



<b>Title:</b> QSU4 FY2017	<b>Author:</b> Thisdell/ADs	<b>Date:</b> 11/15/2017
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## National Radio Astronomy Observatory

### Quarterly Status Update 4 FY2017

July – September 2017

PREPARED BY	ORGANIZATION	DATE
Thisdell/ADs	Director's Office	11/15/2017

APPROVALS (Name and Signature)	ORGANIZATION
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**NRAO Quarterly Status Update**  
(QSU4 FY2017)  
July - September 2017

POP Section	POP Milestone	Milestone	Completion Date	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment			
				Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope	
2.6		Atacama Large Millimeter/submillimeter Array (ALMA)														
		Operations														
	1	The NAASC will provide management training opportunities to the new team and task lead positions as well as anyone else interested in formal management training and provide professional development opportunities	3/31/2017													
			06/31/2017													
			9/30/2017													
	2	The NAASC will provide AODs in support of telescope operations in Chile	12/31/2016													
			3/31/2017													
			6/30/2017													
	3	The NAASC will continue to provide diagnostic support for troubleshooting issues and problems found during array operations	9/30/2017													
			12/31/2016													
			3/31/2017													
	4	The NAASC will provide a technical secretary(s) that will attend the ALMA Proposal Review and Time Allocation Committee meeting	6/30/2017													
			9/30/2017													
			12/31/2016													
	5	The NAASC will review all the Phase 2 Scheduling Blocks submitted by PIs for ALMA Cycle 4	3/31/2017													
	6	The NAASC will participate in CPM6	12/31/2016													
	7	The NAASC will participate in ObsMode 6	3/31/2017													
	8	NAASC staff will participate in the planning and coordination meetings in preparation for ALMA Cycle 5 scheduled for 2017 October	3/31/2017													
			6/30/2017													
			9/30/2017													
	9	NAASC staff will assist in the testing of the Cycle 4 CASA release	12/31/2016													
	10	Testing of the incremental releases of the Cycle 4 CASA release	3/31/2017													
	11	Testing the new Cycle 5 candidate release	6/30/2017													
	12	SWST supporting calibration and imaging heuristic development	12/31/2016													
			3/31/2017													
			6/30/2017													
	13	Assembling the Cycle 5 Release 1 (CSR1) requirements	9/30/2017													
			12/31/2016													
			3/31/2017													
	14	Providing support for running the Cycle 4 Pipeline on PI data	12/31/2016													
			3/31/2017													
			6/30/2017													
	15	Testing the Cycle 5 candidate pipeline	9/30/2017													
			6/30/2017													
			9/30/2017													
	16	NAASC staff will take a leading role in testing the Cycle 5 ALMA Archive access	12/31/2016													
			3/31/2017													
			6/30/2017													
	17	Data services team will deliver on average between 20 – 25 datasets per week	9/30/2017													
			12/31/2016													
			3/31/2017													
	18	NAASC staff will deliver on average between 20 – 25 datasets per week	6/30/2017													
			9/30/2017													
			3/31/2017													
	19	NAASC staff will take part in the Phase 3 testing of the AAT/PP1	9/30/2017													
	20	NAASC staff is planning to host a "hack day" where scientists and developers will come and work collaboratively on the best methodology to combine data	12/31/2016													
			3/31/2017													
			6/30/2017													
	21	NAASC staff will take a lead role in the preparation of the Cycle 5 Call for Proposals and user documentation including all updates and edits to the ALMA science portal	12/31/2016													
			3/31/2017													
			6/30/2017													
	22	NAASC staff will act as CSs and liaisons to the NA ALMA PI observing programs	9/30/2017													
			12/31/2016													
			3/31/2017													
	23	NAASC staff will initiate the ALMA Ambassadors program and train the scientific community to run outreach events	6/30/2017													
			9/30/2017													
			12/31/2016													
	24	NAASC staff will host 2 data reduction workshops in Charlottesville	3/31/2017													
			6/30/2017													
			9/30/2017													
	25	The NAASC will continue to host data reduction visitors over the FY with the goal of hosting a minimum of 12 visits	12/31/2016													
			3/31/2017													
			6/30/2017													
	26	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	9/30/2017													
			12/31/2016													
			3/31/2017													
	27	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	6/30/2017													
			9/30/2017													
			12/31/2016													
	28	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	3/31/2017													
			6/30/2017													
			9/30/2017													
	29	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	12/31/2016													
			3/31/2017													
			6/30/2017													
	30	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	9/30/2017													
			12/31/2016													
			3/31/2017													
	31	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	6/30/2017													
			9/30/2017													
			12/31/2016													
	32	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	3/31/2017													
			6/30/2017													
			9/30/2017													
	33	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	12/31/2016													
			3/31/2017													
			6/30/2017													
	34	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	9/30/2017													
			12/31/2016													
			3/31/2017													
	35	NAASC staff will hold the 11th NAASC workshop, in coordination with our Taiwanese colleagues	6/30/2017													
			9/30/2017													
			12/31/2016													

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POP Section	POP Milestone	Milestone	Completion Date	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment		
				Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope
	36	Team building workshops focused on vision, mission, objectives and performance metrics	12/31/2016												
			3/31/2017												
			12/31/2016												
	37	Oversight of environmental issues	3/31/2017												
			6/30/2017												
			9/30/2017												
	38	Sister Cities: evaluation of July-September 2016 cultural exchange	12/31/2016												
	39	Sister Cities: assessment of Magdalena/San Pedro needs, definition of objectives and program proposal including scientific research component	3/31/2017												
			6/30/2017												
	40	NINE: analysis of Chilean groups involved in STEM, underrepresented groups and opportunities for targeting	12/31/2016												
	41	NINE: preparation of hub proposal	3/31/2017												
			6/30/2017												
	42	NINE: implementation of hub	9/30/2017												
3.5		<b>Very Large Array</b>													
		<b>VLA Science Operations</b>													
	1	Define VLA general and shared risk capabilities to be offered for semester 2017B	12/31/2016												
	2	Define VLA general and shared risk capabilities to be offered for semester 2018A	6/30/2017												
	3	Update VLA documentation to support 2017B Call for Proposals, perform proposal technical reviews	3/31/2017												
	4	Update VLA documentation to support 2018A Call for Proposals, perform proposal technical reviews	9/30/2017												
	5	Determine baselines and pointing for antennas moving into their D configuration locations	3/31/2017												
	6	Determine baselines and pointing for antennas moving into their C configuration locations	6/30/2017												
	7	Determine baselines and pointing for antennas moving into their B configuration locations	9/30/2017												
	8	Define heuristics for the analysis of TIP scan data	3/31/2017												
	9	Define P-band and 4 Band OPT requirements	6/30/2017												
		<b>VLA Array Operations</b>													
	10	Reconfigure array to D configuration	3/31/2017												
	11	Reconfigure array C configuration	6/30/2017												
	12	Reconfigure array B configuration	9/30/2017												
	13	Complete VLA Operators cross-training on the VLBA	3/31/2017												
	14	Complete Array Operations duties reassignment plan	9/30/2017												
		<b>VLA Development</b>													
	15	Obtain initial Realist observations	9/30/2017												
	16	Conduct VLA Sky Survey Critical Design Review	3/31/2017												
	17	Begin VLA Sky Survey observing	9/30/2017												
	18	Establish ngVLA Project Office	12/31/2016												
	19	Initiate ngVLA Community Studies program	12/31/2016												
	20	Complete development of high level technical specifications for ngVLA	3/31/2017												
	21	Complete system architecture and block diagram for ngVLA	6/30/2017												
	22	Design and prototype He manifold for ngVLA/Green Antenna initiative	6/30/2017												
	23	Design and prototype variable frequency driver unit for ngVLA/Green Antenna initiative	9/30/2017												
	24	Develop VLA 4 Band implementation plan	6/30/2017												
		<b>VLA Antenna Maintenance</b>													
	25	Perform 7 antenna overhauls during the course of the year	9/30/2017												
	26	Replace one antenna azimuth bearing during the course of the year	9/30/2017												
	27	Perform preventive maintenance on each of two transporters prior to array reconfiguration to D	12/31/2016												
	28	Perform preventive maintenance on each of two transporters prior to array reconfiguration to C	6/30/2017												
	29	Perform preventive maintenance on each of two transporters prior to array reconfiguration to B	9/30/2017												
		<b>VLA Track Maintenance</b>													
	30	Identify and replace 5000 aging or damaged cross-ties during the course of the year	9/30/2017												
	31	Identify and replace 5 antenna pad intersections during the course of the year	9/30/2017												
		<b>VLA Site Infrastructure Maintenance</b>													
	32	Perform preventive maintenance on the next configuration VLA antenna transformers prior to array reconfiguration to D	12/31/2016												
	33	Perform preventive maintenance on the next configuration VLA antenna transformers prior to array reconfiguration to C	6/30/2017												
	34	Perform preventive maintenance on the next configuration VLA antenna transformers prior to array reconfiguration to B	9/30/2017												
	35	Purchase 2 high rail vehicles for the Track Crew	9/30/2017												
	36	Purchase a tie inserter for the Track Crew	9/30/2017												
	37	Purchase a Boom Truck for general use at the VLA	9/30/2017												
	38	Purchase a CNC Mill for the VLA machine shop	9/30/2017												
	39	Contract an outside vendor to refurbish and upgrade the overhead crane in the VLA AAB	9/30/2017												
	40	Purchase replacement heavy vehicles/equipment on a priority basis	9/30/2017												
	41	Contract an outside vendor to replace the VLA Activity Center roof	9/30/2017												
		<b>VLA Technical Upgrades and Enhancements</b>													
	42	L-band solar upgrade, install 4 additional receivers (#11 - #14) with full RF upgrade	3/31/2017												
	43	X-band solar upgrade, install eight additional receivers (#10 - #17) with 20 dB switched attenuators on outputs only, no solar Tcals	9/30/2017												
	44	Ku-band solar upgrade, install one additional receiver (#6) with solar Tcal path plus 20 dB switched attenuators	3/31/2017												
	45	Ku-band solar upgrade, install eight additional receivers (#6 - #13) with 20 dB switched attenuators on outputs only, no solar Tcals	9/30/2017												

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	46	FE card cage upgrades, complete replacement of all legacy card cages (53 remaining)	6/30/2017												
	47	C-band thermal gap retrofits, install 6 additional (#15 - #20)	9/30/2017												
	48	Install 7 <sup>th</sup> replacement ACU	9/30/2017												
		<b>VLA Observing Capability Enhancements</b>													
	49	Define software requirements for enabling pulsar phase binning to be set up using standard tools	12/31/2016												
	50	Define best practices for using online frequency averaging	12/31/2016												
	51	Define software requirements for enabling frequency averaging to be set up using standard tools	3/31/2017												
	52	Commission upgraded solar receiver hardware	6/30/2017												
	53	Define software requirements for full solar observing support in standard tools	9/30/2017												
		<b>VLA Operational Enhancements</b>													
	54	Integrate automated subarray observing into operations	3/31/2017												
4.3		<b>Central Development Laboratory</b>													
		<b>Repair, Maintenance, Production, Support</b>													
	1	Evaluate Band 6 mixer with LNF preamp and gain-slope equalizer	3/31/2017												
			12/31/2016												
	2	Build and test twelve (12) Band 1 amplifiers	3/31/2017												
			6/30/2017												
			9/30/2017												
		<b>Research and Development</b>													
	3	Complete testing of current 385-500 GHz SIS mixer wafers	9/30/2017												
	4	Measure optics of ALMA Band 2 in the test cryostat extending the frequency range to 95 GHz	6/30/2017												
	5	Produce Final Report for NRAO-led ALMA Correlator Study	12/31/2016												
	6	NRAO contributions to final report complete	3/31/2017												
	7	Submit ALMA Dev. Proposal to upgrade the existing ALMA correlator	12/31/2016												
	8	Implementation of the "F" part of a correlator in a state-of-the-art FPGA	6/30/2017												
	9	Development of a pre-processing technique to detect interferences and/or nonstationary signals	9/30/2017												
	10	Use IRD source modules to probe-test W-band, IQ mixer chip	12/31/2016												
	11	Finalize polarization-synthesis firmware	9/30/2017												
	12	Build and test integrated, W-band, sideband-separating mixer module	6/30/2017												
	13	Design W-band IRD front-end	9/30/2017												
	14	Demonstrate high-bandwidth unformatted serial link	3/31/2017												
	15	Complete HERA feed development	6/30/2017												
	16	Deliver HERA receivers	3/31/2017												
	17	Development of the Cosmic Twilight Polarimeter	4/30/2017 (NCE)												
	18	Completion of Band 2 Prototype Project	6/30/2017												
5.5		<b>Science Support and Research</b>													
		<b>Telescope Time Allocation</b>													
	1	CIP for semester 2017B	3/31/2017												
	2	CIP for semester 2018A	9/30/2017												
	3	SRP and tech review process, semester 2017B	3/31/2017												
	4	SRP and tech review process, semester 2018A	9/30/2017												
	5	TAC meeting for semester 2017A	12/31/2016												
	6	TAC meeting for semester 2017B	6/30/2017												
	7	Update SW tools requirements for TAC support 2017A	12/31/2016												
	8	Update SW tools requirements for PST 2017B	3/31/2017												
	9	Update SW tools requirements for TAC support 2017B	6/30/2017												
	10	Update SW requirements tools for PST 2018A	9/30/2017												
	11	Update documentation for CIP and tools 2017B	3/31/2017												
	12	Update documentation for CIP and tools 2018A	9/30/2017												
	13	TTA SW tool suite requirements	6/30/2017												
		<b>Science Users Support</b>													
	14	CDE planning	3/31/2017												
	15	NM Symposium	12/31/2016												
	16	CASAguides	12/31/2016												
	17	CASAguides	6/30/2017												
	18	SRDP requirements development	3/31/2017												
	19	Summer student selection	3/31/2017												
	20	Summer student offers	3/31/2017												
	21	Summer student program begins	6/30/2017												
	22	Summer student program complete	9/30/2017												
	23	Student observing support selection	12/31/2016												
	24	Student observing support selection	6/30/2017												
	25	Reber predoc selection	3/31/2017												
	26	Reber predoc selection	9/30/2017												
		<b>SSR Services</b>													
	27	Bibliomatrix applications development	12/31/2016												
	28	Bibliomatrix beta release	3/31/2017												
	29	Bibliomatrix production release	6/30/2017												
		<b>Scientific Staff Support</b>													
	30	Scistaff performance review	12/31/2016												
	31	Scistaff promotions review	3/31/2017												
	32	Post-tenure reviews	3/31/2017												
6.4		<b>Data Management &amp; Software</b>													
		<b>Scientific Information Services</b>													
	1	Upgrade of NAASC Cluster	3/31/2017												
	2	Enforced Lustre storage quotas	6/30/2017												
	3	Processing workflow overview	6/30/2017												
	4	Processing workflow	9/30/2017												
	5	NAASC Network capacity increase	9/30/2017												
	6	External computing service provider engagement	12/31/2016												

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	7	Disaster recovery for Lustre storage	12/31/2016												
	8	Disaster recovery for Lustre storage	6/30/2017												
		<b>ALMA System Software</b>													
	9	ALMA Q2 Release	3/31/2017												
	10	ALMA Q4 Release	9/30/2017												
	11	Correlator maintenance and simulation	9/30/2017												
	12	Update Scheduling software	3/31/2017												
		<b>VLA System Software</b>													
	13	Deploy software to support Semester 2016B observing	3/31/2017												
	14	Deploy software to support Semester 2017A commissioning	3/31/2017												
	15	Deploy software to support Semester 2017A observing	9/30/2017												
	16	Deploy software to support Semester 2017B commissioning	9/30/2017												
	17	Support pulsar phase bin development	3/31/2017												
	18	Implement currently used solar modes	6/30/2017												
	19	Implement in OPT	12/31/2016												
		<b>Software Development</b>													
	20	Archive/RPI Release 2.5	12/31/2016												
	21	Archive/RPI Release 3.0	3/31/2017												
	22	CASA Release 4.7	12/31/2016												
	23	CASA Release 4.8	6/30/2017												
	24	ASIAA ACDC formed	12/31/2016												
	25	CASA-Pipeline 4.7	12/31/2016												
	26	Pipeline checkpoint release	6/30/2017												
	27	Implement PST updates for Semester 2017B Call for Proposals	12/31/2016												
	28	Implement PST updates for Semester 2018A Call for Proposals	6/30/2017												
	29	Implement PHT updates for Semester 2017B TAC meeting	3/31/2017												
	30	Implement PHT updates for Semester 2018A TAC meeting	9/30/2017												
	31	Implement OPT updates for Semester 2017A VLA Observing	12/31/2016												
	32	Implement OPT updates for Semester 2017B VLA Observing	6/30/2017												
	33	PST/OPT updated to remove sessions	6/30/2017												
	34	Elaboration of tool design	9/30/2017												
	35	CI testing plan released	12/31/2016												
	36	CI testing implemented	3/31/2017												
	37	Modular testing framework	9/30/2017												
	38	AAT/RPI build testing	3/31/2017												
7.4		<b>Program Management Department</b>													
		<b>New Mexico Operations</b>													
			12/31/2016												
			3/31/2017												
	1	NM Documentation Support	6/30/2017												
			9/30/2017												
			12/31/2016												
	2	NM PM/SE Learning Opportunities	3/31/2017												
			6/30/2017												
			9/30/2017												
			12/31/2016												
	3	NM Proposal Development Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
			12/31/2016												
	4	NM PM/SE Project Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
		<b>Long Baseline Observatory</b>													
			12/31/2016												
			3/31/2017												
	5	LBO Documentation Support	6/30/2017												
			9/30/2017												
			12/31/2016												
	6	LBO Document Repository	12/31/2016												
	7	LBO Input to PMD SOPs	12/31/2016												
	8	LBO Risk Management Plan and Risk Register	3/31/2017												
	9	LBO PM/SE Learning Opportunities	9/30/2017												
			12/31/2016												
	10	LBO PM/SE Project Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
		<b>CDL/ALMA</b>													
			12/31/2016												
			3/31/2017												
			6/30/2017												
			9/30/2017												
			12/31/2016												
	11	CDL Documentation Support	3/31/2017												
			6/30/2017												
			9/30/2017												
			12/31/2016												
	12	CDL PM/SE Learning Opportunities	3/31/2017												
			6/30/2017												
			9/30/2017												
			12/31/2016												
	13	CDL Proposal Development Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
			12/31/2016												
	14	CDL PM/SE Project Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												

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				Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope
		<b>Green Bank Observatory</b>													
	15	GBO Documentation Support	12/31/2016												
			3/31/2017												
			6/30/2017												
			9/30/2017												
	16	GBO Input to PMD SOPs	12/31/2016												
	17	GBO Report Plan and Templates	3/31/2017												
	18	GBO Risk Management Plan and Risk Register	6/30/2017												
			12/31/2016												
	19	GBO Proposal Development Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
	20	GBO Process Improvement Workshop	9/30/2017												
			12/31/2016												
	21	GBO PMISE Project Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
		<b>DMS/CASA</b>													
	22	DMS Documentation Support	12/31/2016												
			3/31/2017												
			6/30/2017												
			9/30/2017												
	23	DMS Define CASA Development Processes	12/31/2016												
			12/31/2016												
	24	DMS PMISE Learning Opportunities	3/31/2017												
			6/30/2017												
			9/30/2017												
	25	DMS Perform Retrospective on CASA Processes	6/30/2017												
	26	DMS Develop Process Improvement Plan	9/30/2017								Cancelled			Cancelled	
			12/31/2016												
	27	DMS Proposal Development Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
	28	DMS PMISE Project Leadership	12/31/2016												
			3/31/2017												
			6/30/2017												
			9/30/2017												
		<b>Headquarters</b>													
	29	PMHQ Observatory-wide Documentation Support	12/31/2016												
			3/31/2017												
			6/30/2017												
			9/30/2017												
	30	Incorporate Changes and Feedback into SOPs	9/30/2017												
			12/31/2016												
	31	PMISE Training/Workshop	3/31/2017												
			6/30/2017												
			9/30/2017												
			12/31/2016												
	32	PMHQ PMISE Project Leadership	3/31/2017												
			6/30/2017												
			9/30/2017												
<b>8.5</b>		<b>Education &amp; Public Outreach</b>													
		<b>STEM Education</b>													
	1	Sister Cities Phase Two STEM development	3/31/2017												
	2	Sister Cities Phase Two STEM activities	6/30/2017												
	3	Sister Cities Phase Two STEM exchange	9/30/2017												
	4	Three-element Teaching Interferometer pilots	3/31/2017												
	5	Third Dish Installation complete	12/31/2016												
	6	STEM Career Day at Dominion Virginia Electric	12/31/2016												
	7	10 <sup>th</sup> Grade STEM Day at Piedmont Virginia Community College & Ruckersville STEM Expo	3/31/2017												
	8	Summer Camp Assessment Plan	3/31/2017												
		<b>News and Media Relations</b>													
	9	NASW Session Plan	3/31/2017												
		<b>Multimedia Engagement</b>													
	10	WordPress site Beta tests	12/31/2016												
	11	WordPress site launches	3/31/2017												
	12	WordPress interactive templates	6/30/2017												
	13	Vimeo and YouTube repositories	3/31/2017												
	14	ALMA Explorer video updates	3/31/2017												
	15	ALMA Explorer Spanish updates	9/30/2017												
	16	Milky Way Explorer Extragalactic update	9/30/2017												
		<b>Visitor Center Operations</b>													
	17	VLA Visitor Center Education and Interpretive Plan completed	6/30/2017												
	18	VLA Visitor/Education Center architectural schematic designs completed	6/30/2017												
	19	Prep for Contact-themed Open House at VLA	9/30/2017												
<b>9.4</b>		<b>Computing &amp; Information Services</b>													
	1	Business Process Review	3/31/2017												
	2	Implementation of Key Processes	9/30/2017												
	3	Staff Help Desk Service Level Objectives	6/30/2017												
	4	Computer inventory management review	3/31/2017												
	5	Network perimeter review	3/31/2017												
	6	Securing the Human training	9/30/2017												
	7	Web search and single sign-on	9/30/2017												

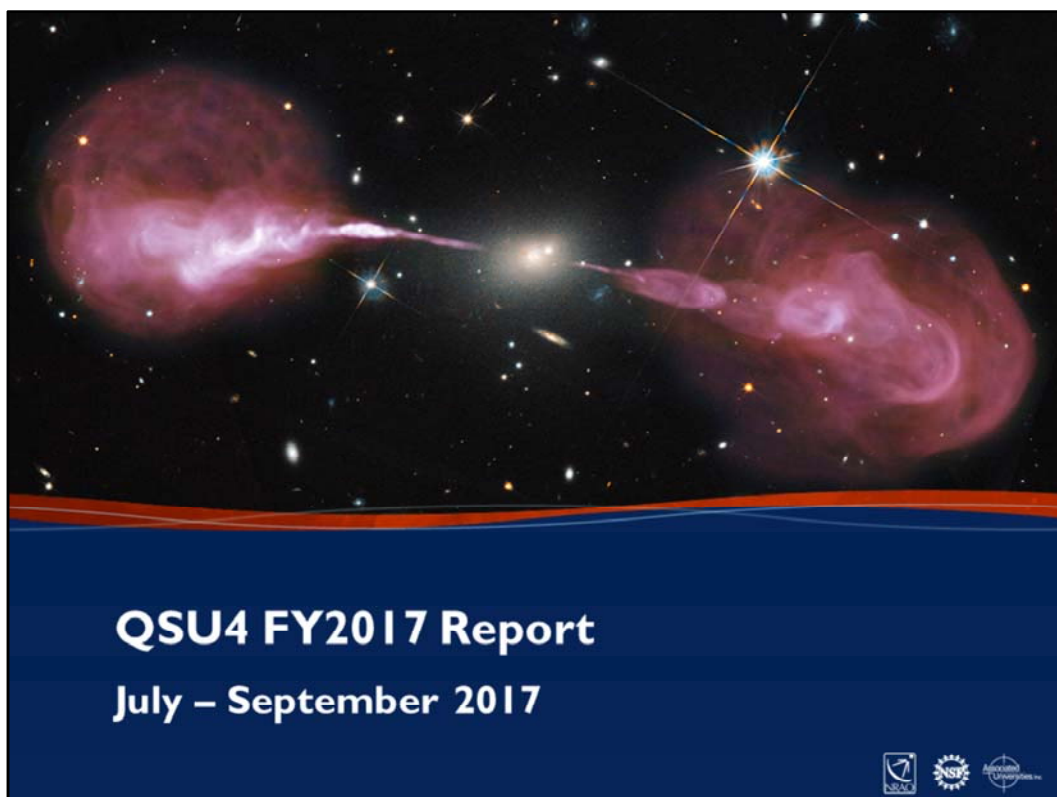
**NRAO Quarterly Status Update**  
(QSU4 FY2017)  
July - September 2017

POP Section	POP Milestone	Milestone	Completion Date	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment		
				Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope
	8	Capacity reporting metrics	12/31/2016												
	9	Storage Area Network for virtual servers	3/31/2017												
	10	Computer Hardware Standards review	6/30/2017												
10.3		<b>Office of Diversity &amp; Inclusion</b>													
		<b>Diversity Council</b>													
			12/31/2016												
	1	Diversity Council Meeting	3/31/2017												
			6/30/2017												
			9/30/2017												
		<b>Local and National Programs</b>													
	2	SEDLE, LSAMP, AATF, NAC	3/31/2017												
			6/30/2017												
	3	NAC Expansion	6/30/2017												
	4	Summer program orientations	6/30/2017												
	5	Summer programs initiated	9/30/2017												
	6	NAC Annual Workshop	9/30/2017												
		<b>International Programs</b>													
	7	ODI Chile undergraduate research experience recruitment	12/31/2016												
	8	ODI Chile undergraduate research experience initiated	3/31/2017												
			12/31/2016												
	9	NINE program expansion	3/31/2017												
			6/30/2017												
			9/30/2017												
	10	Sister Cities	3/31/2017												
		<b>Diversity &amp; Cultural Awareness</b>													
			12/31/2016												
	11	DCA Program plan developed and implemented	3/31/2017												
			6/30/2017												
			9/30/2017												
11.7		<b>Human Resources</b>													
		<b>Policy</b>													
	1	Provide ongoing updates and develop and disseminate a Workplace Violence Prevention Policy in coordination with ESS	12/31/2016												
		<b>Training &amp; Development</b>													
	2	Develop and communicate Professional Development Central Pool Program	12/31/2016												
	3	Design and deliver Succession Planning Training to Managers	3/31/2017												
	4	Communicate with Managers and assist with roll out of on-line Unlawful Harassment training for all staff	6/30/2017												
	5	Deliver Comp 101 & Performance Management Training	6/30/2017												
	6	Design and deliver Interviewing/Hiring Training (Mgrs.)	9/30/2017												
		<b>Compensation</b>													
	7	Implement new FLSA regulations	12/31/2016												
	8	Electronic Performance Appraisal Process	12/31/2016												
	9	Salary Review	3/31/2017												
	10	Salary survey and benchmark jobs analysis	9/30/2017												
		<b>Benefits</b>													
	11	Electronic Open Enrollment Process Development	12/31/2016												
	12	Electronic Open Enrollment (non-Open Enrollment)	6/30/2017												
		<b>Recruitment</b>													
	13	Applicant Tracking System	12/31/2016												
		<b>Employment</b>													
	14	Workforce Management Plan	3/31/2017												
		<b>Human Resources</b>													
	15	Succession Planning Guide	3/31/2017												
	16	Employee Climate & Engagement Survey	12/31/2016												
	17	JAO Collective Bargaining Planning	12/31/2016												
	18	Process Improvement/Employee Communication	9/30/2017												
	19	Employee Hardship Program	6/30/2017												
	20	Leave Management Policy/Process Improvement	9/30/2017												
	21	HR Web Page Re-Design	6/30/2017												
12.1		<b>Communications</b>													
	1	Complete science meeting exhibit redesign	12/31/2016												
	2	Publish 2017 Research Facilities brochure	12/31/2016												
	3	Submit 2018 AAAS science symposium proposal	6/30/2017												
	4	Publish 2016 NRAO Annual Report	9/30/2017												
13.7		<b>Administration</b>													
		<b>Contracts and Procurement</b>													
	1	Investigate best practices at other FFRDCs. Create goals and implement plan to meet goals	6/30/2017												
		<b>Environmental, Safety and Security</b>													
	2	Review and Safety Manual and Policies	6/30/2017												
		<b>Management Information Services</b>													
	3	Purchase Equipment and coordinate installation with CIS	12/31/2016												
	4	Complete installation and perform any necessary training with ERP user base	6/30/2017												
		<b>Technology Transfer Office</b>													
	5	Acquire license to Wellspring intellectual property management software	12/31/2016												
	6	Loading of NRAO Intellectual Property information	3/31/2017												
		<b>Budget</b>													
	7	With Budget Manager assigned to GBO, identify and measure areas of ICC unique to GBO, and determine if they materially affect the ICC rate and merit separate inclusion	3/31/2017												

**NRAO Quarterly Status Update**  
(QSU4 FY2017)  
July - September 2017

POP Section	POP Milestone	Milestone	Completion Date	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment		
				Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope
I4.3		<b>Spectrum Management</b>													
	1	WP 7D Meeting	12/31/2016												
	2	IA, SB Meeting	12/31/2016												
	3	7D Meeting	6/30/2017												
	4	WP IA meeting	6/30/2017												
	5	CORF Meeting	6/30/2017												
	6	SFCG Meeting	6/30/2017												
	7	URSI General Assembly	9/30/2017												
I5.1		<b>Director's Office</b>													
		<b>ALMA</b>													
	1	ALMA Board Meeting	12/31/2016												
			6/30/2017												
	2	ALMA Director's Council	12/31/2016												
			3/31/2017												
			6/30/2017												
			9/30/2017												
		<b>Corporate Meetings</b>													
			12/31/2016												
	3	AUI Board of Trustees meetings	3/31/2017												
			6/30/2017												
			12/31/2016												
	4	AUI Executive Committee meetings	6/30/2017												
			9/30/2017												
		<b>Science Community</b>													
	5	Appoint new Users Committee members	12/31/2016												
	6	Users Committee meeting	6/30/2017												
		<b>Management Reviews</b>													
	7	NSF Annual Program Review	12/31/2016												
	8	All-Hands presentations	12/31/2016												
			6/30/2017												





## Annual POP Score Card

Total number of 2017 POP Milestones: 303

Total 2017 milestones completed on time: 251

Percent of total completed on time: 82.84%

Total completed in the year 2017: 270

Percent of total completed in the year: 89.11%

Total moved to FY2018 POP: 10

Total carryovers to FY2018: 8

Percent of total postponed to next year: 5.94%

Total 2017 milestones cancelled: 14

Percent of total 2017 milestones cancelled: 4.62%

## POP MILESTONE # 2.6.19

### ALMA OPS - NAASC

NAASC staff is planning to host a "hack day" where scientists and developers will come and work collaboratively on the best methodology to combine data

<b>COST:</b>		<b>SCOPE:</b>	
Labor Actuals	Expected	Milestone cancelled	
\$	\$		
Material Actuals	Expected		
\$	\$		
Travel Actuals	Expected		
\$	\$		
<b>SCHEDULE:</b>		<b>RISK &amp; MITIGATION:</b>	
<b>Milestone</b>	<b>Schedule</b>	<b>Target</b>	
I Will host a data combination "hack day" in Q4 FY2017.	30 September 2017	Cancelled	
		<b>Risk</b>	<b>Mitigation</b>
		I The data combination "hack day" did not take place in Q4 FY2017.	I Support more one-on-one data reduction visitors to the NAASC especially in support of data combination.

3

QSU4 FY2016



**COST:** No impact.

**SCOPE:** No impact.

**SCHEDULE:** It was anticipated that the NAASC would host a "hack day" where scientists and developers will come and work collaboratively on the best methodology to combine data taken with multiple arrays. With the loss of key personnel in community outreach and support, this workshop in Q4 was cancelled.

**RISK & MITIGATION:** The risk involved was to not host the data combination "hack day" which would have happened in Q4. However, the mitigation has always been that if a workshop is cancelled, NAASC staff would still support face-to-face visitors on a routine and regular basis. The number of data reduction visitors during the summer has not fallen off and we are still fulfilling our obligations to the community and specifically took requests for face-to-face visits on the topic of data combination.

## POP MILESTONE # 2.6.25

### ALMA OPS - NAASC

NAASC staff will hold the 11<sup>th</sup> NAASC workshop, in coordination with our Taiwanese colleagues

Cost




Schedule

Scope

<b>COST:</b> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b> FY2018 POP milestone #2.5.20 due 3/31/2018.		
Labor Actuals	Expected																
\$	\$																
Material Actuals	Expected																
\$	\$																
Travel Actuals	Expected																
\$	\$																
<b>SCHEDULE:</b> <table> <tr> <th>Milestone</th> <th>Schedule</th> <th>Target</th> </tr> <tr> <td>I Will host a joint science workshop with Taiwan in Q4 FY2017.</td> <td>9/30/2017</td> <td>3/31/2018</td> </tr> </table>			Milestone	Schedule	Target	I Will host a joint science workshop with Taiwan in Q4 FY2017.	9/30/2017	3/31/2018	<b>RISK &amp; MITIGATION:</b> <table> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>I The workshop would not be scheduled in Q4.</td> <td>I Reschedule the workshop in FY2018 as milestone #2.5.20.</td> </tr> </table>			Risk	Mitigation	I The workshop would not be scheduled in Q4.	I Reschedule the workshop in FY2018 as milestone #2.5.20.		
Milestone	Schedule	Target															
I Will host a joint science workshop with Taiwan in Q4 FY2017.	9/30/2017	3/31/2018															
Risk	Mitigation																
I The workshop would not be scheduled in Q4.	I Reschedule the workshop in FY2018 as milestone #2.5.20.																

4

QSU4 FY2016

COST: No impact.

SCOPE: No impact.

**SCHEDULE:** It was anticipated that the NAASC, in coordination with our Taiwanese colleagues, would co-sponsor the 11<sup>th</sup> NAASC workshop which would be held in Taiwan. Given the scheduling constraints of our Taiwanese colleagues it was decided that the science workshop would be better received in FY2018. As such, this milestone was missed and is now listed in the FY2018 POP, Milestone #2.5.20 with a due date of 3/31/3018 (Q2).

**RISK & MITIGATION:** There is no risk to missing this milestone and the mitigation was simply to add it to the FY2018 POP.

## POP MILESTONE # 2.6.26

### ALMA Development

#### FY2016 (Cycle 4) Studies Complete

Cost
  Schedule
  Scope

<b>COST:</b>			<b>SCOPE:</b>	
Labor Actuals	Expected	As reported in QSU3, milestone was incorrectly listed in FY2017 POP as 6/30/2017. Cycle 4 study end date has been managed through NRAO change control. This milestone appears in the FY2018 POP as Q3 Milestone #2.5.27.		
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
<b>SCHEDULE:</b>			<b>RISK &amp; MITIGATION:</b>	
Milestone	Schedule	Target	Risk	Mitigation
I Cycle 4 Studies Complete	FY2017 Q3/Q4	FY2018 Q1	I No impact	

5
QSU4 FY2016

COST: No impact.

SCOPE: No impact.

**SCHEDULE:** As specified in the ALMA Development Cycle 4 Call for Study Proposal instructions and documents and the FY2017 POP text on page 18, the Cycle 4 Studies are scheduled to end 9/30/2017. The Cycle 4 milestone #2.6.26 is incorrectly listed as 6/30/2017 in the milestone chart and should have been 9/30/2017 based on the ALMA Development call, but in fact some studies commenced with an agreed upon 12/31/2017 end date.

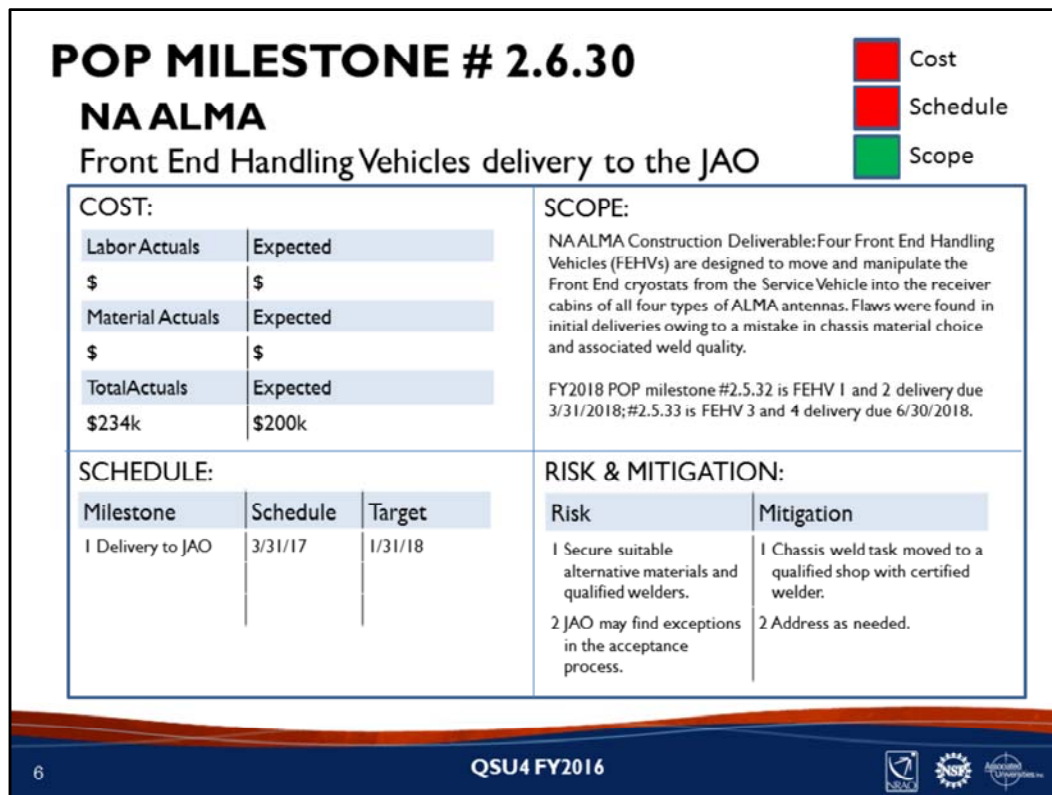
Per FY2017 POP Final narrative text on page 18: "Proposed NRAO Studies (Development Cycle 4): The Cycle 4 Call for Study Proposals was released on 01 March 2016. The Proposal submittal deadline was 2 May 2016 and notification of awards will be made on 30 July 2016. A total of \$1.0M is available for funding Studies during NA ALMA Development Cycle 4. The NRAO expects to fund no more than six (6) of the proposed Studies listed in Table 2.3.1 (below). The period of performance will begin in late Q4 FY2016 and end in Q4 FY2017."

The Cycle 4 Call for Studies instructions (issued prior to the FY2017) list 9/30/2017 as the end date. However, due to a late start in setting up the subrecipient awards for the external agreements, Cycle 4 study periods of performance currently are:

1. Digital Back End Antenna Article (NRAO): 10/1/2016 – 9/30/2017
2. Development of 2nd Generation SIS Receivers for ALMA (NRAO): 10/1/2016 – 9/30/2017
3. Prototype of a Complete Dual-Linear 2SB Block and Single-Polarization Balanced 2 SB Block (NRC): 10/1/2016 – 1/31/2018. Note that a no cost extension for this study to 1/31/2018 was requested by NRC due to upgrades they need to make in their mixer test set cryostat. The change request was approved by the NRAO change control board on 7/13/2017.
4. Diversifying the Scientific Applications of the ALMA Phasing System (MIT): 12/1/2016 – 12/31/2017
5. Total Power Map to Visibilities (TP2VIS) (Stony Brook University): 10/1/2016 – 9/30/2017
6. Cleaning Up Interactive Cleaning (University of Alberta): 12/1/2016 – 12/31/2017

Therefore, the end date of the studies should be Q1 FY2018.

**RISK & MITIGATION:** No impact. Extension of studies beyond originally planned period has been reviewed and approved by change management representatives, including ALMA Development budget representative.

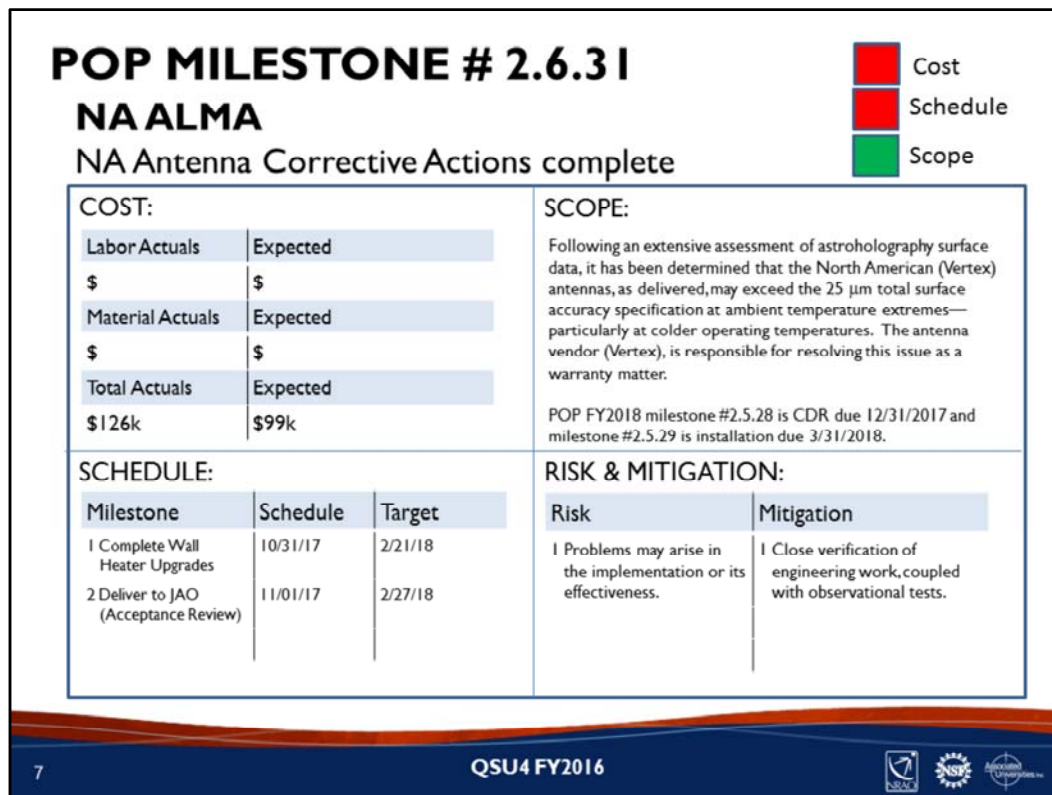


**COST:** In FY2017, \$200k was budgeted for this project, and \$234k was expended. Materials and labor were both somewhat higher than budgeted as a couple of tries were necessary before a shop was found that could produce the certified welds necessary with the required materials.

**SCOPE:** Original scope of work has not changed. Action is to build four new chassis with correct materials and certified welds, and reassemble vehicles.

**SCHEDULE:** As of end of FY2017, first chassis had been successfully welded in Green Bank Observatory machine shop, inspected and certified, shipped to the assembler in Chile, and fit-tested. Assembly of the first vehicle was nearly completed. Tests of the first vehicle were expected by the end of October 2017. Acceptance tests with the JAO for the first vehicle are expected in November 2017. Work on the remaining chassis were proceeding at the GBO shop. Completion of the remaining vehicles are expected in early Q2 FY2018. There are two corresponding milestones in the FY2018 POP: #2.5.32 Deliver FEHVs 1 and 2 to JAO and #2.5.33 Deliver FEHVs 3 and 4 to JAO.

**RISK & MITIGATION:** The primary risk was in obtaining a certified welder that was able to successfully weld the aluminum chassis. That appears to have been met now, and that risk has been largely mitigated. The remaining risk is that the JAO may find further exceptions in the acceptance tests of the rebuilt chassis that will need to be addressed.



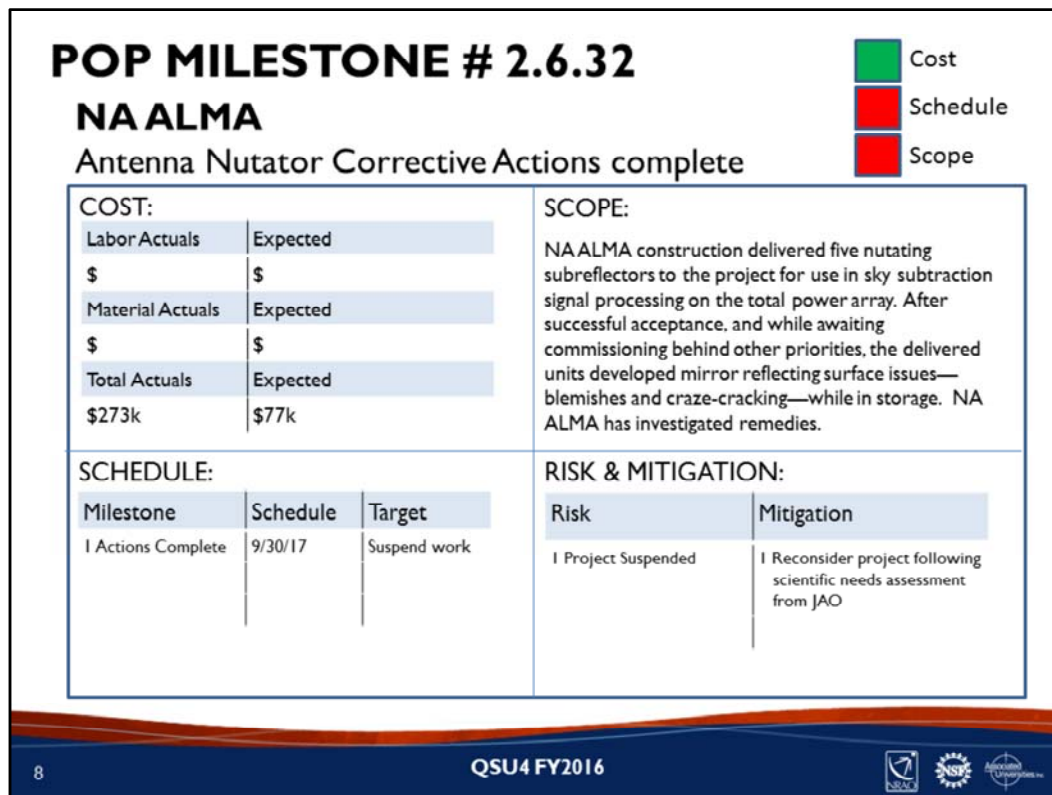
**COST:** The vendor is responsible for all engineering design and implementation costs to rectify this warranty issue. NA ALMA performs engineering analysis to confirm the work of the vendor and analyzes the astronomical observations that test the resultant performance. The time expended on this work and time spent traveling to review meetings with the vendor somewhat exceeded the budgeted allocation in FY2017.

**SCOPE:** The root cause of the surface accuracy behavior has been traced to local temperature variations in the antenna receiver cabin wall that generate mechanical strain (due to thermal expansion/contraction) which is transferred through the antenna back-up structure (BUS) and imprinted on the reflecting surface of the dish. The antenna contractor, Vertex Antennentechnik, GmbH, has developed a mitigation system consisting of thermostatically controlled wall heaters that may be adjusted to maintain more uniform wall temperature and a corresponding stable surface rms versus ambient temperature. This concept has been tested via astrophotography and thermocouple readings during FY2017 on four antennas (DV06, DV09, DV14, and DV25).

**SCHEDULE:** It was expected that the prototyping and testing could be completed by end of FY2017 with completion of final implementation on all antennas by the end of CY2017. The long period of poor weather on the Atacama site that began in February 2017 and hampered access and measurements at the site through August 2017 slowed this work considerably. A delta-design review is now scheduled for mid-November 2017, and it is planned that the installation of thermostatically controlled wall heaters will be completed in early Q2 FY2018.

**RISK & MITIGATION:** Until the installations are completed, observationally verified, and all units are working reliably, risk will remain. This risk is primarily borne by the vendor, and is being mitigated by close observational and engineering verification of the work.





**COST:** The FY2017 expenditures on this project were within the budgeted allocation.

**SCOPE:** NA ALMA investigated a restoration of the subreflectors with two of the original subcontractors, Composite Mirror Applications, Inc., in Tucson, AZ, and Zrinski, GmbH, in Wurmlingen, Germany. Unfortunately, the conclusion of the investigations was that the craze-cracking extended through the reflecting layer into the carbon-fiber substrate. Although some repair options exist, they are not simple nor particularly inexpensive. The JAO has given these devices low scientific priority over the past few years and may have an alternative observing method (fast scanning) that does not require their use.

**SCHEDULE:** The nutator plan for FY2017 assumed that these investigations would lead to a quick resolution of the issues. At this point, however, we have asked the JAO to make an assessment of the scientific requirement for a nutation system versus other options. This analysis will inform a cost-benefit analysis on how to proceed, which could include the options of opting for another observing technique not requiring the nutators, repairing the existing subreflectors, or replacing them with an improved design. New milestones in FY2018 POP: #2.5.30: Root Cause Analysis due 12/31/2017 and #2.5.31: Cost/benefit analysis due 12/31/2017.

**RISK & MITIGATION:** We have suspended further work on this project pending a scientific needs assessment and cost/benefit analysis from the JAO.



## POP MILESTONE # 2.6.42

### NRAO-Chile Office

#### NINE hub implementation

<b>COST:</b>			<b>SCOPE:</b>	
Labor Actuals	Expected		U. Andrés Bello was identified in FY2017 as a location for a NINE hub in Chile. Implementation is delayed until a suitable leader can be identified and trained. Milestone cancelled.	
\$0	\$0			
Material Actuals	Expected			
\$0	\$0			
Travel Actuals	Expected			
\$0	\$0			
<b>SCHEDULE:</b>			<b>RISK &amp; MITIGATION:</b>	
Milestone	Schedule	Target	Risk	Mitigation
I Hub implementation	2017 Q4	Cancelled	I Not feasible to implement a hub at U. Andrés Bello.	Explore other universities as potential locations for a NINE hub in Chile.

**COST:** There were no costs associated with missing this milestone since the resources involved come from the NINE program (for training) and from the institution in Chile (to host the hub).

**SCOPE:** For now there are no prospects for a NINE hub at U. Andrés Bello.

**SCHEDULE:** This milestone was supposed to happen in FY2017 Q4, but could not proceed for lack of a suitable leader.

**RISK & MITIGATION:** In the future (date TBD) NRAO-Chile will explore other universities as potential locations for a NINE hub.

POP MILESTONE # 3.5.30

NM Operations

Identify and replace 5000 cross ties

Cost

Schedule

Scope

COST:

Labor Actuals	Expected
\$	\$
Material Actuals	Expected
\$ 160K	\$
Travel Actuals	Expected
\$	\$

SCOPE:

Identify and replace 5000 aging or damaged rail ties over the course of the year.

SCHEDULE:

Milestone	Schedule	Target
1 Replace 5000 ties	9/30/17	12/31/17

RISK & MITIGATION:

Risk	Mitigation
1 Task completion delayed due to tamper repair time	1 Purchase replacement computer
2 Lack of ballast tamping on outer array arms may delay reconfigure to A-array	2 Track crew started tamping ballast manually in October. Tamper should return to service before reconfiguration.

10

QSU4 FY2016

**COST:** An additional \$160K was needed to purchase a replacement control computer for the rail tamper on an emergency basis.

**SCOPE:** No change in scope.

**SCHEDULE:** Tie replacement delayed by one quarter (to Q1 FY2018) due to failed control computer on rail tamper.

**RISK & MITIGATION:** Purchased replacement computer, which is now being installed. Tie replacement has proceeded on the outer stations of the array arms. Manual tamping of ballast was started in early October to take advantage of good weather so that tamping could be complete in advance of move to A-array in January-February. Tamper return to service is imminent.

## POP MILESTONE # 4.3.8

### Central Development Laboratory

Implementation of the "F" part of the correlator in a state-of-the-art FPGA

<b>COST:</b>			<b>SCOPE:</b>	
Labor Actuals	Expected		Milestone cancelled.This work has been put on hold pending the acquisition of the desired FPGA.	
\$				
Material Actuals	Expected			
\$				
Travel Actuals	Expected			
\$				
<b>SCHEDULE:</b>			<b>RISK &amp; MITIGATION:</b>	
Milestone	Schedule	Target	Risk	Mitigation
I Implementation of the "F" part of the correlator	6/30/2017	Cancelled	I The submitted ALMA study proposal under which the new FPGA hardware is to be procured,might not materialize (has not materialized.)	I Could allocate CDL CSA-V funds for the buy,or exploit synergy with ngVLA (would probably lead to longer procurement horizon.)

11

QSU4 FY2016



**COST:** No impact.

**SCOPE:** Early on, it was decided that the performance evaluation of an FX correlator implemented using FPGAs should be carried out using the new state-of-the-art FPGA hardware which would be procured under an ALMA study proposal aimed at increasing the bandwidth of the receiver's backend to up to 16 GHz.

**SCHEDULE:** This milestone is cancelled for FY2017. A new target date will be determined once we have the new FPGA on hand.

**RISK & MITIGATION:** See description under schedule.

## POP MILESTONE # 4.3.9

### Central Development Laboratory

Development of a pre-processing technique to detect interferences and/or non-stationary signals

<b>COST:</b>			<b>SCOPE:</b>	
Labor Actuals	Expected		Milestone cancelled. Work to define the necessary architecture is complete. Implementation activity has been deferred in favor of a new initiative aimed at increasing the bandwidth of the receiver's backend to up to 16 GHz. This line of research is deemed to be in better consonance with the current needs of the observatory.	
\$				
Material Actuals	Expected			
\$				
Travel Actuals	Expected			
\$				
<b>SCHEDULE:</b>			<b>RISK &amp; MITIGATION:</b>	
Milestone	Schedule	Target	Risk	Mitigation
I Development of a technique to detect interferences and/or non stationary signals.	9/30/2017	The implementation of the RFI excision architecture will be revisited at the end of the new 16 GHz study, if funded.	I Long delay before this milestone is realized.	I Not a priority goal anymore

12

QSU4 FY2016



**COST:** No impact.

**SCOPE:** Following up on the plan to study pre-correlation techniques for interference detection and its mitigation, joint time-frequency analysis and higher order statistics were selected for further study as the most promising single-dish detection technique. A tensor-based RFI mitigation technique with application to interferometric arrays was successfully applied to VLA data, and a potential architecture for RFI detection and excision at the 'F' stage of an FX correlator has been defined. However, these activities were deferred in favor of a new initiative aimed at increasing the bandwidth of the receiver's backend to up to 16 GHz. This line of research was deemed to be in better consonance with the current needs of the observatory, and a proposal for the same has been submitted.

**SCHEDULE:** The implementation of the RFI excision architecture will be revisited at the end of this new study, if funded. A more accurate target date will be established at that point. Milestone is cancelled.

**RISK & MITIGATION:** Long delay; mitigation not a priority.

## POP MILESTONE # 5.5.13

### Science Support and Research

TTA tool suite requirements

Cost

Schedule

Scope

<b>COST:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; border-bottom: 1px solid black;">Labor Actuals</td> <td style="border-bottom: 1px solid black;">Expected</td> </tr> <tr> <td style="border-bottom: 1px solid black;">\$</td> <td style="border-bottom: 1px solid black;">\$</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Material Actuals</td> <td style="border-bottom: 1px solid black;">Expected</td> </tr> <tr> <td style="border-bottom: 1px solid black;">\$</td> <td style="border-bottom: 1px solid black;">\$</td> </tr> <tr> <td style="border-bottom: 1px solid black;">Travel Actuals</td> <td style="border-bottom: 1px solid black;">Expected</td> </tr> <tr> <td style="border-bottom: 1px solid black;">\$</td> <td style="border-bottom: 1px solid black;">\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b> Uncertainty due to divestment implications.  Rescheduled as POP FY2018 milestone #5.6.14 due 3/31/2018.		
Labor Actuals	Expected																
\$	\$																
Material Actuals	Expected																
\$	\$																
Travel Actuals	Expected																
\$	\$																
<b>SCHEDULE:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%; border-bottom: 1px solid black;">Milestone</th> <th style="width: 30%; border-bottom: 1px solid black;">Schedule</th> <th style="width: 40%; border-bottom: 1px solid black;">Target</th> </tr> <tr> <td style="border-bottom: 1px solid black;">I Detailed requirements</td> <td style="border-bottom: 1px solid black;">30 Jun 2017</td> <td style="border-bottom: 1px solid black;">31 Mar 2018</td> </tr> </table>		Milestone	Schedule	Target	I Detailed requirements	30 Jun 2017	31 Mar 2018	<b>RISK &amp; MITIGATION:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; border-bottom: 1px solid black;">Risk</th> <th style="width: 50%; border-bottom: 1px solid black;">Mitigation</th> </tr> <tr> <td style="border-bottom: 1px solid black;">I No impact</td> <td style="border-bottom: 1px solid black;"></td> </tr> </table>		Risk	Mitigation	I No impact					
Milestone	Schedule	Target															
I Detailed requirements	30 Jun 2017	31 Mar 2018															
Risk	Mitigation																
I No impact																	

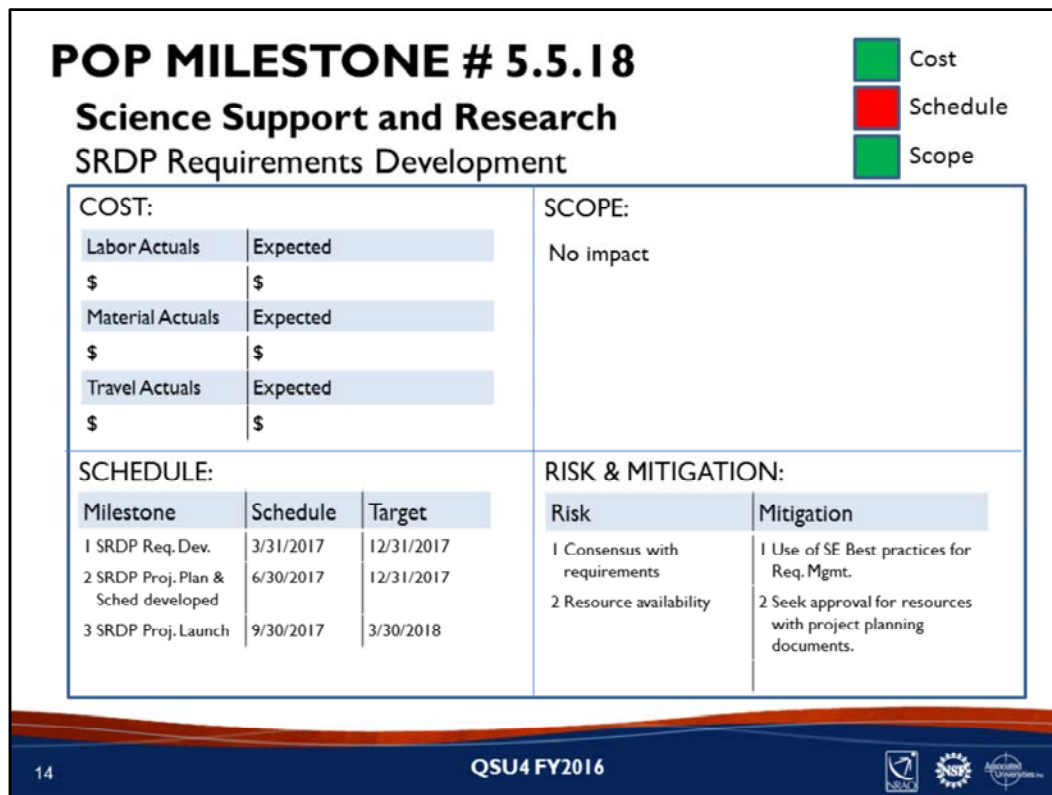
13
QSU4 FY2016

COST: No impact.

SCOPE: Uncertainty w.r.t. requirement to support NRAO only (VLA), or NRAO plus LBO plus GBO needed resolution in order to move forward—decision: needs to support VLA, VLBA and GMVA with GBO to decide whether to opt in.

SCHEDULE: Progress has been delayed because of lack of resources to undertake programming effort (new archive tool has taken precedence—now released). Now POP FY2018 milestone #5.6.14 due 3/31/2018.

RISK & MITIGATION: No impact.



COST: No impact.

SCOPE: No impact.

SCHEDULE: A delay of approximately six months in appointing the SRDP Director (appointed Mar 21, 2017) has translated to a six month delay for the overall effort.

Milestone 1 is in the FY2017 POP table. A decision was taken to establish a Requirements Committee to broaden input beyond DMS and SSR. The charge to the SRDP Requirements Committee was approved early October 2017 and the committee is now appointed, with representation from VLA Ops, NM Ops, DMS, and SSR. LBO is also represented on the committee to observe and evaluate how VLBA can engage in SRDP.

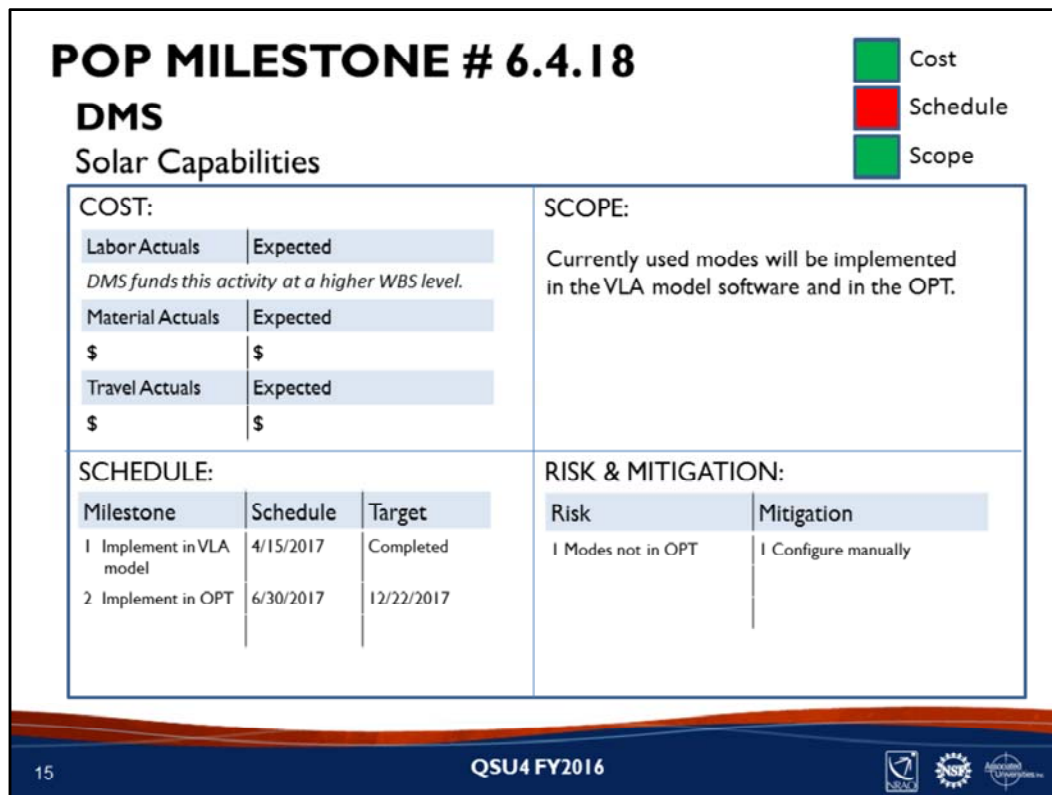
Milestones 2 and 3 are project level milestones that are referenced in the 2017 POP narrative. More specific targets have been defined as 2018 POP Milestones #5.6.15–19. The Project Management Plan, SE Management Plan and subsidiary documents are well developed as drafts and are targeted for approval in Q1 FY2018. The Project Scientist position is reflected as Q1 FY2018 POP milestone #5.6.15. and has been in recruitment since late July 2017. Resource requests to other NRAO departments were made at the Budget and Resource summit in June of 2017, so project resourcing is also underway.

#### RISK & MITIGATION:

- 1) Taking a broader approach to requirements development adds risk that consensus will not be reached in a timely manner. This is mitigated with written plans for requirements management based on industry best practices established by INCOSE and IEEE.
- 2) SRDP is competing for contributed effort from scarce resources and must appeal to the challenge and satisfaction of participation in the project. SRDP was also to benefit from algorithm development under VLASS which has been delayed to their operations phase. Resource commitments will be strengthened with document approvals which clearly state project needs.

Re: from 2017 POP

“The major SUS initiative in FY2017 is the launch of the Science Ready Data Products (SRDP) project. In collaboration with DMS, SRDP requirements will be developed in Q1 and Q2. The project plan and schedule will be developed in Q2 and Q3. The project will be reviewed at the end of Q3 and launched in Q4.

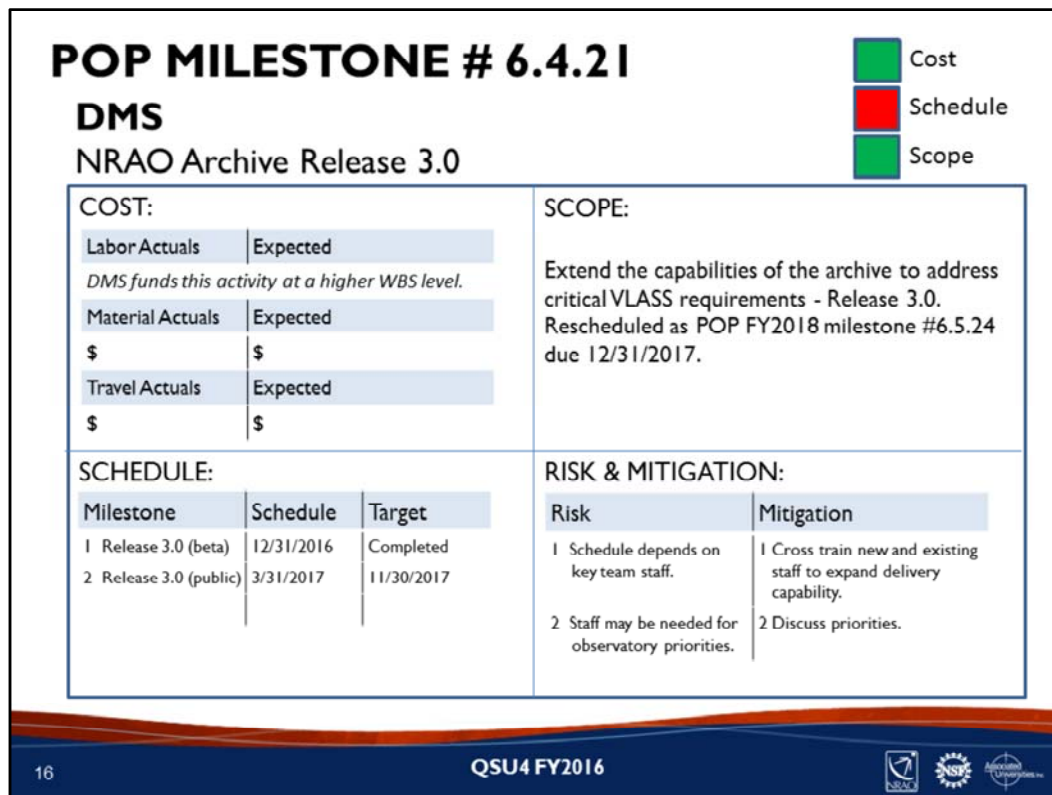


**COST:** DMS funds this activity at a higher WBS level. Costs are not tracked for this milestone.

**SCOPE:** Currently used modes will be implemented in the VLA model software and in the OPT.

**SCHEDULE:** The modes were implemented in the VLA model. OPT development work was completed, but validation testing has been delayed by the need to first test VLASS changes.

**RISK & MITIGATION:** Since modes are not in the OPT yet, projects using these modes will need to be manually configured. Waiting on acceptance testing but falls behind VLASS in the queue.



**COST:** DMS funds this activity at a higher WBS level. Costs are not tracked for this milestone.

**SCOPE:** Extend the capabilities of the archive to address critical VLASS requirements. Release 3.0. Extensions include implementation of a new ingestion process to support VLASS, and schema extensions for calibration, images, and catalogs to support the restore process for VLASS.

**SCHEDULE:** Schedule was delayed due to resource constraints and the focus on Archive 2.5. The initial beta release to support VLASS needs was delivered in time for VLASS startup. Follow-up work remains before the public release.

**RISK & MITIGATION:** The primary risk is to the schedule due to the demand on key staff members on the team. New and existing resources will be cross-trained to enable distribution of some of the remaining VLASS archive tasks and to maintain the teams other responsibilities. Much progress has been made in this area over the past quarter.

Staff may be needed for other observatory priorities. Currently, all staff on the SSA team are allocated to archive, with a portion of their time also allocated to support. The PST and OPT also need attention, and compete for the same staff. Priorities will be evaluated and staff re-allocated if needed.

**NOTE:** This goal has been moved to FY2018 as 6.5.24.



## POP MILESTONE # 6.4.34

### DMS

#### Tool Design Elaboration

<b>COST:</b>			<b>SCOPE:</b>	
Labor Actuals	Expected		The next-level detailed design of the future tools based on detailed requirements from SSR (Section 5.1) will be conducted and will be completed in Q4.	
DMS funds this activity at a higher WBS level.				
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected		Milestone cancelled.	
\$	\$			
<b>SCHEDULE:</b>			<b>RISK &amp; MITIGATION:</b>	
Milestone	Schedule	Target	Risk	Mitigation
I Design Elaboration	9/30/2017	Cancelled	I Current toolset needs revisions.	I Address high-priority UC and TAC concerns.

17

QSU4 FY2016

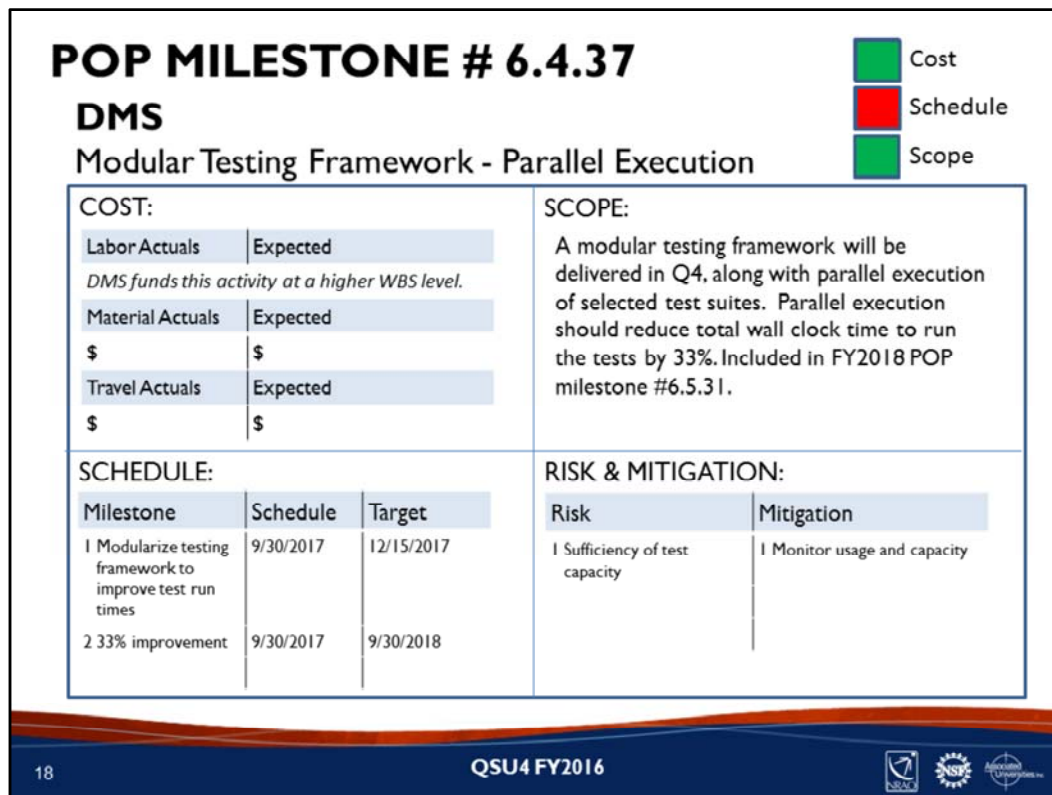


**COST:** DMS funds this activity at a higher WBS level. Costs are not tracked for this milestone.

**SCOPE:** The next-level detailed design of the future tools based on detailed requirements from SSR (section 5.1) will be conducted and will be completed in Q4. This was delayed by a focus on the successful delivery of VLASS observing and delays in development of the detailed requirements.

**SCHEDULE:** This milestone is cancelled for FY2017. As noted in the FY2018 POP, we will work with SSR on requirements development in FY2018. We will establish new milestones when the requirements are in hand.

**RISK & MITIGATION:** Work is in progress on high impact/relatively low effort changes to the PST, such as sessionless proposals and improvements needed by the TAC to handle increased proposal volume.



**COST:** DMS funds this activity at a higher WBS level. Costs are not tracked for this milestone.

**SCOPE:** A modular testing framework will be delivered in Q4, along with parallel execution of selected test suites. Parallel execution should reduce total wall clock time to run the tests by 33%.

**SCHEDULE:** The schedule was missed due to the departure of a staff member. Prior to departure, the focus moved from this activity to operational transition. The staff member was gone for a month, but then fortunately returned to NRAO which will allow us to make progress on this goal again. The 33% improvement in wall clock time has proven to be more of a challenge than originally thought.

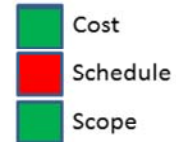
**RISK & MITIGATION:** The capacity for the testing framework is currently adequate, but is anticipated to become less so as new tests are added. The modularization will help. We will monitor the capacity.

**NOTE:** The wall clock time portion of this goal has been moved to FY2018 as part of 6.5.31.

## POP MILESTONE # 7.4.2

### PMD

#### NM PM/SE Learning Opportunities



COST: No Change			SCOPE:	
Labor Actuals	Expected		No change	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
I Q4 Learning Opportunity	9/30/2017	10/10/2017	I No impact	

COST: No impact.

SCOPE: No impact.

SCHEDULE: Rescheduled from 09/23/17 to 10/10/17 at the request of NM Ops AD due to availability of Division Heads and other staff.

RISK & MITIGATION: No risks associated with this task.

## POP MILESTONE # 7.4.26

### PMD

#### DMS Develop a Process Improvement Plan

COST: No Change			SCOPE:	
Labor Actuals	Expected		Milestone cancelled	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
I Develop a Process Improvement Plan.	9/30/2017	Cancelled	I None	

20

QSU4 FY2016



COST: No impact.

SCOPE: : No impact.

SCHEDULE: This is a follow-on to milestone 7.4.25 which was cancelled in the last quarter: From last quarter: Closing project. Cancelling remaining milestones as new management is in place which will affect the going forward position associated with the study that was done. If necessary, the CASA lead will request PMD involvement in CASA to address specific items. PMS shifting to project focus—SRDP. Remaining recommendations that are being put on hold include: 1) expedite development work according to the recommendations of the CASA Users Committee (CUC) rather than the CASA lead. 2) Rather than working on CASA housekeeping activities simultaneously as a whole group, 3) CASA team adopts a continuous release process wherein each change to the code base generates a new release of CASA, 4) CASA team co-locates staff within Charlottesville and Socorro to promote serendipitous encounters and exchange of information, and 5) provides traceability of functions, files, and test cases, additions to proposed testing framework, and coding guidelines and repay CASA's technical debt. These activities will be implemented as the new CASA lead feels is appropriate.

RISK & MITIGATION: No risks associated with this task.

## POP MILESTONE # 7.4.30

### PMD

Incorporate Changes and Feedback into SOPs



COST: No Change			SCOPE:	
Labor Actuals	Expected		No impact	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
I Incorporate changes and feedback into SOPs.	9/30/2017	10/30/2017	I None	

COST: No impact

SCOPE: : No impact

SCHEDULE: Updated SOPs are in workflow and will be completed one month late.

RISK & MITIGATION: No risks associated with this task.

## POP MILESTONE #8.5.17

### EPO

#### VLA VC Education and Interpretive Plan completed



<b>COST:</b>		<b>SCOPE:</b>	
Labor Actuals	Expected	This milestone was described as delivery of interpretive plan, but the deliverable was described as a proposal for the new VLA VC exhibits and programs delivered through PMD. These are two very different products; the interpretive plan is more appropriate at this stage.	
\$0	\$5000		
Material Actuals	Expected		
\$0	\$0		
Travel Actuals	Expected		
\$0	\$0		
<b>SCHEDULE:</b>		<b>RISK &amp; MITIGATION:</b>	
Milestone	Schedule	Target	
I Interpretive plan	Q3 FY2017	Q1 FY2018	
		<b>Risk</b>	<b>Mitigation</b>
		I Definition of exhibits before funds are secured. In the time it takes to raise the funds, more interesting technologies may be available.	I Re-scope milestone to define interpretive themes and priorities without specific definition of the exhibits.

22

QSU4 FY2016



**COST:** \$3000

**SCOPE:** Definition of exhibits is premature until goals, themes and sub-themes are defined.

**SCHEDULE:** Interpretive planning workshop is scheduled for October 23 in Magdalena.

**RISK & MITIGATION:** I) Defining exhibits before funds have been raised is risky. It would be wise to define concepts and themes first. The exhibits can be scaled to match the success of the fund raising.

# POP MILESTONE #8.5.18

## EPO

VLA Visitor/Education Center architectural schematic designs completed

Cost

Schedule

Scope

<b>COST:</b> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$ 50,000</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$ 50,000	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b> No impact		
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<b>SCHEDULE:</b> <table> <tr> <th>Milestone</th> <th>Schedule</th> <th>Target</th> </tr> <tr> <td>I Architectural sketches</td> <td>Q3 FY2017</td> <td>Q2 FY2018</td> </tr> </table>			Milestone	Schedule	Target	I Architectural sketches	Q3 FY2017	Q2 FY2018	<b>RISK &amp; MITIGATION:</b> <table> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>I Designing a plan for the wrong building.</td> <td>I A structural engineer will inspect both the existing VC and the former cafeteria before an RFP goes out for bid on a concept design.</td> </tr> </table>			Risk	Mitigation	I Designing a plan for the wrong building.	I A structural engineer will inspect both the existing VC and the former cafeteria before an RFP goes out for bid on a concept design.		
Milestone	Schedule	Target															
I Architectural sketches	Q3 FY2017	Q2 FY2018															
Risk	Mitigation																
I Designing a plan for the wrong building.	I A structural engineer will inspect both the existing VC and the former cafeteria before an RFP goes out for bid on a concept design.																

23

QSU4 FY2016

COST: No impact.

SCOPE: No impact.

SCHEDULE: Building inspections were completed in Q4. Q1 of FY2018 is when the interpretive planning workshop will be held and the RFP will be issued and firm chosen. Concept design will be delivered in Q2.

RISK & MITIGATION: We are gathering additional information for the RFP to fully characterize the options for renovation.

POP MILESTONE # 11.7.12

Human Resources

Electronic Benefit Enrollment (Non Open Enrollment)

Cost

Schedule

Scope

<div>COST:</div> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$ ICC only</td> <td>\$ Additional in FY18</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$ n/a</td> <td>\$ n/a</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$ n/a</td> <td>\$ n/a</td> </tr> </table>			Labor Actuals	Expected	\$ ICC only	\$ Additional in FY18	Material Actuals	Expected	\$ n/a	\$ n/a	Travel Actuals	Expected	\$ n/a	\$ n/a	<div>SCOPE:</div> <p>Create electronic enrollment for new hires, qualifying event changes and voluntary benefit enrollment changes.</p> <p>DBA Audit uncovered incompatibility issues between current setup and enrollment workflow. Must revise DBA instructions.</p> <p>FY2018 POP milestone # 11.7.6 due 6/30/2018.</p>		
Labor Actuals	Expected																
\$ ICC only	\$ Additional in FY18																
Material Actuals	Expected																
\$ n/a	\$ n/a																
Travel Actuals	Expected																
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Milestone	Schedule	Target															
1 Deliver electronic benefit enrollment.	6/30/2017	6/30/2018															
Risk	Mitigation																
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2 JDE DBE setup not optimized for use of enrollment workflow.	2 Audit of DBAs to determine correct setup so workflow can run appropriately.																

24

QSU4 FY2016

**COST:** Labor is all contributed effort covered by ICC departmental budgets. No budget was specifically built for this milestone in FY2017. Additional budget for training and/or setup support has been identified for FY2018. Estimated 40 hours of consulting services (\$6,800) required to complete this task.

**SCOPE:** Initial scope was to partner with NRAO PMD, MIS, and HR to create electronic enrollment workflow for new hires, qualifying event changes, and voluntary benefit enrollment changes outside of the annual open enrollment process. Recruitment of MIS representative was delayed by lack of qualified candidates with direct JDE experience. Setup for Deductions, Benefits, Accruals (DBAs) that drive the enrollment workflows was not well understood prior to hire of new MIS representative. Through development of new ROTH 403b DBA with consultant, DBA setup incompatibilities have been identified. An additional audit and revision step will be necessary before the workflow can be developed.

**SCHEDULE:** Due third quarter FY2017. Inclusion of additional audit step, combined with open enrollment deliverables, will push this milestone to third quarter FY2018. Budget constraints for consulting and training can impact the scheduling of this project.

#### RISK & MITIGATION:

**1. Risk** – MIS support delayed due to retirement of experienced MIS representative. **Mitigation** – Hire new MIS representative with JDE knowledge and experience, and/or hire consultant to perform the work (additional funding required). Neither mitigation option was realized contributing to delay. New MIS representative in training process to learn JDE benefit enrollment and configuration.

**2. Risk** – JDE DBA setup not optimized for use of enrollment workflow. **Mitigation** – Perform a full audit of all system DBAs to confirm configuration is aligned with best practices for use of electronic enrollment workflows. Time required to perform this action, combined with other deliverables for open enrollment and payroll processing, pushes the schedule out beyond FY2017.



# POP MILESTONE # 11.7.14

## Human Resources

### Workforce Management Plan

Cost




Schedule

Scope

<b>COST:</b> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b> No impact		
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Milestone	Schedule	Target															
I Develop/Distribute WFM Plan	3/31/2017	12/01/2017															
Risk	Mitigation																
I No risk																	

25

QSU4 FY2016

COST: No impact.

SCOPE: No impact.

SCHEDULE: HR collaborated with stakeholders across the Observatory to solicit input into the WMP. The Communications Analyst and NRAO Director are reviewing the document for final approval and distribution to AUI and NSF. Expected approval is December.

RISK & MITIGATION: No risk. NRAO currently has a WFM Plan.

# POP MILESTONE # 12.1.4

## Communications

### Publish 2016 NRAO Annual Report

Cost




Schedule

Scope

COST:			SCOPE:	
Labor Actuals	Expected		No impact	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
I Publish Report	30 Sep 2017	9 Feb 2018	I No risk	

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QSU4 FY2016

COST: No impact.

SCOPE: No impact.

SCHEDULE: Report completion delayed by higher priority tasks. New target date: 9 February 2018.

RISK & MITIGATION: No impact.



## QSU-4 Overall Comments

- Preliminary results
- Benefits @35.7% vs. 36% budget
- Rec'd ICC rate amendment at year end. Modest over-recovery. Expect only tiny changes to the forecast rate of 25.4% during final submission.
- For NRAO, increase in AUI IDC rate from 5.5% to 6.0% was accommodated by decrease from budgeted ICC rates. For ALMA, this change caused an overage.

## Q4 CSA-V

	FY17 POP Budget	FY17 Rev. Budget	FY17 YTD Expenses	YTD % Rev Budget
NSF	32,000	32,000	32,000	100.0%
Carryforward/Other	0	99	99	0.0%
<b>Total CSA-V Revenues</b>	<b>32,000</b>	<b>32,099</b>	<b>32,099</b>	<b>100.0%</b>
Telescope Ops	10,672	11,034	10,864	98.5%
Development	3,276	3,324	3,568	107.3%
Science Ops	6,026	5,934	5,689	95.9%
Admin Services	9,179	9,032	8,210	90.9%
Director's Office	1,987	1,955	1,910	97.7%
Education & Public Outreach	644	654	551	84.3%
<b>FY17, Total</b>	<b>31,784</b>	<b>31,933</b>	<b>30,791</b>	<b>96.4%</b>
<b>FY17 CSA-V Net</b>	<b>216</b>	<b>166</b>	<b>1,308</b>	

## Q4 CSA-V Comments

- Surplus of \$1.3M includes open commitments of \$400K; budgeted surplus for FY2018 of \$405K; and salary pool of \$123K. Remaining surplus (\$380K) will support major initiative risk reduction in FY2018.
- CDL (Develop) overspend forecast and monitored throughout year.
- ICC savings enabled \$300K VLASS risk reduction expenditure (computing) and \$160K risk matured expenditure (NM tamper computer).
- Year I of VLA Infrastructure program accomplished within budget.
- EPO underspend due to breakage and strong gift shop revenues.

## Q4 CSA-A

	FY17 POP Budget	FY17 Rev. Budget	FY17 YTD Expenses	YTD % Rev Budget
NSF	43,250	43,250	42,926	99.3%
Carryforward	12,385	14,076	14,399	102.3%
Canadian Contribution	1,528	1,528		0.0%
Other	345	697		0.0%
<b>Total CSA-A Revenues</b>	<b>57,508</b>	<b>59,551</b>	<b>57,325</b>	<b>96.3%</b>
Telescope Ops	22,431	25,609	21,423	83.7%
Development	5,313	12,406	2,202	17.7%
Science Ops	7,756	8,207	6,693	81.6%
Admin Services	6,819	9,059	7,323	80.8%
Director's Office	2,406	3,521	2,832	80.4%
Education & Public Outreach	694	694	543	78.2%
<b>FY17, Total</b>	<b>45,419</b>	<b>59,496</b>	<b>41,016</b>	<b>68.9%</b>
<b>FY17 CSA-A Net</b>	<b>12,089</b>	<b>55</b>	<b>16,309</b>	

## Q4 CSA-A Comments

- Additional surplus of \$4.2M over POP budget largely due to no ALMA Development project awards and unused \$1.5M currency reserve.
- JAO expenses under by \$1M, includes impact of positive exchange rate differences early in the year, unexpended currency reserve, and expenditure of \$470K in NSF forward-funded projects, and credit from Taiwan contribution.
- Science Ops savings related to breakage and ramp-down of data analyst surge.
- Admin services ahead due to multicancha expenses and warranty expenses budgeted elsewhere as well as AD office overage.
- Director's Office ahead due to increase in IDC load.
- EPO underspend due to breakage.



## Q4 Internal Common Costs (ICC)

	FY17 POP Budget	FY17 Rev. Budget	FY17 YTD Expenses	YTD % Rev Budget
NRAO Recoveries	11,931	11,931	11,534	96.7%
External Recoveries	4,501	4,501	4,653	103.4%
<b>Total ICC Revenues</b>	<b>16,432</b>	<b>16,432</b>	<b>16,187</b>	<b>98.5%</b>
Telescope Ops	103	104	127	122.3%
Development	442	445	347	77.9%
Science Ops	1,850	2,018	2,067	102.4%
Admin Services	11,897	11,675	11,689	100.1%
Director's Office	2,140	2,140	1,849	86.4%
<b>FY 17, Total</b>	<b>16,432</b>	<b>16,382</b>	<b>16,079</b>	<b>98.2%</b>
<b>FY17 ICC Net</b>	<b>0</b>	<b>50</b>	<b>108</b>	

## Q4 ICC Comments

- Slightly exceeded external recovery budget.
- Accommodated AUI policy change regarding fixed assets and first year depreciation charges.
- Underspend related to breakage and savings in GBO maintenance expenses.
- Telescope Ops, increasing expenses related to International Spectrum Management.
- Science overspend, mid-year SRDP appointment added to ICC.
- In-year revision of ICC rate (27.3 to 25.4) due to:
  - Underestimate of MTDC based on NRAO-processed JAO expenditures.
  - Forecast underspend within ICC units.



## POP MILESTONE FY2015 #3.4.62

Admin (from NM Ops)

Renew VLBA leases for ~~SC~~ and Owens Valley (OV)

Cost
  Schedule
  Scope

<b>COST:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; background-color: #e6f2ff;">Labor Actuals</td> <td style="background-color: #e6f2ff;">Expected</td> </tr> <tr> <td colspan="2">No changes</td> </tr> <tr> <td style="background-color: #e6f2ff;">Material Actuals</td> <td style="background-color: #e6f2ff;">Expected</td> </tr> <tr> <td colspan="2">No changes</td> </tr> <tr> <td style="background-color: #e6f2ff;">Travel Actuals</td> <td style="background-color: #e6f2ff;">Expected</td> </tr> <tr> <td colspan="2">No changes</td> </tr> </table>			Labor Actuals	Expected	No changes		Material Actuals	Expected	No changes		Travel Actuals	Expected	No changes		<b>SCOPE:</b> OV CA site lease is not renewed. LBO is awaiting lease negotiation outcome by Caltech (we sublease from Cal Tech) and the LA Power and Water. R Sakshaug contacted James W. Lamb, Owens Valley Radio Observatory Director, on 08/01/2017. Mr. Lamb reported "they just starting negotiations with LADWP, and I will keep you updated as the process moves along. I think it will happen on the timescale of a couple of months." 10/17/2017: No update per Mr. Lamb.		
Labor Actuals	Expected																
No changes																	
Material Actuals	Expected																
No changes																	
Travel Actuals	Expected																
No changes																	
<b>SCHEDULE:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%; background-color: #e6f2ff;">Milestone</th> <th style="width: 20%; background-color: #e6f2ff;">Schedule</th> <th style="width: 20%; background-color: #e6f2ff;">Target</th> </tr> <tr> <td>I Owens Valley Lease renewed</td> <td>03/31/15</td> <td>Unknown</td> </tr> </table>			Milestone	Schedule	Target	I Owens Valley Lease renewed	03/31/15	Unknown	<b>RISK &amp; MITIGATION:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 40%; background-color: #e6f2ff;">Risk</th> <th style="background-color: #e6f2ff;">Mitigation</th> </tr> <tr> <td>1 Impact on VLBA operating budget (increase in lease cost)</td> <td>1 Adjust VLBA Operating budget, if necessary</td> </tr> <tr> <td>2 Impact on VLBA operations</td> <td>2 Avoid by periodic follow up of Caltech negotiation progress</td> </tr> </table>			Risk	Mitigation	1 Impact on VLBA operating budget (increase in lease cost)	1 Adjust VLBA Operating budget, if necessary	2 Impact on VLBA operations	2 Avoid by periodic follow up of Caltech negotiation progress
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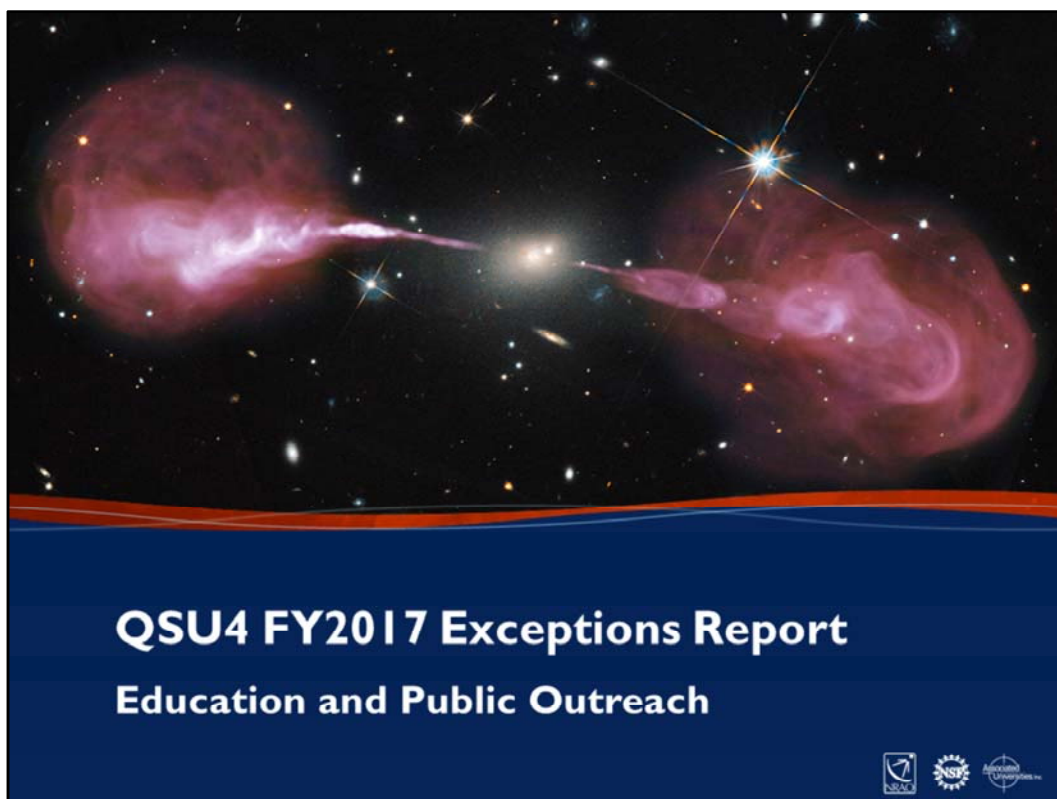
**COST:** Future lease costs are subject to the status of Cal Tech's re-negotiation of the lease with Los Angeles Water and Power.

**SCOPE:** No changes.

**SCHEDULE: Owens Valley Lease:** The master lease for the Owens Valley Radio Observatory is an agreement between Caltech and Los Angeles Water and Power (the lease holder). The master lease has been expired since March 31, 2015, and renegotiating it does not appear to be a priority for LA W&P. NRAO has a sublease agreement for VLBA-OV with Caltech. We propose to cancel this milestone for FY2015 since its ultimate resolution is beyond our control. We will continue to monitor the situation with the master lease, and propose a new milestone for the sublease at the appropriate time.

#### **RISK & MITIGATION:**

1. Cal Tech has leased Owens Valley, CA for a low yearly fee. The probability of a cost increase is low, but a budget adjustment would be needed if a cost increase occurs.
2. Impacts on other aspects of VLBA Operations are not likely to occur.
3. An interim agreement between Caltech and NRAO regarding the sublease during this interim period has been discussed.



# EPO

## News and Public Information



We had a nice variety of press release topics this quarter, from a lovely image release of a carbon star U Antlae (amateur astronomers love these things like Mu Cephei, Hershell's Garnet Star), to lots of interesting chemistry in the hearts of galaxies, in Titan's atmosphere and newly minted molecules in supernova remnants. The last release of the quarter burst the bubble of astrobiologists, dashing the hopes that a particular molecule could be used as a test for the presence of life when it was found both in a star forming region and on a comet.

The announcements ranged from the hiring of a new director of ALMA, to patting ourselves on the back for being good neighbors in Chile, to some fun videos that our partners at JAO put together explaining some basics about ALMA.

News Release: July 10, 2017 at 11:00 am - **Heart of an Exploded Star Observed in 3-D:** Supernova forges billowing, tangled knots of new molecules.

News Release: July 28, 2017 at 2:00 pm - **ALMA Confirms Complex Chemistry in Titan's Atmosphere:** Saturn's moon offers glimpse of Earth's primordial past.

News Release: August 30, 2017 at 11:00 am - **Star-formation 'Fuel Tanks' Found around Distant Galaxies:** ALMA observations offer insights into star-forming history of universe.

Image Release: September 20, 2017 at 6:00 am - **Aging Star Blows Off Smoky Bubble**

News Release: September 28, 2017 at 11:00 am - **Astronomers Discover Traces of Methyl Chloride around Infant Stars and Nearby Comet:** Dashing hopes molecule could point to life on other planets.

Announcement: July 8, 2017 at 1:51 pm - **ALMA Selects New Director**

Announcement: September 7, 2017 at 12:20 pm - **New Animated Series Explains What Makes ALMA So Special**

Announcement: September 26, 2017 at 3:12 pm - **ALMA Receives Award for Its Contribution to the Progress of Chile**

## EPO

### News and Public Info



We had fewer science results for the public from the VLA this quarter and having back to back announcements about VLASS and ngVLA, we were stepping on our own headlines a bit. Local papers were more interested in the development than the science, and the announcement of the local event got even more coverage. That press release was only a local release and did not go out on Newswise. More about the *Contact* event results next quarter. It was a near record number—just under 1000 attendees.

Announcement: July 18, 2017 at 4:35 pm

#### **NSF Funds Partnership to Advance Minority Participation in STEM Research**

The National Science Foundation has awarded a \$5 million grant to fund the highly successful [Virginia-North Carolina Louis Stokes Alliance for Minority Participation \(VA-NC Alliance\)](#) program.

News Release: August 28, 2017 at 11:00 am

#### **VLA Reveals Distant Galaxy's Magnetic Field**

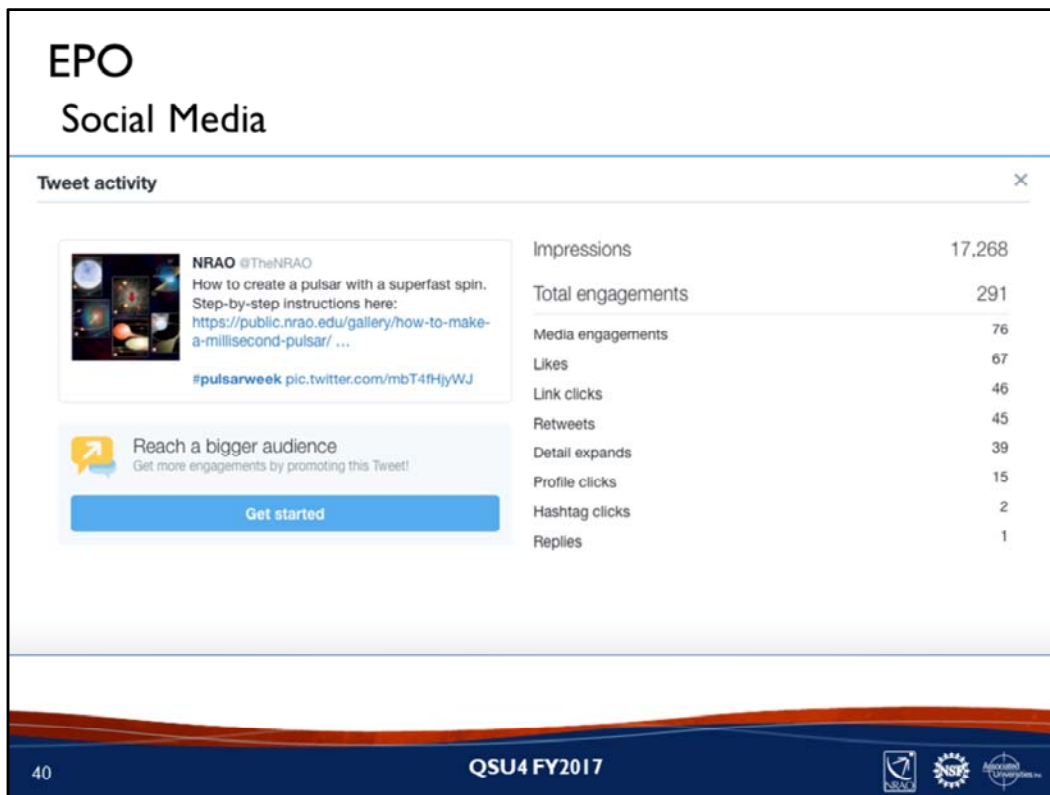
Announcement: September 14, 2017 at 3:11 pm

**Next-generation U.S. Radio Telescope Development Begins:** Planning begins for next leap forward in research capability.

News Release: September 18, 2017 at 1:30 pm

**VLA Begins Huge Project of Cosmic Discovery:** New sky survey is largest observing project in VLA's history.





### Instagram Followers: 191

We began our account in May 2017, and have posted on average twice a week. We're growing organically, which means we are not sponsoring any of our posts to extend reach. I'm reviewing the option of an Instagram business account. Our top post for this quarter is a picture of ALMA OSF.

### Facebook Followers: 60,590

Our FB audience grows a bit more slowly, because we already have a significant audience base. The highlights of the quarter were the eclipse, pulsar week, especially posts focused on Jocelyn Bell, and posts about the VLA or Green Bank. There's a lot of interest in ALMA, too, but there's a significant portion of our audience with an affinity towards the VLA and Green Bank.

### Twitter Followers: 12,218

We gained a total of 794 followers over a three month period (July/August/September 226/247/321).

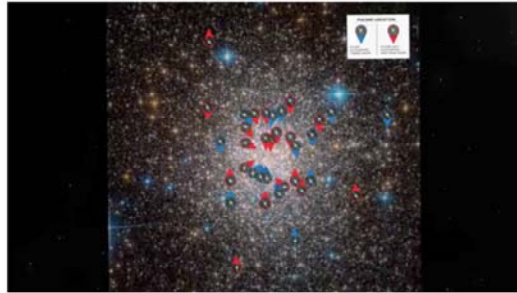
For the week of July 30 through August 7, we partnered with NASA Blueshift (AstroPhysics arm of NASA) for Pulsar Week. Of course, this is an easy area for us to do well, since we have so much expertise in this realm. It also inspired a commitment to launching a themed social media campaign each quarter as a strategy for gaining exposure through partnerships.



## EPO

SLA work for GBO and LBO

- **GBO: Pulsar Jackpot Reveals Globular Cluster's Inner Structure**
- **LBO:VLBA Finds Closest Pair of Supermassive Black Holes**



## EPO STEAM



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### **Communication Science to NRAO summer students**

On Tuesday, August 1 from 9–11am, Suzy give a mini-workshop on “Communicating Your Science” to six of the NRAO summer students.

### **Career presentation to NRAO summer students**

On Wednesday, July 26 Jessica gave a career presentation to the NAC students and mentors (total of 14 in attendance).

### **VA Space Grant Consortium Meeting**

On Thursday, September 7, Suzy, Jessica, and Ed Murphy (UVA) travelled to Old Dominion University to attend the VA Space Grant Consortium Advisory Council Meeting.

### **NAC V workshop**

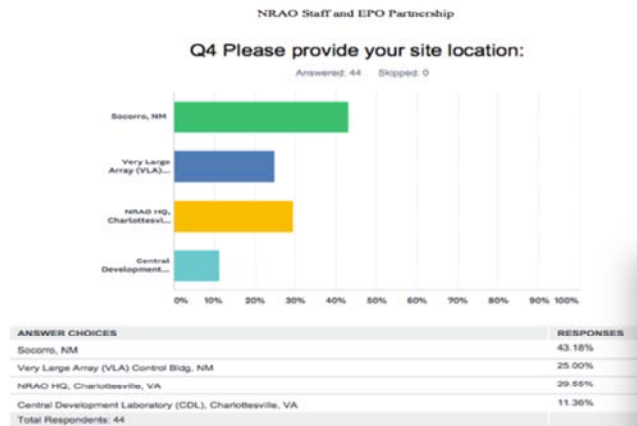
On the weekend of September 15–17, several EPO staff attended and supported the NAC V workshop. Jessica gave a Networking presentation to students on Friday, Nan captured video and photographs throughout the event and also took headshots of the students for their professional portfolios. Suzy and Jessica gave the mini-workshop on “Communicating Your Science” to the 10 NAC cohort and NAC alum.

### **ESTEAM Summit**

On Saturday, September 23<sup>rd</sup> several EPO staff participated in the first ESTEAM Summit (Entrepreneurship, Science, Technology, Engineering, Art, and Math) at Albemarle High School. More than 175 girls and 40 mentors participated. Suzy Gurton led a ESTEAM challenge for K-5 grade girls. Jessica Harris led a ESTEAM challenge for 6-12 grade girls. Nan Janney worked with Lighthouse Studios for a video challenge with students, where girls ended up creating a video of interviews from facilitators and attendees.

# EPO

## STEAM - Growing our Team



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On Wednesday, September 13<sup>th</sup> the EPO staff in Charlottesville and remotely in NM hosted their first EPO Meet and Greet with staff. This was an opportunity for staff to learn more about the efforts of EPO at NRAO and meet the team. The meeting was also coordinated with a survey of the staff. The survey is still being analyzed but we had a total of 44 staff complete the survey. 43.18% from DSOC Socorro, 25% VLA, 29.55% NRAO HQ, and 11.36 % from CDL.

# EPO STEAM in NM

## RAP-NM Pilot



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During the week of July 9–16, the Radio Astronomy and Physics Camp in New Mexico (RAP-NM) piloted its first residential camp led by Judy Stanley. The camp hosted a total of 11 students, 1 professional educator, and 4 mentors. Students engaged in full days of hands-on activities like Skynet Junior Scholars, building a crystal radio, and spectral gas investigation. Students also received a special presentation from guest speakers Dr. Jedidah Isler and presentations by NINE interns that were in Socorro at the same time. The culmination of the camp were student presentations of their week-long research using SJS. Lots of lessons learned from the pilot. One of the most surprising was the level of parental involvement, or their unwillingness to just let their kids have a residential camp experience. They were texting and showing up with soccer uniforms and taking their kids out at odd times. There is a clear need for a stronger parental contract for the camp.

## EPO STEAM in NM

- Sister Cities exchange



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The Sister Cities cohort from Magdalena, NM visited San Pedro at the end of July through the end of August 2017. (The Sister Cities cohort from San Pedro is currently visiting NM until end of October 2017). The two students (Samantha Scarborough and Carmen Torres) attended regular 10<sup>th</sup> grade classes during their stay at San Pedro high school. Scarborough attended work sessions supervised by the school for the tourism specialization, in partnership with a tour agency in the town. The teacher from Magdalena engaged in three systematic stages of the program which include the first week of observing the subject of her area of study, history. The second week was focused on supporting a local class, and the third week was devoted to preparing a lesson plan and teaching it to the local students. The cohort visited ALMA and had a tour at the OSF facilities (3,000 m). Finally, the teacher and students also were invited by their host families to travel and get to know the surrounding area of the town.

TCristian Cruz, Diana Manriquez, Florencia Caraccioli and Maira Tinte. Cruz and Manriquez are Sister Cities cohort from 2016. Caraccioli and Tinte are Sister Cities cohort from 2017 and will be visiting NM in the month of October 2017. All students are from the Liceo Likan Antai (school) in San Pedro the complete exchange group. From left to right: David Medina, Maira Tinte and Florencia Caraccioli (the Chilean visitors); and Cheyennes Sullivan, Samantha Scarborough and Carmen Torres (from Magdalena). The last one, María Solange Molina, principal from high school in San Pedro. Crédito: Liceo Likan Antai.

San Pedro high school visit to ALMA. Credit: Thais Mandiola – ALMA (ESO/NAOJ/NRAO).

# EPO

## VLA Visitor Center



505/852 Adults in tours in Q4  
125/964 School children in tours in Q4

Q4	Adult	School	Outreach
7/6/17 Scientists tour by Rick Perley	27		
7/8/17 REU Tours at 11:00 and 1:00 45 total	45		
7/13/17 Chautauque tour 12 total	12		
7/15/17 REU tours 11:00 & 1:00 55 total	55		
7/16/17 REU tours 11:00 & 1:00 41 total	41		
7/18/17 Summer Science tour from Tech 42 total	42		
7/21/17 UNM STEM tour 18 total	18		
7/22/17 REU tours 11:00 & 1:00 60 total	60		
7/23/17 REU tours 11:00 & 1:00 38 total	38		
7/27/17 Finley tour 74	74		
8/2/17 Mark Twain ABQ ES -Eclipse outreach 9 teachers			350
8/2/17 Box of Stars returned from Santa Fe Group			450
8/7/17 Geek Nation scouting tour 3		3	
8/9/17 Perley astro students tou		12	
8/18/17 Asian group tou	62		
8/21/17 Eclipse Event at VLA 32 total	32		
8/26/17 NM Tech tour 12 total		12	
9/3/17 Boy scouts tour 15 total		15	
9/10/17 Boy scout tour 25 total		25	
9/14/17 College tour UW 17 total		17	
9/27/17 Sacarino MS science night 200 plus attended			200
9/28/17 Sacarino MS yearlong plan for 6 <sup>th</sup> grade first classroom event			152
9/30/17 STEM UNM Collaborative tour 26 - Greg Taylor LWA tour 15 total		41	
TOTALS	506	125	1152
FY17 Total	852	964	1878



## EPO

### VLA Visitor Center

- Q4
  - 5996 visitors
  - \$107,312.60
- FY2017
  - 22,275 visitors
  - \$357,624.46
  - \$32,314 more than last year



Spring and summer are the high seasons at the visitor center—these two quarters generate over two-thirds of our business.



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