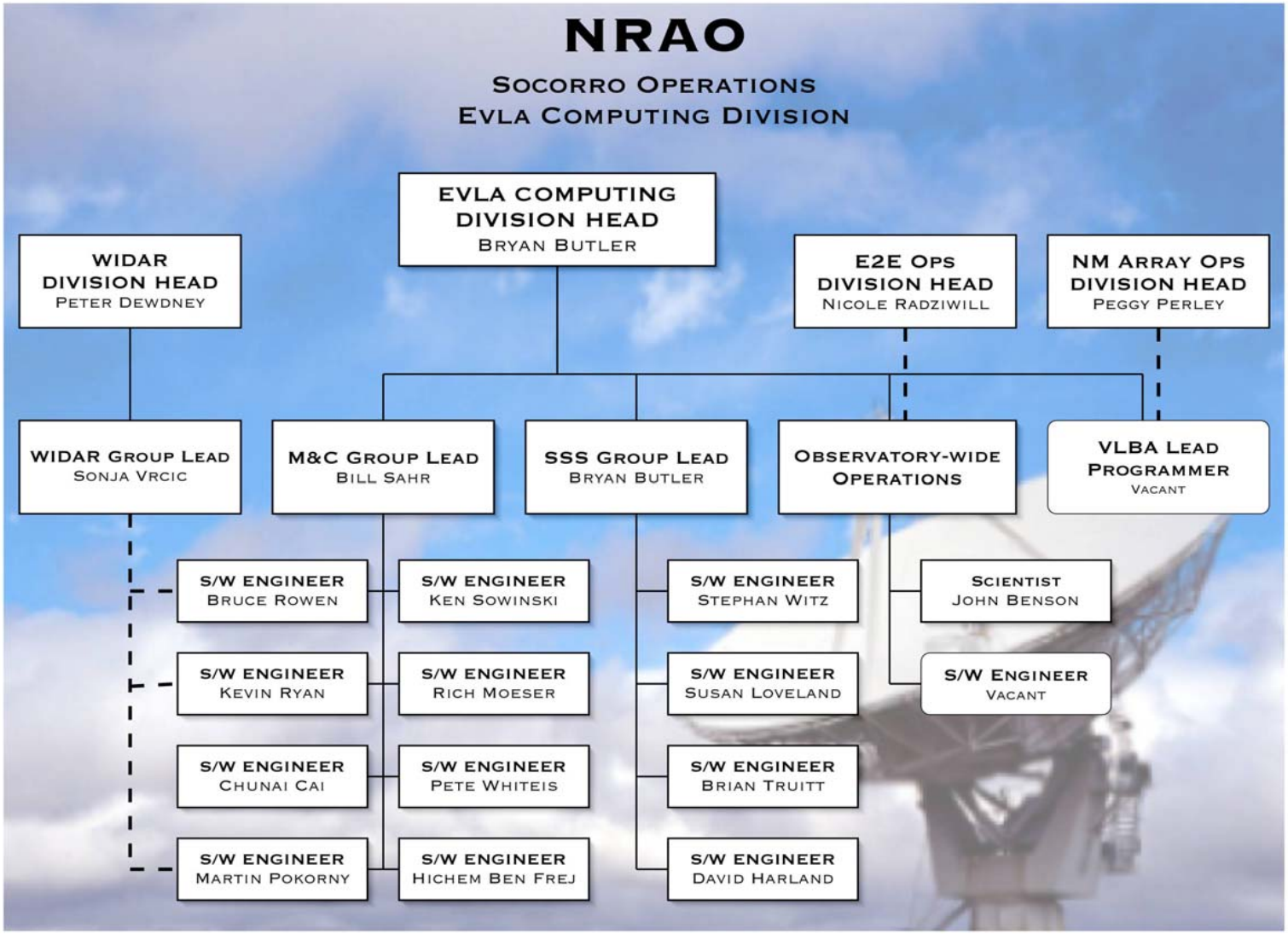
EVLA Monitor & Control Transition System Software

Organization, Budget, Schedules

Organization – ECD Staffing



Organization – ECD Staffing, M&C SW Dev

1. **Hichem Ben Frej – CMP, MIB/module, deformatter port**
2. **Bryan Butler – obs2script, design, software management**
3. **Chunai Cai – deformatter (earlier), Telcal multicast, Telcal display, Flagging (1st version), monitor data archive, monitor data retrieval**
4. **Richard Moeser – user interface software, communications**
5. **Martin Pokorny – WIDAR correlator software**
6. **Bruce Rowen – new correlator controller, WIDAR correlator software**
7. **Kevin Ryan – WIDAR correlator software**
8. **Ken Sowinski – new correlator controller, Telcal, parameters data base, extensive consultation in <u>many</u> areas including but not limited to MIB/module SW, CMP, Vis Pipe, Flagging, IDCAF, VLA antenna screens, plus invaluable assistance with the characterization and debugging of EVLA antenna performance**
9. **Pete Whiteis – MIB/module software, MIB systems sw, Vis Pipe software**

Organization – Effort Contributed Directly to EVLA M&C SW Dev

1. **John Benson – monitor data archive, VLA archive, EVLA archive**
2. **Walter Brisken – IDCAF**
3. **Brent Carlson (DRAO) – numerous, detailed, high quality software specifications, plus many other contributions**
4. **Barry Clark – Observation Executor, extensive consultation in <u>many</u> areas too numerous to mention, plus invaluable assistance with the characterization and debugging of EVLA antenna performance**
5. **Dave Del Rizzo (DRAO) – Real-Time Data Display software**
6. **Ray Ferraro – new correlator controller HW**
7. **Dave Fort (DRAO) – utility & test software for the Station Board**
8. **Clayton Frank Helvey (contractor) – MIB/module software, esp MIB Systems software**
9. **Michael Rupen – Binary Data Format spec, SDM spec, other correl issues**
10. **Pat Van Buskirk – monitor data archive, numerous operational issues**
11. **Sonja Vrcic – Station Board software, WIDAR correlator software**

Organization – Staffing levels

- One (1) EVLA M&C Group Leader
- Nine (9) individuals in the ECD working directly on EVLA M&C software development
- Eleven (11) scientists and engineers making significant contributions directly to &/or actually developing EVLA M&C software
- Many significant contributions from numerous individuals omitted – Gene Cole, Mark McKinnon, Rick Perley, Steve Durand, Jim Jackson, Peggy Perley, VLA Operators, numerous hardware engineers, many others

Organization - Code

- From Jan through June 2006, biweekly code reviews
  - The code reviews will probably be resumed
  - Design reviews have been requested
- CVS used for source code control since earliest days of the project.
  - Agreed upon, standard dir/subdir structure
  - Now transitioning to Subversion
- Maven and make files used for builds
  - Update to Maven 2.0 planned
- Nightly code builds
- Agreed upon system for code distribution

Budget - WBS Categories

- The software categories were formulated in 2001, before there was a software design, so they do not map well onto actual high level software tasks
- The software categories do provide a means of organizing the funds
- The hardware categories do map reasonably well onto reality.

WBS Categories – Transition & Final System

WBS #	Name	M&S Funds or Main Purpose	Other Funds
6.10.01	Mngmnt/Subsys Engnring	Prof'l Dev, training, etc	Travel
6.10.05.05	Physical Interface	HW: MIB, Analog Board, Slot ID	None
6.10.05.10	Utility Module – M302 & M303	HW: M302 & M302 modules	None
6.10.10	M&C Network: HW & SW	Not admin'd by EVLA M&C	None
6.10.15	M&C Cmpting Systems: HW&SW	Computing platforms, SW, support	Contracts
6.10.20.05	Stabilization of the VLA	No funds, New Modcomp Cmptrs	None
6.10.20.10	Requirements	No funds, used only to track labor	None
6.10.20.15	High Level SW Arch & Design	No funds, used only to track labor	None
6.10.20.20	Test & Dev Support, Antennas	No funds, used only to track labor	None
6.10.20.25	Mid Level Analysis & Design	No funds, used only to track labor	None
6.10.20.30	Test & Dev Support, Correlator	CBE test cluster, track labor	Contracts
6.10.20.35	Detailed Design & Coding	Maint, training	Contracts
6.10.25	Switch Interface Module – M301	HW: M301 Switch module	None
6.10.30	M&C Transition Hardware	HW: F320 FE cntrllr, ACU/FRM IF	None

WBS Categories: Funding – Transition & Final System

WBS	Name	M & S, Othr - Totals (includes contractors)									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	Totals
6.10.01	Mngmnt/Subsys	0.0	0.0	4.7	3.3	3.8	7.0	7.2	5.3	0.0	31.3
6.10.05.05	Phys Interface	33.3	93.8	49.3	361.5	443.4	25.8	7.7	2.5	0.0	1,017.4
6.10.05.10	M302 & M303	0.0	0.0	9.0	10.0	7.0	20.8	20.8	20.8	20.8	109.0
6.10.10	M&C Network	0.6	21.0	86.9	94.8	15.3	138.5	83.8	87.4	21.2	549.5
6.10.15	M&C Cmpting Systems	175.2	131.3	57.7	53.4	70.5	125.5	144.5	108.0	217.5	1,083.7
6.10.20.05	Stabilization of the VLA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.10.20.10	Requirements	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.10.20.15	Arch & Design	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.10.20.20	Tst & Dev, Ant	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.10.20.25	Mid Level Anlysis & Dsgn	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.10.20.30	Test & Dev Correlator	0.0	0.0	0.0	0.0	0.0	54.1	45.2	52.6	35.0	186.8
6.10.20.35	Detailed Design & Coding	0.0	1.8	152.2	4.2	16.0	9.2	0.0	0.0	0.0	183.5
6.10.25	M301	0.0	0.0	4.4	0.1	52.4	12.5	0.7	0.0	0.0	70.0
6.10.30	M&C Transition Hardware	0.0	7.9	2.8	13.5	1.4	14.3	12.1	13.3	0.0	65.2
	Totals	209.2	255.8	367.0	540.8	609.9	407.6	321.9	289.8	294.4	**3,296.5**

WBS – 6.10.15, M&C Computing Systems, HW & SW

- Approximately $1M allocated over the life of the project
- MIB Systems SW: OS, Network stack, Ethernet driver, shell – purchase, port, support
- MIB SW Dev Systems: laptop, toolset, debugger SW & HW
- Oracle license (& support) for the monitor data archive
- Workstations for SW development
- The EVLA M&C computing platforms
- The CMP hardware

Schedules – Planning

- EVLA M&C Software Development Plan
  - EVLA_MandC.mpp, an MS Project worksheet
    - Task sheet view of the current version on CDR web page
  - Task list: basically functional decomposition
  - Start & finish dates, duration
  - Percent complete
  - Predecessors
  - Resources

Schedules – Planning
EVLA_MandC.mpp

ID	Task Name	Duration	Start	Finish	% Comp	Predeces	Resource Names
11	**Transition System, Retirement of M**	**284 wk**	**Jan 1**	**Jun 25**	**74%**		
12	**General Capabilities**	**65.6 wk**	**Dec 5**	**Mar 19**	**75%**		
57	**M&C of EVLA Antennas**	**54.6 wk**	**Feb 1**	**Feb 28**	**68%**		
78	**Visibility data distribution (Visibi**	**44 wks**	**Mar 3**	**Jan 12**	**79%**		**Ray Ferraro[25%],Bruce Rowen[1**
88	**VLA format archive records (IDC**	**90.8 w**	**May 2**	**Feb 5**	**68%**		
89	Definition of archive format	13.6 w	May 2	Aug 3	100		Ken Sowinski[10%]
90	Control script extensions	8 wk	Sep 29	Nov 28	75%		?
91	Obs2script extensions needed b	8 wk	Sep 29	Nov 28	75%		Bryan Butler[10%]
92	Executor extensions needed by	8 wk	Sep 29	Nov 28	75%		Barry Clark[30%],Ken Sowinski[5%
93	IDCAF software	14 wl	Sep 29	Jan 12	40%	92SS	Walter Brisken[50%]
94	IDCAF testing of deployed final	3 wk	Jan 16	Feb 5	0%	89,91,92	
95	VLA format archive records writ	0 wk	Feb 5	Feb 5	0%	94	
96	**Operator training - Modcomp Re**	**5.2 wk**	**Feb 21**	**Mar 28**	**0%**		
101	**M&C of VLA Antennas**	**49.4 wk**	**Mar 1**	**Feb 20**	**89%**		
116	**M&C of VLA Correlator**	**272 wk**	**Jan 1**	**Mar 29**	**83%**		
140	**ITelcal**	**107.6 wl**	**Feb 14**	**Mar 19**	**85%**		
146	**Flagging**	**84 wks**	**Sep 21**	**May 1**	**71%**		
155	**User Interfaces, Transition Syste**	**48 wks**	**Mar 20**	**Feb 28**	**44%**		
169	**User Interfaces, Transition & Fin**	**70.6 w**	**Aug 1**	**Dec 11**	**69%**		
175	**Global Issues**	**0.2 wk**	**May 1**	**May 1**	**20%**		
183	**EVLA M&C System Controlling tl**	**12 wk**	**Mar 30**	**Jun 25**	**0%**		

EVLA M&C Software Goals/Milestones

- Transition System
  - ✓ Support for EVLA antenna hardware development
  - ✓ Support use of EVLA antennas in scientific observations
  - ☐ Replacement of the Modcomp-based VLA control system
  - ☐ Support WIDAR prototype board tests & prototype correlator
  - – Support for design & development of final system architecture: lessons learned, carryover, testbed
- Final System
  - – Final System Architecture: Observation Executor, Device Objects, Full Alerts Subsystem, Archive IF, & more
  - – Support for full version of WIDAR correlator: Obs Exec, EVLA Telcal, EVLA DCAF, MCCC SW (VCI, config mapping), CPCC SW, MAHs/Dev Drvrs V2, System GUIs, & much more

Replacement of Modcomp-based VLA Control System

- Retirement of the Modcomp-based VLA Control System
- By the end of Q2 2007 (end of June 2007)
- Major Steps remaining:
  - VLA correlator output (Visibility Pipe): mid Jan 2007
  - VLA format archive records (IDCAF): early Feb 2007
  - Monitor and control of VLA antennas: late Feb 2007
  - Monitor and control of VLA correlator: early Mar 2007
  - Operator Training, Modcomp Repl System: starts late Feb 2007
  - Parallel operation & testing: Apr – Jun 2007

Prototype Correlator

- Installation at the VLA site: Jan 2008
- DRAO on-the-sky (OTS) testing: Feb thru mid-May 2008
- Main NRAO responsibilities:
  - Supply delay models & integration control parameters
  - Prototype CBE/FF with Binary Data Format output
  - Archive records (IDCAF2) & Archiving
  - Sufficient post processing capabilities
- An exercise in NRAO-DRAO coordination

Prototype Correlator - Planning

ID	Task Name	Duratic	Start	Finisl	% Comp	Predece	Resource Names
290	**Prototype Correlator (PTC**	**124 wl**	**May 1**	**Oct 7**	**4º**		
291	**Binary Data Format (BD**	**42.4 w**	**May 1**	**Mar 2**	**0º**		
296	**Archive Records Forma**	**34 wk**	**May 1**	**Dec 2º**	**0º**		
303	**Science test plan for th**	**6.3 wl**	**Jan 2**	**Feb 15**	**0º**		
305	**PTC Data Archive**	**0.2 wl**	**May 1**	**May 1**	**0º**		
309	**Post Processing**	**2.4 wl**	**May 1**	**May 1(**	**0º**		
315	**PTC SW RFS documen**	**13.2 v**	**Oct 25**	**Feb 2**	**0º**		
319	**Interim Observation Ex**	**0.2 wl**	**May 1**	**May 1**	**0º**		
324	**Config & Control**	**16 w**	**Oct 19**	**Feb 16**	**0º**		
327	**Test Builder, Executor,**	**22.6 v**	**Sep 4**	**Feb 16**	**15**		
332	**Real-Time Data Display**	**0.2 wl**	**May 1**	**May 1**	**0º**		
334	**Prototype MCCC softwa**	**0.8 wl**	**May 1**	**May 4**	**0º**		
339	**Higher Level RT CMIB S**	**0.2 wl**	**May 1**	**May 1**	**0º**		
343	**? Lower Level CMIB SW**	**19.2 w**	**Aug 28**	**Jan 17**	**0º**		
347	**CBE & FF SW for the P**	**0.2 wl**	**May 1**	**May 1**	**0º**		
349	**IDCAF2**	**0.2 wl**	**May 1**	**May 1**	**0º**		
353	**PTC - DRAO Assembly**	**3 wl**	**May 1**	**May 1º**	**0º**		
356	**PTC - VLA On-The-Sky**	**121.8 w**	**May 1(**	**Oct 7**	**4º**		