



<b>Title:</b> QSU# 2 FY2014	<b>Author:</b> L. Wingate, ADs	<b>Date:</b> 5/7/2014
NRAO Doc. #: PMD00050		<b>Version:</b> 0.01

## National Radio Astronomy Observatory Quarterly Status Update 2 FY2014

January – March 2014

<b>PREPARED BY</b>	<b>ORGANIZATION</b>	<b>DATE</b>
L. Wingate, ADs	PMD/Director's Office	5/7/2014

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

Q1 Performance Assessment

Q2 Performance Assessment

POP Section Number	POP Milestone	Task Name	Completion Date	Cost	Schedule	Technical	Cost	Schedule	Technical
<b>Observatory Science Operations</b>									
3.1		<b>Telescope Time Allocation (TTA)</b>							
	1	SSR review of TTA	12/31/2013						
	2	CIP for semester 2014B	3/31/2014						
	4	SRP & tech review process, semester 2014B	3/31/2014						
	6	TAC meeting for semester 2014A	12/31/2013						
	8	Update SW tools requirements for TAC support 2014A	12/31/2013						
	9	Update SW tools requirements for PST 2014B	3/31/2014						
	12	Update documentation for CIP & tools 2014B	3/31/2014						
		<b>Science User Services (SUS)</b>							
	14	HD 4.5 documentation	12/31/2013						
	15	Update ALMA Cycle 2 proposal preparation documentation	12/31/2013						
	16	Update CASAGUIDES	12/31/2013						
	18	IAU Symposium 303 – The Galactic Center	12/31/2013						
	21	AAT/ASA science requirements	12/31/2013						
	22	Manual reduction of ALMA science data and QA2	12/31/2013						
	23	Manual reduction of ALMA science data and QA2	3/31/2014						
		<b>Science &amp; Academic Affairs</b>							
	29	Jansky Fellow selection	12/31/2013						
	30	NRAO summer student selection	3/31/2014						
		<b>Science Support and Research Services</b>							
	34	Renegotiate electronic journals	3/31/2014						
<b>Observatory TELESCOPE Operations</b>									
4.1		<b>Atacama Large Millimeter/submillimeter Array (ALMA)</b>							
		<b>Construction</b>							
	1	ALMA Construction Completion and Operations Readiness Review	3/31/2014						
	2	Acceptance of Optical Pointing Telescopes	12/31/2013						
	3	Complete installation of 400V cables and fuse disconnects at AOS	12/31/2013						
	4	Complete delivery of FE Thermal Interlock Modules	3/31/2014						
	5	Complete delivery of NAOJ Band 4, 8, and 10 multipliers	3/31/2014						
	6	Delivery of first Front End Handling Vehicle (FEHV)	3/31/2014						
	7	Delivery of three remaining FEHVs	9/30/2014						
		<b>Operations</b>							
		NAASC/NA ARC							
	8	ALMA Construction Completion and Operations Readiness Review	3/31/2014						
	9	ALMA C1 User Survey	3/31/2014						
4.2		<b>Very Large Array (VLA)</b>							
		<b>Scientific Support for Operations</b>							
	1	Support the 2014B semester (2014 Feb 1) Call for Proposals	3/31/2014						
	3	Support reconfiguration to B-config	12/31/2013						
	4	Support reconfiguration to BnA and A-configs	3/31/2014						
		<b>Array Operations</b>							
	8	Re-configurations to B config	12/31/2013						
	9	Re-configurations to BnA and A configs	3/31/2014						
		<b>VLA Prototype ACU</b>							
	13	Critical Design Review of ACU prior to 2 <sup>nd</sup> installation	12/31/2013						
	14	Install 2 <sup>nd</sup> ACU	3/31/2014						
		<b>VLA 3-Bit Sampler Upgrade</b>							
	20	Install 3-bit sampler PCB in 2 VLA DTS modules	3/31/2014						
		<b>VLA API Upgrade</b>							
	22	Install final 2 API dishes	12/31/2013						
		<b>Capability Enhancements</b>							
	24	Define and demonstrate new SR and general capabilities for 2014B	12/31/2013						
		<b>Operational Enhancements</b>							
	27	Tipping scans implemented	3/31/2014						
		<b>Infrastructure Maintenance and Renewal</b>							
	30	Overhaul total of 6 antennas	12/31/2013						
	31	Overhaul total of 6 antennas	3/31/2014						
	40	Preventive maintenance on hatch gear	3/31/2014						
4.3		<b>Very Long Baseline Array (VLBA)</b>							
		<b>Scientific Support for Operations</b>							
	1	Support the 2014B semester (2014 Feb 1) Call for Proposals	3/31/2014						
	3	Complete verification tests of VLBA dual RDBE system	3/31/2014						
	5	Stabilize VLBA + Y27/GBT operations	3/31/2014						
		<b>Retirement of VLBA VMEs</b>							
	6	Design, build, and install VLBA Control Computer Interface Box in laboratory	12/31/2013						
		<b>Retirement of Legacy Recording System</b>							
	8	Complete transition of projects using legacy system to DDC	6/30/2014						
		<b>C-Band Receivers</b>							
	10	Complete construction of spare VLBA C-Band receiver	3/31/2014						
		<b>Capability Enhancements</b>							
	12	Define and demonstrate new SR and general capabilities for 2014B	12/31/2013						
4.4		<b>Green Bank Telescope (GBT)</b>							
		<b>Antenna Performance</b>							
	4	A new pointing model for the GBT will be developed	12/31/2013						
		<b>Observatory Development Programs</b>							
5.1		<b>CDL Development</b>							
		<b>Phased Array Feeds</b>							

NRAO Quarterly Status Update (QSU2 FY2014)  
January - March 2014

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Q1 Performance Assessment

Q2 Performance Assessment

POP Section Number	POP Milestone	Task Name	Completion Date	Cost	Schedule	Technical	Cost	Schedule	Technical
	1	Design improved low-noise amplifier with lower noise and improved reliability	3/31/2014						
	4	Demonstrate single L-Band prototype integrated downconverter digital photonic link	3/31/2014						
	6	Demonstrate single-FPGA narrowband beamformer prototype	3/31/2014						
	10	Implement version control and document existing PAF software	12/31/2013						
		<b>Advanced Receiver Technologies</b>							
	12	Test triangular Digital OMT (DOMT) on the sky	12/31/2013						
	13	Demonstrate polarization isolation of DOMT using FPGA	3/31/2014						
	14	Measure W-Band phase stability of the LO distribution network	3/31/2014						
	15	Demonstrate printed circuit flexible thermal transition with low loss up to 40 GHz	6/30/2014						
	16	Build multi-channel digital back end for testing of digital photonic links	3/31/2014						
5.2		<b>ALMA Development</b>							
		<b>Band 5 Local Oscillator</b>							
	1	Unit production; WCA No. 04 - 05	12/31/2013						
	2	Unit production; WCA No. 06 - 20	3/31/2014						
5.3		<b>GBT Developments</b>							
	1	ARGUS Cryostat Complete	3/31/2014						
	4	ARGUS Warm electronics complete	3/31/2014						
	6	MUSTANG 1.5 Science commissioning begins	12/31/2013						
		<b>OBSERVATORY-WIDE SERVICES</b>							
6.1		<b>Central Development Lab</b>							
	3	Demonstrate 4-12 GHz balanced IF LNA with low power dissipation	3/31/2014						
	7	Complete design of reflective Band 2 optics	3/31/2014						
	9	Produce prototype data acquisition upgrade for PAPER	3/31/2014						
	10	Characterize beam pattern of MWA tiles and PAPER antennas using ORBCOMM satellite	3/31/2014						
6.2		<b>Data Management &amp; Software</b>							
		<b>Software Development</b>							
		<i>Archive Access Tool</i>							
	1	Develop initial design of ALMA Archive Tool	3/31/2014						
		<i>CASA Pipeline</i>							
	3	Develop CASA pipeline for ALMA Cycle 1 Early Science	12/31/2013						
	4	Integrate VLA Scripted Pipeline	12/31/2013						
	5	Develop CASA pipeline for ALMA Cycle 2 Early Science	3/31/2014						
		<i>CASA</i>							
	6	Release CASA version 4.2	12/31/2013						
			12/31/2013						
	8	Develop CASA version 4.4	3/31/2014						
			6/30/2014						
			9/30/2014						
		<i>Observing Preparation Tool</i>							
	10	Implement OPT updates for Semester 2014A VLA observing	3/31/2014						
		<i>Proposal Handling Tool</i>							
	12	Implement PHT updates for Semester 2014A TAC meeting	12/31/2013						
		<i>Proposal Submission Tool</i>							
	14	Implement PST updates for Semester 2014B Call for Proposals	12/31/2013						
		<b>ALMA Systems Software</b>							
		<i>System Software Updates, Bundle 1</i>							
	17	Deploy Dynamic Scheduling software	3/31/2014						
	18	Deploy Quick-look improvements software	12/31/2013						
	19	Incorporate TelCal calibrations in scan sequences	3/31/2014						
		<b>VLA/VLBA System</b>							
	22	Deploy software to support Semester 2013B observing	12/31/2013						
	23	Deploy software to support Semester 2014A commissioning	12/31/2013						
	28	Demonstrate quasi-real time spacecraft tracking	3/31/2014						
		<b>GBT System</b>							
		<i>WV Sys Archive</i>							
	30	GBT Data in NRAO Archive	3/31/2014						
		<i>WV Sys - M&amp;C</i>							
	31	Core infrastructure changes complete	12/31/2013						
		<i>GBT PP - Pipeline</i>							
	34	Deliver GBT imaging capability in CASA	12/31/2013						
	35	VEGAS supports highest data rates	3/31/2014						
		<b>Scientific Information Services</b>							
		<i>Archive &amp; Cluster</i>							
	37	Draft computer access policy for external users	12/31/2013						
	38	Enable early access to cluster resources	3/31/2014						
		<i>XSEDE/Cloud</i>							
	39	Install Grid/Cloud Middleware	3/31/2014						
		<i>Network Performance</i>							
	41	Enable improved monitoring of Internet 2 links	3/31/2014						
	44	Install 10 Gigabit/s link to UVa Data Center	12/31/2013						
	45	Install storage at UVa	3/31/2014						
		<i>Green Bank data</i>							
	46	Install 10 Gigabit network hardware	12/31/2013						
	47	GB link go-live	3/31/2014						
		<b>DMSD Administration</b>							
	49	Complete Data Management & Services Department formation	12/31/2013						
6.3		<b>Program Management Department</b>							
	2	Audit complete - proposal development	12/31/2013						

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Q1 Performance Assessment

Q2 Performance Assessment

POP Section Number	POP Milestone	Task Name	Completion Date	Cost	Schedule	Technical	Cost	Schedule	Technical
	3	Audit complete – project management	3/31/2014						
	6	PMD F2F complete	12/31/2013						
<b>6.4</b>		<b>Education and Public Outreach</b>							
		<b>News &amp; Public Information</b>							
	1	Specify, Develop, and Review Design NRAO Homepage	12/31/2013						
	2	Program, implement design, test, correct, migrate Homepage to live server	3/31/2014						
	4	NRAO lobby display: Define and specify project. Design digital signage display	12/31/2013						
	5	NRAO lobby display: Programming and graphical implementation	12/31/2013						
	6	NRAO lobby display: Procure digital signage software system, program digital signage display, publish to network	12/31/2013						
	7	Milky Way Explorer for public website: Design and specify project. Develop design	3/31/2014						
		<b>STEM Education</b>							
	9	Conduct online course for first cohort of SkyNet Jr. Scholars educators	12/31/2013						
<b>6.5</b>		<b>Administration</b>							
		<b>Business Services</b>							
	1	Succession planning documentation for OAS divisions	12/31/2013						
		<b>CAP</b>							
	2	Create a process to label controlled items as "ITAR Controlled" or "EAR Controlled"	3/31/2014						
	3	Develop on-line Export Compliance training	3/31/2014						
		<b>ES&amp;S</b>							
	6	Develop a comprehensive safety training plan	12/31/2013						
		<b>MIS</b>							
	9	Implementation of new cost allocation system	12/31/2013						
	10	Upgrade of J.D. Edwards to tools release 9.1.3	3/31/2014						
	11	Investigation and implementation of automated Personnel Evaluation Process	12/31/2013						
		<b>TTO</b>							
<b>6.6</b>		<b>Human Resources</b>							
		<b>Compensation</b>							
		<b>Policy</b>							
	3	Complete update and consolidation of NRAO HR policies	12/31/2013						
		<b>Training</b>							
<b>6.7</b>		<b>Diversity</b>							
		<b>Communication</b>							
	1	Clarify and communicate the Diversity Mission	12/31/2013						
		<b>Domestic Outreach</b>							
	5	Continue domestic outreach partnerships to maintain pipeline. Partner with EPO and SSR to maximize existing programs and funding	3/31/2014						
		<b>Employment</b>							
	6	Implement recruitment guide and provide training that focuses on diversity focus	12/31/2013						
<b>6.8</b>		<b>Computing &amp; Information Services</b>							
	1	Installation of staff Helpdesk solution	3/31/2014						
	4	Installation of 10Gbps network equipment	3/31/2014						
	5	Retirement of legacy LDAP	12/31/2013						
	6	Evaluation of interactive Web collaboration tool	12/31/2013						
	8	Evaluation of Bro tool	3/31/2014						
	10	Specification and installation of ER generator	12/31/2013						
	11	Installation of archive servers in UVa Data Center	12/31/2013						
<b>6.9</b>		<b>Director's Office</b>							
		<b>Communication</b>							
	2	Complete NRAO exhibit re-design for January 2014 American Astronomical Society meeting	12/31/2013						

# QSU #2 FY2014 Report



January – March 2014






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



**POP MILESTONE #: 4.1.1**

**TITLE: Construction & Operations Readiness**

**Review**

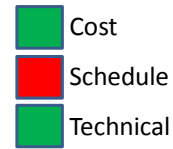
-  Cost
-  Schedule
-  Technical

<b>COST:</b>		<b>TECHNICAL:</b>											
<table border="1"><thead><tr><th>Actuals</th><th>Expected</th></tr></thead><tbody><tr><td>N/A</td><td>N/A</td></tr></tbody></table>	Actuals	Expected	N/A	N/A		<ul style="list-style-type: none"><li>• No technical issues associated with the Review itself</li></ul>							
Actuals	Expected												
N/A	N/A												
<b>SCHEDULE:</b>		<b>RISK &amp; MITIGATION:</b>											
<table border="1"><thead><tr><th>Milestone</th><th>Schedule</th><th>Actual</th></tr></thead><tbody><tr><td>Complete review</td><td>1/31/14</td><td>TBD; 2-stage approach. Stage 1 in July 2014; Stage 2 in January 2015</td></tr></tbody></table>	Milestone	Schedule	Actual	Complete review	1/31/14	TBD; 2-stage approach. Stage 1 in July 2014; Stage 2 in January 2015		<table border="1"><thead><tr><th>Risk</th><th>Mitigation</th></tr></thead><tbody><tr><td>Limited opportunity to fund potential cost impacts with Construction budget (Project concludes 9/30/2014)</td><td>Encouraging JAO to expedite the Review.</td></tr></tbody></table>	Risk	Mitigation	Limited opportunity to fund potential cost impacts with Construction budget (Project concludes 9/30/2014)	Encouraging JAO to expedite the Review.	
Milestone	Schedule	Actual											
Complete review	1/31/14	TBD; 2-stage approach. Stage 1 in July 2014; Stage 2 in January 2015											
Risk	Mitigation												
Limited opportunity to fund potential cost impacts with Construction budget (Project concludes 9/30/2014)	Encouraging JAO to expedite the Review.												

**SCHEDULE:** The JAO will conduct the “ALMA Construction Completion and Operations Readiness Review (ACCOR)” in two stages. Stage One is tentatively scheduled for the late July timeframe and will address the Permanent Power Supply and ADE. The balance of the Review will be conducted in early CY15.

**RISK & MITIGATION:** No expenses can be charged to the NA ALMA Construction budget after 30 September 2014. If any cost impacts (shared or otherwise) arise from the ACCOR, the expense will have to be paid with NA ALMA Operations budget. The NA ALMA Project Office recommends that the ACCOR be completed prior to the close of FY14.

**POP MILESTONE #: 4.I.2**  
**TITLE: Acceptance of OPTs**



<b>COST:</b> <table border="1"> <thead> <tr> <th>Actuals</th> <th>Expected</th> </tr> </thead> <tbody> <tr> <td>\$769K</td> <td>\$836K</td> </tr> </tbody> </table>		Actuals	Expected	\$769K	\$836K	<b>TECHNICAL:</b> <ul style="list-style-type: none"> <li>None: all OPTs perform to specification           <ul style="list-style-type: none"> <li>- revised drawing package received from supplier</li> <li>- Final Acceptance review pending JAO</li> </ul> </li> </ul>							
Actuals	Expected												
\$769K	\$836K												
<b>SCHEDULE:</b> <table border="1"> <thead> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>JAO acceptance of OPTs #3 - #6</td> <td>2/25/13</td> <td>5/15/14</td> </tr> </tbody> </table>		Milestone	Schedule	Actual	JAO acceptance of OPTs #3 - #6	2/25/13	5/15/14	<b>RISK &amp; MITIGATION:</b> <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>Further JAO delay of FA Review</td> <td>A. Symmes @ OSF in mid-May to expedite Review</td> </tr> </tbody> </table>		Risk	Mitigation	Further JAO delay of FA Review	A. Symmes @ OSF in mid-May to expedite Review
Milestone	Schedule	Actual											
JAO acceptance of OPTs #3 - #6	2/25/13	5/15/14											
Risk	Mitigation												
Further JAO delay of FA Review	A. Symmes @ OSF in mid-May to expedite Review												




**COST:** Cost for OPT acceptances is on track.

**SCHEDULE:** All OPTs have been delivered to Chile and acceptance testing of all units is complete. The OPTs are unnecessary within the Project and, consequently, unit acceptance is a low priority for JAO in comparison to other deliverables. NSF has agreed to remove this item from the Level I milestone list.

**RISK & MITIGATION:** NA AIPT is encouraging the JAO to expedite Final Acceptance once the drawing package is received. Supplier delivered revised Final Documentation Package on 25 April.

**POP MILESTONE #: 4.1.3**

**TITLE:** Complete installation of power cables and fuse disconnects at AOS

-  Cost
-  Schedule
-  Technical

<b>COST:</b>			<b>TECHNICAL:</b>	
<b>Actuals (k\$)</b>	<b>Expected (k\$)</b>		• None	
\$50,593 Estimated Cost to Complete		\$51,158		
<b>SCHEDULE:</b>			<b>RISK &amp; MITIGATION:</b>	
<b>Milestone</b>	<b>Schedule</b>	<b>Actual</b>	<b>Risk</b>	<b>Mitigation</b>
1 Complete AOS Utilities contract	4/30/13	5/15/14	Altiplanic "winter" may impede work	Press contractor to expedite schedule while weather permits. Performance penalties apply.
2 Complete AOS fuse disconnectors	10/30/13	5/15/14		

**COST:** Estimated Cost at Complete is \$51,675K. Performance penalties will be levied on contractor for work performed after the contracted finish date (31 December 2013).

**SCHEDULE:** The Contractors are behind schedule finishing the work and completion has been delayed to May 2014. The work on the Extended Array power disconnectors is ongoing with delays. The contractor is expending resources, but work has resulted slower than expected; this work will proceed until May 2014. Coordinating priorities with JAO Science.

**RISK & MITIGATION:** Press contractor to work as much as possible while the weather is favorable.



**POP MILESTONE #: 4.1.6 & 4.1.7**  
**TITLE: Deliver Front End Handling Vehicle**  
**units 1 – 4**

- Cost
- Schedule
- Technical

<b>COST:</b> <table border="1"> <thead> <tr> <th>Actuals (k\$)</th> <th>Expected (k\$)</th> </tr> </thead> <tbody> <tr> <td>\$408.6</td> <td>\$611</td> </tr> </tbody> </table>		Actuals (k\$)	Expected (k\$)	\$408.6	\$611	<b>TECHNICAL:</b> <ul style="list-style-type: none"> <li>Design being perfected with field tests at supplier's facility. Minor issues and are being resolved.</li> <li>Final design release pending field trials of Unit #1 at the ALMA site.</li> <li>All four antenna cabin configurations represented in field trial.</li> </ul>																			
Actuals (k\$)	Expected (k\$)																								
\$408.6	\$611																								
<b>SCHEDULE:</b> <table border="1"> <thead> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>1. Complete JAO field test of Unit #1</td> <td>3/31/14</td> <td>5/15/14</td> </tr> <tr> <td>2. Final design release</td> <td>4/30/14</td> <td>5/31/14</td> </tr> <tr> <td>3. Deliver Unit #2</td> <td>6/30/14</td> <td>7/15/14</td> </tr> <tr> <td>4. Deliver Unit #3</td> <td>7/31/14</td> <td>8/15/14</td> </tr> <tr> <td>5. Deliver Unit #4</td> <td>8/30/14</td> <td>9/15/14</td> </tr> </tbody> </table>		Milestone	Schedule	Actual	1. Complete JAO field test of Unit #1	3/31/14	5/15/14	2. Final design release	4/30/14	5/31/14	3. Deliver Unit #2	6/30/14	7/15/14	4. Deliver Unit #3	7/31/14	8/15/14	5. Deliver Unit #4	8/30/14	9/15/14	<b>RISK &amp; MITIGATION:</b> <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>Safety concern: suspended load (FE) in confined space (antenna cabin)</td> <td>Proceed with caution while handling FEs with present equipment.</td> </tr> </tbody> </table>		Risk	Mitigation	Safety concern: suspended load (FE) in confined space (antenna cabin)	Proceed with caution while handling FEs with present equipment.
Milestone	Schedule	Actual																							
1. Complete JAO field test of Unit #1	3/31/14	5/15/14																							
2. Final design release	4/30/14	5/31/14																							
3. Deliver Unit #2	6/30/14	7/15/14																							
4. Deliver Unit #3	7/31/14	8/15/14																							
5. Deliver Unit #4	8/30/14	9/15/14																							
Risk	Mitigation																								
Safety concern: suspended load (FE) in confined space (antenna cabin)	Proceed with caution while handling FEs with present equipment.																								




**COST:**Actuals include Non-Recurring Engineering and procurement of first unit.

**SCHEDULE:**The FEHV subproject (originally scheduled to complete in Q2 FY13) was running late and then was suspended in Q3 FY13 when the NA ALMA Project *Cost to Complete* forecast indicated a significant cost overrun. The subproject was re-activated late in Q4 FY 13. The field tests at the supplier's facilities have detected minor changes required to the design. Implementation of the design manufacture changes has delayed the schedule of Unit #1 by 6 weeks. Schedule of Units #2-4 only suffered a 4 week setback.

**TECHNICAL:** First unit will be a field-tested and any design changes will be incorporated into it and subsequent units.

**RISK & MITIGATION:** JAO continues to use the same FE handling equipment that it has used from the beginning of the Project. The new FEHVs will increase efficiency and safety margin. Continued vigilance is required.

**POP MILESTONE #: 4.1.8**  
**TITLE: Construction Completion and Operations Readiness Review**

-  Cost
-  Schedule
-  Technical

<b>COST:</b> No immediate impact (but see notes)			<b>TECHNICAL:</b> Per ALMA Director, comprehensive operations review deferred until early 2015 with ad hoc operations reviews on selected topics in the interim.											
<b>SCHEDULE:</b> <table border="1" data-bbox="354 739 779 850"> <thead> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>			Milestone	Schedule	Actual				<b>RISK:</b> <table border="1" data-bbox="820 739 1263 882"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>JAO and NA budget and operations planning delayed</td> <td>Reserve NA Fuel Carryover Funds, Provide NA Staff for Commissioning</td> </tr> </tbody> </table>		Risk	Mitigation	JAO and NA budget and operations planning delayed	Reserve NA Fuel Carryover Funds, Provide NA Staff for Commissioning
Milestone	Schedule	Actual												
Risk	Mitigation													
JAO and NA budget and operations planning delayed	Reserve NA Fuel Carryover Funds, Provide NA Staff for Commissioning													

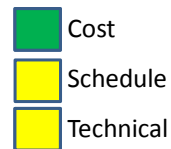
**COST:** No short-term cost impact.

**SCHEDULE:** The ALMA Director has proposed to defer the comprehensive operations review until early 2015 and conduct ad hoc reviews on selected topics, such as power, in the interim period (per ALMA Board minutes, March 2014).

**TECHNICAL:** No impact.

**RISK & MITIGATION:** This milestone was entered to denote the effort required by NA ALMA Operations to participate in the review. Slippage of the review may have an impact on ALMA Operations as a whole as operations planning and required budget levels will remain in flux. NA ALMA has reserved carryover funds (“fuel reserve”) which may partially offset potentially higher power costs in CY2014/15. NA ALMA is also providing extra staff to assist with commissioning as a short-term measure.

**POP MILESTONE #: 4.2.22**  
**TITLE: Install Final 2 API Dishes**



<b>COST:</b>		<b>TECHNICAL:</b>		
Labor Actuals	Expected	The 10 MHz LO is still producing too much phase jitter. Parts were ordered to change to a 50 MHz LO, which will be put in place and tested when they arrive.		
<i>Ops funds this activity at a higher WBS level</i>				
Material Actuals	Expected			
\$2000	\$0	Temperature stability issues continue to be addressed.		
Travel Actuals	Expected			
\$0	\$0			
<b>SCHEDULE:</b>		<b>RISK:</b>		
Critical Path	Schedule	Actual	Risk	Mitigation
Improve phase jitter (from LO)	N/A	5/14/14	1 Phase jitter from LO	Move to 50 MHz
Milestone	Schedule	Actual	2 Temperature instability	Further shielding
1 Build Ant. 3 & 4	9/25/13	5/30/14		
2 Deploy & Test 4 antenna system	10/25/13	6/27/14		

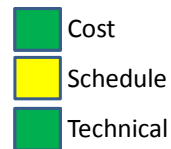
**COST:** Costs are tracked at a higher WBS level. The project is funded as part of the VLA LO/IF group, within NM Operations. The majority of the hardware costs for this project were incurred in 2013, but there was a small additional cost in Q2 FY14 for improvements to the LO system (move from 10 MHz to 50 MHz).

**SCHEDULE:** Technical issues have delayed the system installation. We anticipate the new four antenna API will be operational on the final two antennas by the end of Q3.

**TECHNICAL:** The project is to develop a four antenna API, replacing the existing VLA API. Current technical issues with the new API (LO reference instability and poor daytime temperature stability of electronics, both of which cause above-spec phase jitter) are affecting the final installation and delivery of the system. All of the central electronics, and two of the four antennas of the new API are in place and working. A change of LO frequency, two new fiber optic transmit/receive systems, and additional temperature shielding, should allow the phase jitter spec to be met, at which point the other two antennas can be put in place, finalizing the system.

**RISK & MITIGATION:** There are two specific risk items associated with the full delivery of the new API, noted above. At a higher level, there is risk that without a stable API we cannot do dynamic scheduling on the VLA, because the old API is prone to failure. The current mitigation is to continue to use the old system, at the cost of poorer phase stability and increased maintenance.

**POP MILESTONE #: 4.2.27**  
**TITLE: Tipping scans implemented**



<b>COST:</b> <table border="1"> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td colspan="2"><i>Ops funds this activity at a higher WBS level</i></td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$0</td> <td>\$0</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$0</td> <td>\$0</td> </tr> </table>		Labor Actuals	Expected	<i>Ops funds this activity at a higher WBS level</i>		Material Actuals	Expected	\$0	\$0	Travel Actuals	Expected	\$0	\$0	<b>TECHNICAL:</b> <p>No technical issues – this is all demonstrated to work with the old VLA and simply has to be enabled within the new software system.</p>								
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2 SDM Pointing table	3/1/13	9/1/14																				
Risk	Mitigation																					
1 No sky opacity measurements available	Continue to use weather data and atmospheric models as proxy																					

**COST:** Costs are tracked at a higher WBS level. There are no material or travel costs for this item, only labor.

**SCHEDULE:** TIP scans were not implemented this quarter due to key operations staff being redirected to work on VLITE. We still aim to implement them by the end of Q4, but other staffing losses (David Harland and Michael Rupen) and delays in hiring their replacements may delay this item into FY15.

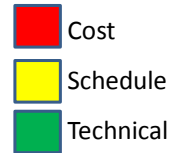
**TECHNICAL:** There are no technical issues – this is all demonstrated to work with the old VLA and simply has to be enabled within the new software system.

**RISK & MITIGATION:** Tipping scans can in principle provide the best measurement of the sky opacity, needed for high frequency calibration. For the last four years (since turning on WIDAR) we have been using weather data and atmospheric models as a proxy, and will continue to do so until tipping scans are fully commissioned.

**POP MILESTONE #:4.2.40**

**TITLE: Preventive Maintenance on Hatch Gear**

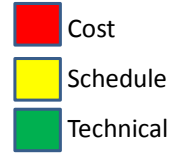
<p><b>COST:</b></p> <table border="1"> <tr> <th>Labor Actuals</th> <th>Expected</th> </tr> <tr> <td>NA</td> <td>NA</td> </tr> <tr> <th>Material Actuals</th> <th>Expected</th> </tr> <tr> <td>NA</td> <td>NA</td> </tr> <tr> <th>Travel Actuals</th> <th>Expected</th> </tr> <tr> <td>NA</td> <td>NA</td> </tr> </table>		Labor Actuals	Expected	NA	NA	Material Actuals	Expected	NA	NA	Travel Actuals	Expected	NA	NA	<p><b>TECHNICAL:</b></p> <p>Preventative Maintenance (PM) on the VLA Hatch Gear is required once a year. Two Hatch PMs were specified in the FY2014 POP. The PM listed for Q2 was an error, and is not needed. The only Hatch PM will take place by Q4 (Milestone #41).</p>																
Labor Actuals	Expected																													
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3 NA																														

**POP MILESTONE #: 5.1.1****TITLE:** Design improved low-noise amplifier with improved reliability for PAF

<b>COST:</b>		<b>TECHNICAL:</b>		
Labor Actuals	Expected	The resources exist at the CDL to expedite the design however leadership is using this as an opportunity to cross train and develop engineering skills.		
\$204,658.58	\$170,549.50 (linear)			
Material Actuals	Expected			
\$32,723.24	\$21,500			
Travel Actuals	Expected			
\$729.10	-			
<b>SCHEDULE:</b>			<b>RISK:</b>	
Milestone	Schedule	Actual	Risk	Mitigation
Design improved low-noise amplifier with lower noise and improved reliability	03/31/2014	09/30/2014	Risk to cost as design, procurement, prototype assembly and testing will continue to expend diminishing funds.	Only fund critical activities for the remainder of the year.

**COST:** \$238,110.92 spent to date with an expected cost to date of \$192,060.00. Total budgeted is \$384,099.00. All numbers are direct expenses only. Cost to complete 2014 is \$170,000.00 with \$145,988.00 remaining in the budget (no indirect costs applied). Need to re-baseline to bring cost back in line with budget.

**SCHEDULE:** Q2 Milestone delayed to last quarter to provide time for training.

**POP MILESTONE #: 5.1.4****TITLE: Demonstrate single L-Band prototype integrated downconverter digital photonic link**

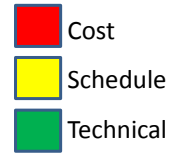
COST:		TECHNICAL:		
Labor Actuals	Expected	The Downconverter is in assembly. The photonic link side of this is being developed by the Integrated Receiver Group.		
\$204,658.58	\$170,549.50 (linear)			
Material Actuals	Expected			
\$32,723.24	\$21,500			
Travel Actuals	Expected			
\$729.10	-			
SCHEDULE:			RISK:	
Milestone	Schedule	Actual	Risk	Mitigation
Demonstrate single L-Band prototype integrated downconverter digital photonic link.	03/31/2014	06/30/2014	Risk to cost as prototype assembly and testing will continue to expend diminishing funds.	Leverage the commonalities of activities and resources for both PAF and IRD to save cost.

**COST:** \$238,110.92 spent to date with an expected cost to date of \$192,060.00. Total budgeted is \$384,099.00. Cost to complete 2014 is \$170,000.00 with \$145,988.00 remaining in the budget (no indirect costs applied).

**SCHEDULE:** Q2 Milestone delayed to next quarter. The downconverter assembly is in progress and the photonic link design is being reviewed.

**TECHNICAL:** The downconverter assembly is in progress and the photonic link design is being reviewed.

**RISK & MITIGATION:** Cost to complete 2014 is \$170,000.00 with \$145,988.00 remaining in the budget. Plan to concentrate on; the design and prototyping of the LNAs; assembly and test of the digital downconverter with photonic receiver. The Integrated Receiver Development group is working on the development of the Photonic Link and this project will reap the benefits of this effort. Will rebaseline activities to meet budget.

**POP MILESTONE #: 5.1.6****TITLE:** Demonstrate single FPGA narrowband beamformer prototype

COST:		TECHNICAL:		
Labor Actuals	Expected	The predoctoral student who was to perform this work left the NRAO. BYU and NRAO are partners in the Beamformer Project and we will continue to work with BYU to accomplish this goal.		
\$204,658.58	\$170,549.50 (linear)			
Material Actuals	Expected			
\$32,723.24	\$21,500			
Travel Actuals	Expected			
\$729.10	-			
SCHEDULE:			RISK:	
Milestone	Schedule	Actual	Risk	Mitigation
Demonstrate single FPGA narrowband beamformer prototype.	03/31/2014	Cancelled	This milestone will not be accomplished.	An exception report will be filed for this milestone.

**COST:** (PAF total budget) \$238,110.92 spent to date with an expected cost to date of \$192,060.00. Total budgeted is \$384,099.00. Cost to complete 2014 is \$170,000.00 with \$145,988.00 remaining in the budget (no indirect costs applied). We will rebaseline to meet project budget. Cancellation of this milestone is not linked to the cost to date.

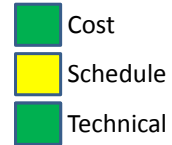
**SCHEDULE:** Q2 Milestone cancelled.

**RISK & MITIGATION:** Exception report filed.



**POP MILESTONE #: 5.1.12**

**TITLE:** Test triangular Digital OMT (DOMT) on the sky



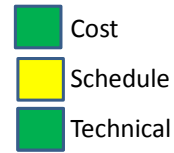
COST:		TECHNICAL:		
Labor Actuals	Expected	System integration and indoor tests will be demonstrated prior to attempting outdoor tests. Results of indoor testing with a cold load will be a decision point for proceeding with outdoor testing.		
\$179,201.34	\$182,897.86 (linear)			
Material Actuals	Expected			
\$15,041.36	\$37,500			
Travel Actuals	Expected			
-	-			
SCHEDULE:			RISK:	
Milestone	Schedule	Actual	Risk	Mitigation
Test triangular Digital OMT on the Sky	12/31/2013	06/30/2014	Indoor test cold load calibration is difficult and critical to the fidelity of the result.	If indoor testing is inconclusive, we will attempt the outdoor test.

**COST:** Under Budget. All numbers used are direct expenses and do not have fees and CCR applied. Expected numbers are based on final budget using straight line forecasting.

**SCHEDULE:** Q1 Milestone of on the sky testing is not as feasible as originally thought. Indoor testing is more feasible and results may prove outdoor testing to be unnecessary.

**TECHNICAL:** Filling the large cold load (approx. 1 x 1 m) with LN2 proved challenging, and the first iteration cracked from thermal expansion. This has been remedied and testing is going ahead.

**RISK & MITIGATION:** Accuracy of the cold load calibration is a concern. If the indoor testing results are in doubt, the outdoor testing will be necessary.

**POP MILESTONE #: 5.1.13****TITLE:** Demonstrate polarization isolation of the Digital OMT using FPGA

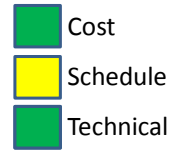
<b>COST:</b>		<b>TECHNICAL:</b>		
Labor Actuals	Expected	Roach II was found unsuitable. The National Instruments FPGAs are proving much more suitable however there is a learning curve associated with the change and now schedule is affected.		
\$179,201.34	\$182,897.86 (linear)			
Material Actuals	Expected			
\$15,041.36	\$37,500			
Travel Actuals	Expected			
-	-			
<b>SCHEDULE:</b>			<b>RISK:</b>	
Milestone	Schedule	Actual	Risk	Mitigation
Demonstrate polarization isolation of the Digital OMT using FPGA.	03/31/2013	06/30/2014	Risk to schedule as multiple critical activities are resourced by a single software engineer.	Find ways to re-allocate some of the activities to other resources.

**COST:** Under Budget. All numbers used are direct expenses and do not have fees and CCR applied. Expected numbers are based on final budget using straight line forecasting.

**SCHEDULE:** Q2 Milestone delayed to next quarter to provide time for the software engineer to develop code for the National Instruments FPGA.

**TECHNICAL:** Original plan had the software engineer doing this work programing Roach II however this was found to be unsuitable and he is now using National Instruments technologies. The National Instruments FPGAs are proving much more suitable however there was a learning curve associated with the change and now schedule is affected.

**RISK & MITIGATION:** The software engineer has multiple critical activities assigned to him. We are working to find methods to alleviate his workload by re-assigning as many tasks as possible to other people.

**POP MILESTONE #: 5.1.16****TITLE:** Build multi-channel digital back end for testing of digital photonic links

<b>COST:</b>		<b>TECHNICAL:</b>		
Labor Actuals	Expected	Roach II was found unsuitable. The National Instruments FPGAs are proving much more suitable however there is a learning curve associated with the change and now schedule is affected.		
\$179,201.34	\$182,897.86 (linear)			
Material Actuals	Expected			
\$15,041.36	\$37,500			
Travel Actuals	Expected			
-	-			
<b>SCHEDULE:</b>			<b>RISK:</b>	
Milestone	Schedule	Actual	Risk	Mitigation
Build multi-channel digital back end for testing of digital photonic links	03/31/2013	09/30/2014	Risk to schedule as multiple critical activities are resourced by a single software engineer.	Find ways to re-allocate some of the activities to other resources.

**COST:** Under Budget. All numbers used are direct expenses and do not have fees and CCR applied. Expected numbers are based on final budget using straight line forecasting.

**SCHEDULE:** Original plan had Software Engineer programing Roach II however this was found to be unsuitable and we are now using National Instruments technologies. The National Instruments FPGAs are proving much more suitable however there was a learning curve associated with the change and now schedule is affected.

**RISK & MITIGATION:** Software Engineer has multiple critical activities assigned to him. We are working to find methods to alleviate his workload by re-assigning as many tasks as possible to other people.



**POP MILESTONE #: 5.3.4**  
**TITLE: ARGUS Warm Electronics Complete**

- Cost
- Schedule
- Technical

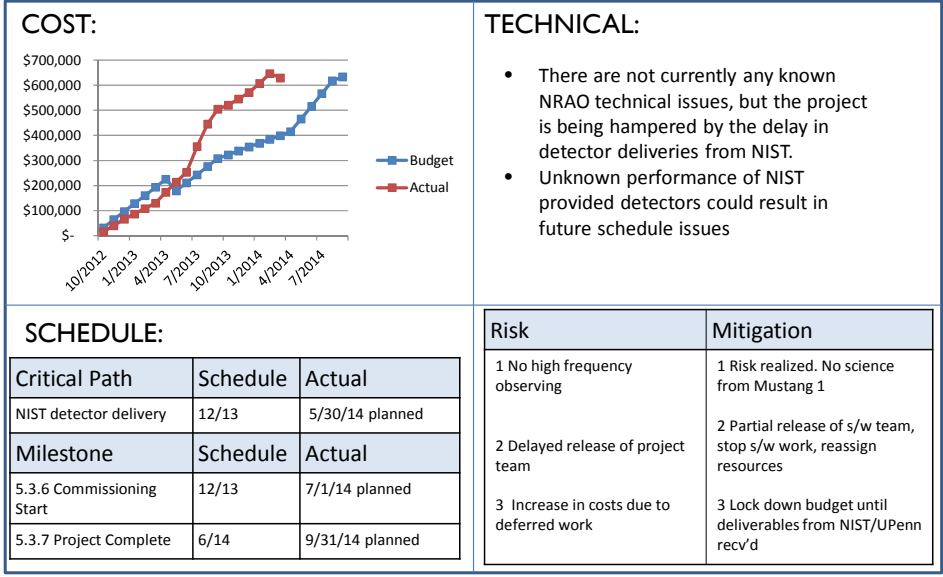
<b>COST:</b>		<b>TECHNICAL:</b>	
Labor Actuals	Expected	No identified technical concerns.	
Material Actuals	Expected		
Travel Actuals	Expected		
<b>SCHEDULE:</b>		<b>RISK:</b>	
Critical Path	Schedule	Actual	Risk
Milestone	Schedule	Actual	Mitigation
1 Warm electronics delivered from U of Maryland to Stanford	7/15/2014		

**COST:** NRAO projects costs are being monitored. No concerns noted at this time.

**SCHEDULE:** The initial POP schedule was for the warm electronics to be complete at the end of FY14 Q2. This required delivery from the University of Maryland to Stanford for integration. According to the project schedule, the anticipated delivery of the warm electronics is now anticipated in July 2014. NRAO has no ability to managed the delivery or integration at Stanford. NRAO needs completion of the warm electronics to ensure that the requirements for software development are clear. Need to monitor the schedule.

**POP MILESTONE #: 5.3.6**  
**TITLE: MUSTANG I.5 Science commissioning begins**

- Cost
- Schedule
- Technical



**COST:** Costs for the project are being actively monitored. A change order is anticipated to establish a new baseline.

**SCHEDULE:** The schedule is driven by receipt of the detectors which are being donated by NIST and the leverage available to the PI (UPenn) is therefore limited. No firm delivery date has been provided by NIST. Will need to monitor the critical path to ensure that the delayed deliverable does not push into FY15.




**TECHNICAL:** There are currently no technical issues out of tolerance for the NRAO portions of the project. Potential technical issues are related to the performance of the NIST detectors in the UPenn and NRAO commissioning.

**RISK & MITIGATION:** Current MUSTANG I.0 has been permanently removed from the GBT so high frequency science capability is limited. NRAO has implementing a plan for our project staff based on well-defined stopping points until which time the detectors arrive at Upenn.



**POP MILESTONE #: 6.1.7**

**TITLE:** Complete design of reflective Band 2 optics

-  Cost
-  Schedule
-  Technical

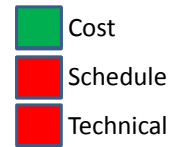
<b>COST:</b>		<b>TECHNICAL:</b>		
Labor Actuals	Expected	The Band 2 optics design is needed to complete the Band 2 ALMA Development project		
Material Actuals	Expected			
Travel Actuals	Expected			
<b>SCHEDULE:</b>		<b>RISK:</b>		
Critical Path	Schedule	Actual	Risk	Mitigation
Milestone	Schedule	Actual		
1 Start design	Jun 2014			
2 Test components	Aug 2014			
3 Complete design	Sep 2014			

**SCHEDULE:** Completion date slipped because the entire project was delayed one quarter by ALMA process delays. Work will start in June 2014 and should complete by October 2014.





**POP MILESTONE #: 6.2.6**  
**TITLE: Release CASA version 4.2**



COST: No Issues			TECHNICAL: CASA 4.2 OSX version is delayed due to difficulties with the OSX build and packaging.	
SCHEDULE:			RISK:	
Milestone	Schedule	Actual	Risk	Mitigation
1 Release CASA 4.2 Linux	Jan 31	Completed	1 Resource constraints.	1 a) Prioritize as top task b) continue structured error resolution.
2 Release CASA 4.2 OSX	Estimated 5/15			

**SCHEDULE:** OSX version delayed due to difficulties in the OSX build.




**TECHNICAL:** CASA 4.2 OSX version was delayed due to difficulties with OSX build and packaging. Issues included missing or different library versions, which caused compile errors and crashes on running. These errors have been resolved.

**RISK & MITIGATION:** We have resolved the technical issues and now have a working build. We found a few issues with the GUI under OSX (e.g. check box appears under entry widget so you can't check it) which we are fixing. May 15<sup>th</sup> is a likely release date.

**Background –** It was decided that 3<sup>rd</sup> party packages should be updated as part of the build. This was a good decision for robustness of the build and for removing some annoying bugs from the software, but the time involved in building and packaging was underestimated. Additionally, there has been a steeper-than-anticipated learning curve on the OSX build due to retirement of the person who was previously in the build role.

**POP MILESTONE #: 6.2.31**

**TITLE: WV Sys – M&C – Core infrastructure changes complete**

-  Cost
-  Schedule
-  Technical

COST: No Issues			TECHNICAL:	
SCHEDULE:			RISK:	
<b>Milestone</b>	<b>Schedule</b>	<b>Actual</b>	<b>Risk</b>	<b>Mitigation</b>
1 Complete VEGAS/DIBAS work	March 31	Complete	Top risks	
2 Complete streaming Phase 1 (POP #31)	June 30		1 Additional delays to VEGAS	1 VEGAS now managed by GB staff, improving our control of schedule.
			2 Resource constraints	2 Manage priorities across projects.

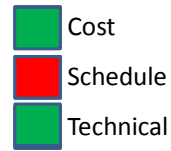
**SCHEDULE:** Delayed due to resource constraints and dependency on VEGAS delivery schedule, which was delayed.

**RISK & MITIGATION:** Note that resources are severely constrained across projects and service delivery. Service outages and additional high-priority projects could impact resource availability and create additional delays.

**Background:** Ray is the primary resource for this and due to his involvement with VEGAS/DIBAS the work for phase I and II have not been completed. If work progresses as planned, his involvement in VEGAS/DIBAS will ramp down in Q2, allowing him to re-focus on streaming in Q3.

## POP MILESTONE 6.2.35

**TITLE:** VEGAS supports highest data rates  
(streaming)



COST: No Issues			TECHNICAL:	
SCHEDULE:			RISK:	
Milestone	Schedule	Actual	Risk	Mitigation
1 Get streaming + metadata input to pipeline	June 1		1 "Highest data rates" is a fuzzy and moving target	1 Has been defined as well as possible currently, will revise based on experience
2 Attach stream to pipeline	June 30		2 Streaming interface not yet stable	2 Deliverable from Milestone 6.2.31




**SCHEDULE:** Delays due to streaming delays, stability of streaming interface, resource constraints.

**TECHNICAL:** May need to move from scripting to a compiled language to get enough speed. Using python first to get it working. There may be a need to refactor error handling & captured knowledge from existing scripts. Existing unit tests will help manage risk.

**RISK & MITIGATION:** "Highest data rates" is a fuzzy & moving target. Streaming interface not yet stable. User support of VEGAS has higher priority, could cause schedule to slip.

**POP MILESTONE #: 6.5.2**

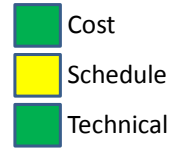
**TITLE:** Create a process to label controlled items as “EAR” or “ITAR”

-  Cost
-  Schedule
-  Technical

<b>COST:</b>		<b>TECHNICAL:</b>		
Labor Actuals	Expected	Only notable or current items If Technical stoplight is yellow or red, add issue description here		
Material Actuals	Expected			
Travel Actuals	Expected			
<b>SCHEDULE:</b>			<b>RISK:</b>	
Milestone	Schedule	Actual	Risk	Mitigation
1. Develop	3/31/2014		1. A Deemed Export can occur if NRAO staff are unaware that a particular item is controlled. 2. A controlled item could inadvertently be transferred or shipped internationally without securing a proper export license.	1. An Export Control Database is available through the NRAO staff website to search the controlled item list. 2. Standard procedure is to submit a TRF to the Export Compliance Officer who should catch the controlled item before shipment.
2. Review w/Management	5/15/2014			
3. Implement	5/30/2014			

**SCHEDULE:** New process to be implemented by 05/30/2014.

**RISK & MITIGATION:** In an effort to expedite assistance to an international colleague, an individual might either hand-carry, transfer or ship an item without checking to see if it is export controlled. If the item is to be shipped, however, the proper procedure is to submit a Transfer Request Form to the Export Compliance Officer (ECO) for processing. The ECO can ascertain export requirements from the TRF prior to shipping. No process is currently in place for preventing a hand-carry of controlled items, which is why labelling items as export controlled when applicable is required.




**POP MILESTONE #: 6.5.3****TITLE: Develop On-line Export Compliance Training**

<b>COST:</b>			<b>TECHNICAL:</b>	
Labor Actuals	Expected		Only notable or current items If Technical stoplight is yellow or red, add issue description here	
Material Actuals	Expected			
Travel Actuals	Expected			
<b>SCHEDULE:</b>			<b>RISK:</b>	
Milestone	Schedule	Actual	Risk	Mitigation
1 Develop Training	06/13/2014		Delay in getting NRAO staff on board with US export regulations related to denied party screening and deemed exports.	None
2 Mgmt. Review	06/30/2014			
3 Post Training	07/30/2014			

**SCHEDULE:** Milestone was delayed due to difficulty in finalizing the Export Management & Compliance Program update on Denied Parties Screening & Prohibited Countries (Section 8.0). After several revision attempts and numerous discussions at the Weekly Coordination Meeting, the final revision to Section 8.0 was approved on 04/15/14. With the procedure in place, training can now be developed to complement established procedures.

**RISK & MITIGATION:** Denied Party Screening and Deemed Exports are two distinct issues which can often be confused as one and the same. The sooner training can be offered, the quicker NRAO can ascertain that export guidelines are being followed.

**POP MILESTONE #: 6.5.6**  
**TITLE: Develop a comprehensive safety training plan**

-  Cost
-  Schedule
-  Technical

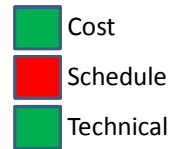
<b>COST:</b>			<b>TECHNICAL:</b>	
Labor Actuals	Expected		None	
N/A				
Material Actuals	Expected			
N/A				
Travel Actuals	Expected			
N/A				
<b>SCHEDULE:</b>			<b>RISK:</b>	
Critical Path	Schedule	Actual	Risk	Mitigation
Milestone	Schedule	Actual		
1 Develop plan	12/31/13	4/8/14		

**SCHEDULE:** Development delayed.

**MITIGATION:** Plan completed as of April 2014. Next QSU update will demonstrate project complete.

## POP MILESTONE 6.8.10

**TITLE:** Specification and installation of ER generator



COST: No Issues			TECHNICAL: No Issues	
<b>SCHEDULE:</b>			<b>RISK:</b>	
Milestone	Schedule	Actual	Risk	Mitigation
1 Specification	Oct 2013	October 2013	Top risks	
2 Bid	Oct 2013	Nov 2013	1 Downtime for ER/NAASC computing and archive	1 Rapid shutdown of non-essential services after power outage to extend battery backup.
3 Go-live	Dec 2013	Pending UVA architectural review	2 Reduced availability for key resources	2 Aligned with current (sub-optimal) availability

**SCHEDULE:** Fixed price contract bidder declined to proceed after award. NRAO awarded to local company with previous experience of ER power installation through previous UPS project. UVA working on Environmental Review for diesel spill prevention.

**RISK & MITIGATION:** Run with current process for rapid prioritized shutdown of services upon a power outage to extend the duration of battery backup systems to ~1 hour.



# QSU #2 FY2014 Exceptions



January – March 2014



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



**Exception Title: POP MILESTONE #: 5.1.6**  
**Demonstrate single FPGA narrowband beamformer prototype**

- This milestone falls under the Phased Array Feed development project.
- The Engineer/Post Doc who was to perform this work left the NRAO.
- BYU and NRAO are partners in the Beamformer Project and we will continue to work with BYU to accomplish this goal.
- BYU has the expertise and resources to concentrate on the beamformer while NRAO concentrates on the front end of the system.



## Exception Title: Milestone 6.2.19 – Scan Sequences (incorporating TelCal calibrations)

- The purpose of this item was to improve observing efficiency.
- Science Operations IPT re-prioritized Fast Scanning as the major deliverable for Release 10.6.
- Efficiency was improved by parallelizing setup and shutdown rather than with scan sequences. This was successful in delivering a significant speed-up, approximately 6 minutes saved per observation.
- Additionally, dual mode (square law detector + autocorrelations) in the Single Dish observing mode was completed.
- Everything was delivered on schedule.



Details on the speedup:

====> Observation Start Speedup: roughly a factor of 2, from 92 to 44 s with 22 antennas. With 49 antennas it takes 52 seconds, which is acceptable for now.

====> Observation End Speedup, including these two fixes: It was reported that times to end an observation went from 6 minutes to 23 seconds with 49 antennas:

- Manual mode arrays were waiting for the archival of the metadata, which can take several minutes. We modified the code so it doesn't wait for the archival, a thread does this in the background and another observation can be executed right away.
- We sped up release of mode controllers (ACS components) at end of execution by releasing them asynchronously.

In addition to Fast Scanning, Ralph completed enabling dual mode (square law detector + autocorrelations) in the Single Dish observing mode.

## Exception Title: EPO – STEM Education

- Multiple groups visited VLA for tours
- Multiple VLA educational outreach events
- Multiple GB overnight educational field trips
- Skynet Jr. Scholars SJS Online Professional Development Workshop conducted
- Skynet Jr. Scholars Face-to-Face Professional Development Workshop at conducted at Yerkes
- WV Pocahontas County Science Fair mentor visits to all county schools by NRAO staff
- WV Science Public Outreach Team (SPOT)
  - 14 undergraduate students were trained and certified to go out to schools
  - 18 schools were visited, 2000 students reached, about half of these in 4th-8th grade



**VLA Visiting Groups:** Boy Scout troop ABQ 16 students/leaders; Astro Club tour 18 NM Tech Students; Johnson HS 36 students/teachers; ABQ Auto Club 38 adults.

**VLA Educational Outreach Events:** APS Taylor MS Star lab presentation 138 students; Box of Stars/Starlab training Parkview ES 285 students; TAAS Starlab presentation Open Space VC 135 public; APS Monte Vista ES Starlab presentations 78 students.

**GB Overnight Educational Field Trips:** University of Maryland Bridge Program J term George Marshall High School PSC Weekend WV SPOT undergraduate student training weekend Ambassadors for Christ Middle School Rockwood High School Youth Science Discovery Experience Boyscout troop 50 Providence Day School Spartanburg Day School Eden Christian School Beaver Creek Christian School Linwood Holton Governor's School Roanoke Catholic Middle School WVU Astronomy Club Glenville State College/Fairmont State University Mini institute

## Exception Title: EPO – Press/Media Activity

- Issued 6 national press releases, 1 image release, and two multiple-story media tip sheets
- Three AAS press conferences
- Commercial filming at VLA
- NM Department of Tourism promotional video filming 28 March
- ALMA segment aired on CBS News *60 Minutes*; U.S. audience of 10.61 million (twice that of the *Cosmos* premiere on Fox)
- ALMA article published in *National Geographic* print and online; magazine has global circulation of 8.3 million
- Several media teams visited Green Bank to film and interview members of the staff and to report on the GBT
- New page on NRAO science site encourages NRAO science users to work with EPO on press releases



**Press & Image Releases:** Pulsar in Stellar Triple System; Supernova's Super Dust Factory Imaged with ALMA; Dwarf Galaxies Give Clues to Origin of Supermassive Black Holes; GBT Sees River of Hydrogen Flowing through Space; Image Release: Starbursting in the Galaxy M82; ALMA Sees Icy Wreckage in Nearby Solar System; 'Death Stars' in Orion Blast Planets before They Even Form

**Tip Sheet Stories:** Discovery of Extended Radio Emission from Merging Galaxy Clusters; Radio Astronomy Innovation Promises Big Boost to Data Transmission; From Dust and Gas to Disk and Planets; Galaxy Evolution in the Early Universe; Astronomers Make Best Measurement Yet of Distance to Galactic Center; VEGAS is a Good Bet to Study the Cosmos; Protoplanetary Disks 'Bulge' in Complex and Asymmetrical Ways

**AAS Press Conferences:** Triple Pulsar (Ransom); Dwarf Galaxies w/ Black Holes (Reines); ALMA Resolves SN 1987A's Dust Factory & Particle Accelerator (Indebetouw)

**Commercial Filming at VLA:** CBS "The Messengers" TV pilot. Fee enabling continuing planning for new VLA Visitor Center

**GB Media Visits:** Associated Press, Yahoo News (the #1 source of news via the Internet), the German magazine Der Spiegel, and a Russian television station

**Page about Press Releases on NRAO Science Site:**

<https://science.nrao.edu/observing/news-release>

## Exception Title: EPO – Social Media & Web

- Facebook followers grew from 25,443 to 32,047 during Q2
- Twitter followers grew from 4,503 to 4,855 during Q2
- Online Milky Way Explorer features 17 new mini-documentaries about radio astronomy within our Galaxy, including exclusive interviews with NRAO staff about the G2 cloud encounter
- New responsive-design [www.nrao.edu](http://www.nrao.edu) homepage features distinct presentations for large screens and smaller smartphones or tablets
- Accessibility: VLA Visitor Center film online now equipped with closed captions in English and Spanish



**Milky Way Explorer:** <https://public.nrao.edu/explorer/milkyway/TheMilkyWayExplorer.php>  
**VLA Film with Closed Captions:** <https://vimeo.com/70554007>

## **Exception Title: EPO – Visitor/Science Centers**

- VLA Public Visitation counted: 3,232 during period
- Research/planning continuing toward goal of a new VLA Visitor Center
- GB Science Center public visitation counted: 3,502 during period



# QSU# 2 FY 2014 - Financials



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





## Q2 FY14 Summary

- NOTE: All charts reset to reflect Revised POP dated March, 2014.
- Overall Issues
  - Benefits – Running slightly ahead of budget for current fiscal year, should recover as HDHP and retiree changes kick in
  - 2% across the board raises effective in January.
  - Cost allocation pool established. Recoveries lagging due to non-linear CSA spend.
- NRAO Ops
  - Static WFO & research activity providing CCR revenue assistance and salary support.
  - Accommodating \$2.1M swing +/- in NRAO Ops/ALMA Ops.
  - Planning for year end cash needs



## FY14 YTD by Major WBS Category ALMA Ops – Q2

	FY14 POP		FY14 YTD Expenses	YTD % Rev Budget
	Budget (March)	FY14 Rev. Budget		
Telescope Ops	24,014	24,454	12,957	53.0
Development	5,445	6,757	3,449	51.0
Science Ops	5,864	6,281	2,597	41.3
Admin Services	4,556	4,556	2,030	44.6
Director's Office	2,952	3,043	1,143	37.6
<b>FY14 , Total</b>	<b>42,831</b>	<b>45,091</b>	<b>22,176</b>	<b>49.2</b>
NSF Allocation Reduction	(2,140)			
Canadian \$ Not Shown Above	1,301			
Open Commits	5,033			
C/F For FY14		1,800		
C/F for Future Years	-	134		
<b>All ALMA Resources</b>	<b>47,025</b>	<b>47,025</b>		

- Shows all ALMA resources.
- Telescope Ops includes \$2.8M in reimbursements received in Dec.
- Development reflects open commitments for external awards.
- Total open commitments are ~\$8M



ALMA Development is working as a cumulative pool, including funds as they are awarded and reporting on them as they are expensed – a process which may span multiple fiscal years.

One aspect of this line is the delayed purchase of the Band 5 LO equipment – totaling \$1.5M. The FY13 budget noted only the FY13 development pool. Future POPs will reflect expected in-year expenditures.

Telescope Ops includes \$5.4M in open po's for JAO activities...catering, cleaning & security are the major drivers. Note that \$16.2M in POP budget (operations line) are JAO expenses.

Development includes \$2.1M in Open Pos for approved awards (Band 5 LO projection \$800K; fiber optic link in Chile \$600K; UVML \$400K; \$200K ALMA phasing project w/MIT; \$100Kmm camera award to NRC.

Science Projecting a slight underspend; \$700K in open PO's. Student observing awards were not awarded as of 3/31...this process is underway.

Admin Services Overhead lags due to other underspends.

Director's Office AUI fee & IDC lagging due to other underspends and prior period corrections. Changed accounting for PPS.

## FY14 YTD by Major WBS Category NRAO Ops – Q2

	FY14 POP			
	Budget (March)	FY14 Rev. Budget	FY14 YTD Expenses	YTD % Rev Budget
NSF	41,000	43,140		
WFO	1,594	1,594		
Carryforward/Other	1,335	1,335		
<b>Total CSA-I Revenues</b>	<b>43,929</b>	<b>46,069</b>		
Telescope Ops	18,013	18,013	8,033	44.6
Development	2,248	2,248	1,522	67.7
Science Ops	5,152	5,152	2,710	52.6
Admin Services	15,834	15,834	6,756	42.7
Director's Office	3,308	3,308	1,411	42.7
<b>FY14 , Total</b>	<b>44,555</b>	<b>44,555</b>	<b>20,432</b>	<b>45.9</b>
<b>FY14 CSA-I NET</b>	<b>(626)</b>	<b>1,514</b>		

- Lag in ALMA spending impacting NRAO Ops
- Reflects increased pace of development spending on CSA-I resources.
- Admin services reflects lower overhead expenses due to lag in spending.
- Also some spread out of expenses to manage cash flow.



## FY14 YTD by Major WBS Category Observatory Central Services – Q2

	FY14 POP		
	Budget (March)	FY14 YTD Expenses	YTD % Rev Budget
Telescope Ops	519	137	26.4%
Development	989	375	37.9%
Science Ops	1,943	1,061	54.6%
Admin Services (Gross)	11,744	5,604	47.7%
Director's Office	1,660	781	47.0%
<b>FY14 Total, Non CSA Sources</b>	<b>16,855</b>	<b>7,958</b>	<b>47.2%</b>
Admin Recoveries (CSA's)	(14,209)	(5,736)	40.4%
External Recovery	(2,787)	(1,735)	62.3%
<b>FY14 NET</b>	<b>(141)</b>	<b>487</b>	

- First year for new Observatory Central Services Pool.
- 30% rate on all allowable expenses.
- External recovery ahead due to construction expenses
- Internal recovery short due to lag in ALMA expenses in development & shutdown & cash flow tail.

