A - WIDAR0 testing support

B - full OSRO support (256 MHz); begin support of RSRO capability (2 GHz)

C - begin support of full-bandwidth RSRO capability (8 GHz)

D - begin support of narrow-band RSRO capability (recirculation)

E - begin support of mixed-bandwidth RSRO capability (different widths/channels per subband)

F - full OSRO support (2 GHz); begin support of correlator resource reallocation RSRO capability (trade subbands for channels)

G - begin support of RSRO capability (special capabilities)

H - full OSRO support (8 GHz)

Software Support for Milestone -- Example

Software necessary for WIDAR0:

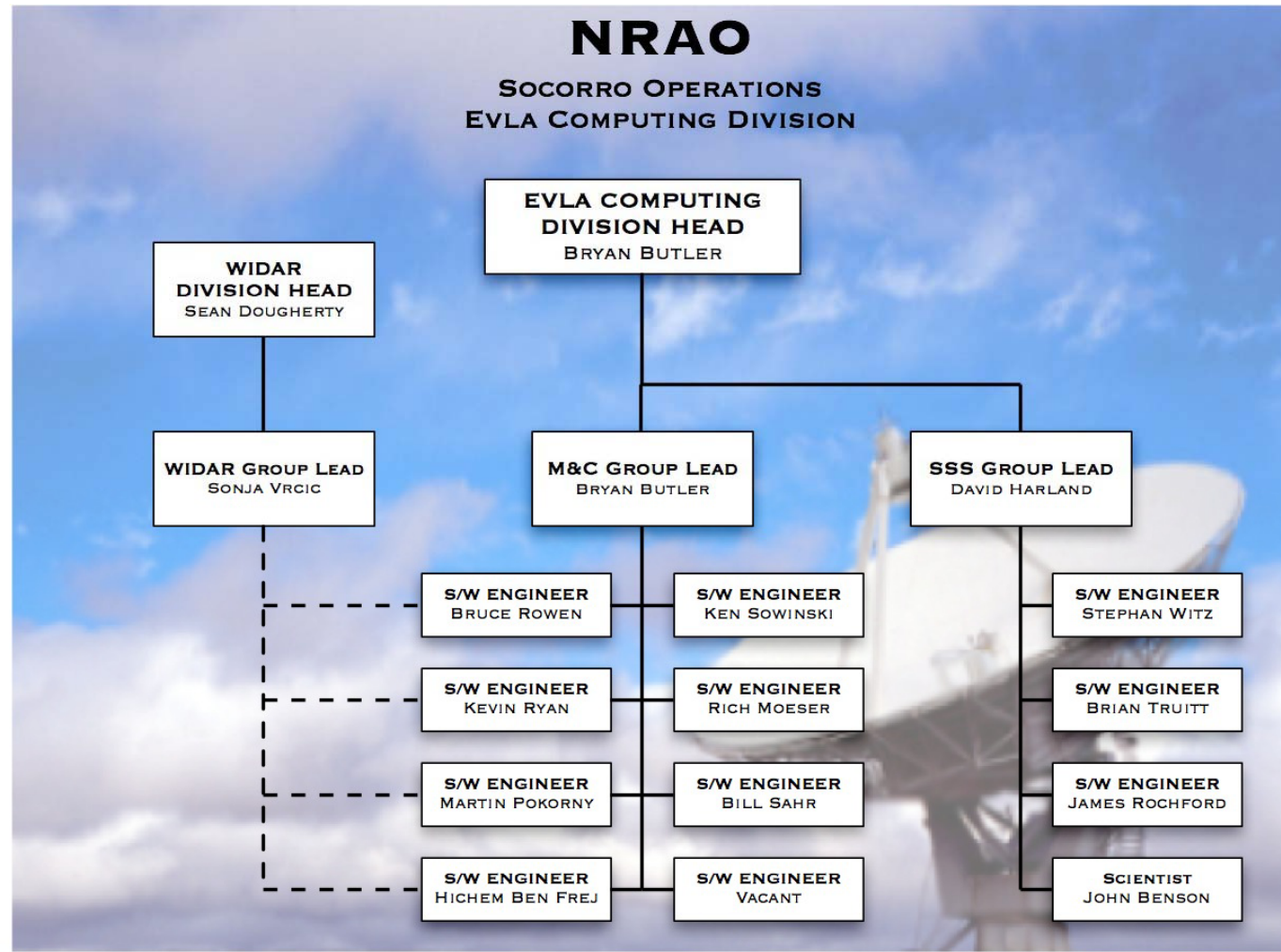
- Executor controls antennas and calculates and distributes delays to correlator system
- Antenna MIB software
- Test Builder and Test Executor used along with correlator board interfaces to store and retrieve board and correlator backend configurations
- Board CMIB software
- Monitor and possibly shut down the correlator boards (CPCC)
- Capture and write visibility data in BDF format (CBE)
- Capture metadata and write it in minimal SDM format (MCAF)
- Write metadata into streamlined and easily searchable database (SDM Cataloger)
- Access metadata for search and data retrieval (AAT)
- Convert from BDF & SDM to Measurement Set (sdmtoms)
- Data analysis - either use CASA directly or use it to write UVFITS then use AIPS

Software Support for Milestone -- Example II

Beyond that, software necessary for initial OSRO (ignoring operations and engineering software):

- Proposals preparation and submission (PST)
- Observation setup (OPT)
- Ability to control and monitor WIDAR (Configuration Mapper, Alerts, Logging, communication with EVLA M&C)
- Increased CBE functionality (decimation in time and frequency, blanking, weighting, Van Vleck correction, etc.)
- realtime telescope corrections (reference pointing only real-time correction necessary, but off-line delay, focus, pointing determinations also supported)
- write more complete SDM (all data necessary for normal user data post-processing)
- Users able to reduce their data fully within CASA (but may still export UVFITS and use AIPS)

Current Staffing



Staffing is sufficient to deliver core software for OSRO and RSRO observing

Planning and Tracking

- We have continued the quarterly planning/tracking mechanism for SSS
- Goals are determined roughly 2 weeks in advance of the beginning of the quarter
- Tracking of progress toward goals occurs at the end of the quarter
- A report is included in the quarterly project updates
- A similar planning and tracking mechanism will be adopted for the M&C group starting this quarter (one has been in place in the past for tracking, but the planning has been less formal - occurring usually during weekly group meetings).

Software Reuse

Within EVLA computing, we reuse software from many places:

- General software community (JAXB, FACES, Hibernate, Eclipse, Tomcat, etc.)
- General astronomical software community (measures, timing, CALC, SLALIB, etc.)
- NRAO, notably ALMA:
 - Particular implementation of CALC
 - CASA
 - AAT (which is based on the ALMA NGAS system)
 - Models - Science Data; Binary Data; Project Data; Calibration Data
 - Catalogs - spectral line; calibrators
 - Enumerations
- We will continue to reuse software wherever beneficial - it is clear that leveraging the ALMA software effort is beneficial and wherever commonality exists (and project timescales allow) we will take advantage of the synergy between the telescopes