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National Radio Astronomy Observatory

Quarterly Status Update 3 FY2016

April - June 2016

PREPARED BY	ORGANIZATION	DATE
Mike Shannon/ADs	PMD	08/05/2016

APPROVALS (Name and Signature)		ORGANIZATION
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NRAO Quarterly Status Update
(QSU3 FY2016)
April - June 2016

POP Section Number	POP Milestone	Milestone	Completion Date	Q1 Performance Assessment: Cost	Q1 Schedule	Q1 Scope	Q2 Performance Assessment: Cost	Q2 Schedule	Q2 Scope	Q3 Performance Assessment: Cost	Q3 Schedule	Q3 Scope
2.6		**Atacama Large Millimeter/submillimeter Array (ALMA)**										
		Operations										
	1	Cycle 3 observing & operations begin Q1, ongoing through Q4	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
	2	Cycle 3 JAO Support: AoD support shifts at the OSF	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
	3	Support Extension of Capability efforts at the JAO	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
	4	Cycle 4: Participate in the Obsmode go / no-go meeting	12/31/2015									
	5	Cycle 4: s/w tests, documentation, CfP	3/31/2016									
	6	Offer data reduction workshop in Charlottesville	12/31/2015									
	7	Cycle 4: CDEs, User Support, Proposal Deadline Supp.	3/31/2016									
	8	Cycle 4: Tech Assessment, Tech Sec Supp.	6/30/2016									
	9	Cycle 5: Capabilities Planning	6/30/2016									
	12	NAASC Science Workshop	6/30/2016									
		Development										
	16	NA ALMA Development Projects for FY2014/2015 will be completed	3/31/2016									
	17	NA ALMA Development Projects – Next Call for Proposals	6/30/2016									
		NRAO-Chile Office										
	18	Completion of the succession and management plan 2015-2016 including the incorporation of a new Business Manager	12/31/2015									
	19	Implementation and monitoring of the new Collective Contract signed with the AUI Union as a result of the negotiations conducted in 2015	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
	20	Renewal of the NRAO/AUI Office of Chilean Affairs lease for a new period of three years	12/31/2015									
3.4		**New Mexico Operations**										
		VLA Science Operations										
	1	Define VLA capabilities to be offered for semester 2016B	12/31/2015									
	2	Define VLA capabilities to be offered for semester 2017A	6/30/2016									
	3	Update VLA documentation to support 2016B Call for Proposals, perform proposal technical reviews	3/31/2016									
	5	Determine baselines and pointing for antennas moving into their D configuration locations	12/31/2015									
	6	Determine baselines and pointing for antennas moving into their DnC and C configuration locations	3/31/2016									
	7	Determine baselines and pointing for antennas moving into their CnB and B configuration locations	6/30/2016									
		VLA Array Operations										
	8	Complete reconfiguring array to D configuration	12/31/2015									
	9	Reconfigure array to DnC, then C configuration	3/31/2016									
	10	Reconfigure array to CnB, then B configuration	6/30/2016									
	11	Release Operations GSA vehicle(s)	12/31/2015									
		VLA Antenna Maintenance										
	14	Perform preventive maintenance on each of two transporters prior to array reconfiguration	12/31/2015									
	15	Perform preventive maintenance on each of two transporters prior to array reconfiguration	6/30/2016									
		VLA Site Infrastructure Maintenance										
	18	Perform preventive maintenance on VLA site hatch gear	12/31/2015									
		VLA Technical Upgrades and Enhancements										
	20	L-Band solar upgrade, 2 additional receivers with full RF upgrade installed	3/31/2016									

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	22	Ku-Band solar upgrade, 2 additional receivers with solar Tcal path plus 20 dB switched attenuators installed	6/30/2016									
	25	FE card cage upgrades, 35 units installed	3/31/2016									
	26	C-Band thermal gap retrofits, 4 additional installed	6/30/2016									
		VLA Observing Capability Enhancements										
	30	Commission remaining P-Band functionality in the OPT for 2016B	6/30/2016									
		VLA Operational Enhancements										
	31	Implement continuous slew tipping scans	3/31/2016									
	32	Heuristics defined for ionospheric calibration for VLASS, pending test results demonstrating need	6/30/2016									
		VLBA Science Operations										
	34	Define VLBA capabilities to be offered for semester 2016B	12/31/2015									
	35	Define VLBA capabilities to be offered for semester 2017A	6/30/2016									
	36	Update VLBA documentation to support 2016B Call for Proposals, perform proposal technical reviews	3/31/2016									
		VLBA Antenna Maintenance										
	38	Tiger Team maintenance campaign to KP	6/30/2016									
		Site Operations										
	41	Renew lease for Pie Town (PT)	12/31/2015									
4.4		**West Virginia Operations**										
		GBT Maintenance										
	1	Beginning of summer painting	6/30/2016									
	4	2015 structural inspections report complete	6/30/2016									
5.3		**Central Development Laboratory**										
		Repair, Maintenance, Production, Support										
	2	Define and finalize Band-2 prototype cartridge configuration for final evaluation	12/31/2015									
	3	Complete evaluating Band-2 prototype in the ALMA test cryostat	3/31/2016							Complete with MIC amplifiers, will repeat with MMICs later		
	4	Pending success of foundry run, CRAL evaluation of new MMIC wafer complete	3/31/2016								NCE in effect, due 30 Apr 2017	
	5	Delivery of final band 2 prototype report and project closeout	4/30/2016								NCE in effect, due 30 Apr 2017	
	7	Complete RF characterization of a HERA 14 meter dish equipped with modified PAPER dipole feed. This include development of an electromagnetic model, reflection coefficient measurements, and beam maps	12/31/2015									
	8	Complete the refurbishment of 24 PAPER dipole active baluns for use with new HERA antennas	12/31/2015									
	9	Begin development of a new broadband feed for the HERA 14m dish, with electromagnetic simulations and basic construction details	3/31/2016									
	10	Complete cross-coupling measurements for a pair of HERA dishes with modified PAPER dipole feeds via S-parameter and correlation measurements	6/30/2016									
	12	Further tests of cross-polarization contributions to Band 2 optics	12/31/2015									
		Research and Development										
	13	Design prototype 35-50 GHz feed horn and phase-shifter for new VLA receiver	12/31/2015					Cancelled				
	14	Measure performance of prototype 35-50 GHz feed horn and phase-shifter for new VLA receiver	6/30/2016								Cancelled see Milestone 5.3.13	
	16	Resolve suspected packaging/heat sink issues with BAE MHEMT MMICs and conduct further cryogenic tests to see if noise temperature can be improved	3/31/2016									
	18	Synchronize parallel data streams on an unformatted serial link using FIFO buffering	6/30/2016									
	20	Fabricate and test 20 low-noise amplifiers for L-band PAF receiver	6/30/2016									
	22	Redesign and construct expanded Field-of-View L-band PAF receiver	6/30/2016									
	24	Science case for next PAF receiver: white paper and recommendation	6/30/2016									
	25	If new 35nm CRAL wafer run produces competitive Band 2 MMIC chips, another Band 2 MMIC LNA module will be built and cryogenically tested	3/31/2016								NCE in effect, due 30 Sep 2016	
	26	Design and prototype 65-90 GHz amplifier with 2 mil substrate thickness (compare to current 3 mil). Goal is improved reliability and performance reproducibility	12/31/2015									

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POP Section Number	POP Milestone	Milestone	Completion Date	Q1 Performance Assessment Cost	Q1 Schedule	Q1 Scope	Q2 Performance Assessment Cost	Q2 Schedule	Q2 Scope	Q3 Performance Assessment Cost	Q3 Schedule	Q3 Scope
	28	Implement advanced topologies and miniaturized packaging of reflectionless filters	3/31/2016									
	29	Implement integrated mm-wave CW signal source	6/30/2016									
6.5		**Science Support & Research**										
		Telescope Time Allocation (TTA)										
	1	CfP for semester 2016B	3/31/2016									
	3	SRP and tech review process, semester 2016B	3/31/2016									
	5	TAC meeting for semester 2016A	12/31/2015									
	6	TAC meeting for semester 2016B	6/30/2016									
	7	Update SW tools requirements for TAC support 2016A	12/31/2015									
	8	Update SW tools requirements for PST 2016B	3/31/2016									
	9	Update SW tools requirements for TAC support 2016B	6/30/2016									
	11	Update documentation for CfP and tools 2016B	3/31/2016									
		Science User Support (SUS)										
	13	15th Synthesis Imaging summer school	6/30/2016									
	14	ALMA cycle 4 CDE planning	6/30/2016									
	15	NAASC sponsored science workshop	12/31/2015									
	16	Testing of version 2 of PPI and NRAO archive	3/31/2016									
	18	Summer student selection	3/31/2016									
	19	Summer student offers	3/31/2016									
	20	Summer student program begins	6/30/2016									
	23	Update CASAGUIDES	12/31/2015									
	24	Review ALMA user documents	3/31/2016									
	25	Update CASAGUIDES	6/30/2016									
		SSR Support										
	26	Library contracts negotiated	3/31/2016									
7.4		**Data Management & Software**										
		Data Management & Software										
	1	DMS Review	6/30/2016									
		ALMA System Software										
	3	ALMA Fall 2015 Release	12/31/2015									
	4	ALMA Spring 2016 Release	6/30/2016									
		VLA/VLBA System Software										
	5	Deploy software to support Semester 2015B observing	3/31/2016									
	6	Deploy software to support Semester 2016A commissioning	3/31/2016									
	9	VME Replacement	6/30/2016									
		GBT System Software										
	11	Vegas Pulsar Modes	3/31/2016									
	12	NRQZ Software	3/31/2016					cancelled				
	15	Test with PSC	6/30/2016									
		Software Development										
	16	User Portal Redesign	6/30/2016									
	17	Leverage NGAS for Green Bank data archive	12/31/2015									
	18	Storage upgrade review	3/31/2016									
	19	New NRAO Archive software	3/31/2016									
	20	New NRAO Archive	6/30/2016									
	21	ALMA Cycle 3 Pipeline Release	12/31/2015									
	22	Pipeline Reference Imaging	3/31/2016									
	23	CASA reliability initiative	12/31/2015									
	24	Release CASA version 4.5	12/31/2015									
	25	Release CASA version 4.6	6/30/2016									
	26	Implement PST updates for Semester 2016B Call for Proposals	12/31/2015									
	27	Implement PST updates for Semester 2017A Call for Proposals	6/30/2016									
	28	Implement PHT updates for Semester 2016B TAC Meeting	3/31/2016									
	30	Implement OPT updates for Semester 2016A VLA Observing	12/31/2015									
	31	Implement OPT updates for Semester 2016B VLA Observing	6/30/2016									
	32	Tool redesign – deliver design	3/31/2016									
	33	Tool redesign – start development	6/30/2016									

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POP Section Number	POP Milestone	Milestone	Completion Date	Q1 Performance Assessment Cost	Q1 Schedule	Q1 Scope	Q2 Performance Assessment Cost	Q2 Schedule	Q2 Scope	Q3 Performance Assessment Cost	Q3 Schedule	Q3 Scope
	34	Deliver iOS App for Public Outreach	3/31/2016									
	35	Expand CASA Test Scope	6/30/2016									
8.5		**Program Management Department**										
		Headquarters										
	1	Quarterly Status Updates	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
		New Mexico										
	5	Finalize NM Ops and DMS Training Plan (2nd Phase)	3/31/2016									
	6	PM/SE Implementation Training	6/30/2016									
	7	DMS Group Practices Assessment	12/31/2015									
	9	Host learning session	12/31/2015									
	10	Host learning session	3/31/2016									
	11	Host learning session	6/30/2016									
		CDL/ALMA										
	13	PM/SE Training development	12/31/2015									
	14	PM/SE Training development	3/31/2016									
	15	PM/SE Training development	6/30/2016									
	17	Facilitate gate review	6/30/2016									
	19	Facilitate gate review	12/31/2015									
		Green Bank										
	20	Finalize Training Evaluation Criteria	6/30/2016									
	22	Host learning session	12/31/2015									
	23	Host learning session	3/31/2016									
	24	Host learning session	6/30/2016									
10.3		**Education & Public Outreach**										
		STEM Education and Outreach										
	1	Translation of SJS curriculum to 4H project books complete	3/31/2016									
	2	SJS instructional videos complete	3/31/2016									
	3	Final round of SJS professional development meetings for educators	12/31/2015									
			3/31/2016									
			6/30/2016									
	6	VLA Visitor/Education Center Education and Interpretive Plan completed	12/31/2015									
	7	VLA Visitor/Education Center architectural schematic designs completed	3/31/2016									
	8	Student interferometer upgrade begins	6/30/2016									
	9	Interferometer curriculum design	6/30/2016									
	11	Pocahontas County Science Fair	12/31/2015									
	12	Hour of Code Event	3/31/2016									
	13	USA Science & Engineering Festival	6/30/2016									
	16	Recruit additional SPOT undergraduate ambassadors	12/31/2015									
	17	Additional training for SPOT ambassadors	3/31/2016									
	18	Seek additional SPOT funding	6/30/2016									
		News & Public Information										
	19	WordPress site specified	12/31/2015									
	20	WordPress site design elements completed	3/31/2016									
	21	Orion videos specification and scripts completed	12/31/2015									
	23	ALMA Explorer filming	3/31/2016									
	25	Beta version iOS "RadioSky" app ready for testing	12/31/2015									
	26	RadioSky" app locked, ready for distribution	3/31/2016									
11.4		**Computing & Information Services**										
	1	Business software review and strategic alignment	3/31/2016									
	3	RHEL 7 Unix OS upgrade	3/31/2016									
	5	Selection of Green Bank phone system	12/31/2015									
	6	Replacement of Green Bank phone system	6/30/2016									
	7	Bro security tool evaluation	6/30/2016									
	9	Business services capacity review	3/31/2016									

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				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section Number	POP Milestone	Milestone	Completion Date	Cost	Schedule	Scope	Cost	Schedule	Scope	Cost	Schedule	Scope
	10	Review and consolidation of backup solutions	12/31/2015									
12.3		**Diversity**										
		Diversity Council										
	1	Diversity Council Meeting	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
		National/Domestic Outreach										
	2	SEDUIP & PING Program Plan complete	12/31/2015									
	3	SEDUIP Expansion Plan complete	3/31/2016									
	4	LSAMP, AATF, & SYEP Program Plans in place	3/31/2016									
	5	Initiate recruitment activities	12/31/2015									
	6	Summer Program Orientations	3/31/2016									
	7	All summer programs initiated	6/30/2016									
		International Outreach										
	9	NINE Program Plan (existing partners) complete	12/31/2015									
	10	NINE Program Plan draft (new partners) complete	3/31/2016									
	11	NINE Program initiated	6/30/2016									
	13	NINE Virtual Classrooms/Learning Venues Program Plan developed and implemented	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
		Diversity and Cultural Awareness										
	14	DCA Program Plan developed and implemented	12/31/2015									
			3/31/2016									
			6/30/2016									
			9/30/2016									
13.7		**Human Resources**										
		Training & Development										
	1	Deliver two new Management/Supervisor development courses: 1. Performance Management, and 2. Comp 101	3/31/2016									
		Compensation										
	3	Annual Performance Review Process	12/31/2015									
	4	All preparations complete and salary review worksheets are open to pay decision managers for final merit review decisions	3/31/2016									
	5	FLSA regulation changes anticipated and analyzed	3/31/2016									
		Benefits										
	7	HR prepares and distributes all open enrollment materials to employees and makes enrollment changes into JDE and with vendors	12/31/2015									
	8	Benefits programs for critical illness, accident and LT care voluntary benefits	12/31/2015									
	9	Assistance program for NRAO employees and retirees for hardship or catastrophic events	3/31/2016									
	10	Alternative solutions for under 65 retiree population	6/30/2016									
		Recruitment and Employment										
	11	Design and implement a comprehensive recruitment toolkit for hiring managers	12/31/2015									
	12	Assess current applicant tracking system and determine need and/or feasibility for improved system	3/31/2016									
	13	Implement an Observatory-wide On-Boarding program	3/31/2016									
		Human Resources										
	14	Evaluate/refine/expand the process	6/30/2016									
	15	Employee Climate Survey Design and Delivery	6/30/2016									
14.1		**Communications**										
		Science Communications										
	1	Update Research Facilities brochure	12/31/2015									
	2	Submit 2017 AAAS science symposium proposal	6/30/2016									
15.7		**Administration**										
		CAP										

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	5	Update manual. Review and approval by Assoc. Director of Administration. Training	3/31/2016									
	6	Update manual. Review and approval by Assoc. Director of Administration and AUI	6/30/2016									
		ES&S										
	7	Determine technical solution to Safety Recordkeeping requirements	12/31/2015									
	8	Complete ES&S supervisory training	6/30/2016									
		MIS										
	10	Prepare list of possible improvements, upgrades and additions Calculate effort, cost, and benefit of each change.	3/31/2016									
		TTO										
	11	Identify from IP Asset Register, review choices through selection committee, begin commercialization efforts.	9/30/2016									
	12	Prepare follow-up program based on prior year agenda	6/30/2016								Cancelled	
16.5		**Spectrum Management**										
		Spectrum Management										
	1	ITU-RWRC-15	12/31/2015									
		WV Radio Quiet Zone										
	2	WV Radio Quiet Zones	3/31/2016									
17.1		**Director's Office**										
		ALMA										
	1	ALMA Board Meeting	12/31/2015									
			3/30/2016									
			6/30/2016									
			9/30/2016									
	2	ALMA Director's Council	12/31/2015									
			3/30/2016									
			6/30/2016									
			9/30/2016									
		Corporate Meetings										
	3	AUI Board of Trustees meetings	12/31/2015									
			3/30/2016									
			6/30/2016									
	4	AUI Executive Committee meetings	12/31/2015									
			6/30/2016									
			9/30/2016									
	5	AUI Visiting Committee meeting	6/30/2016									
		Science Community										
	6	Appoint new Users Committee members	12/31/2015									
	7	Users Committee meeting	6/30/2016									
		Management Review										
	8	NSF Annual Program Review	12/31/2015									
	9	All Hands presentation	12/31/2015									
			6/30/2016									

QSU3 FY2016 Report

April - June 2016

POP MILESTONE # 2.6.16

Cost
Schedule
Scope

ALMA - Development

Development Projects for FY14-16

COST:

Labor Actuals	Expected
$	$
Material Actuals	Expected
$	$
Travel Actuals	Expected
$	$

SCOPE:

See full report on development projects at the end of this report.

SCHEDULE:

Milestone	Schedule	Target
1		
2		
3		

RISK & MITIGATION:

Risk	Mitigation
1	
2	
3	

POP MILESTONE # 3.4.31

NM OPS

Continuous Slew Tipping Scans

Cost | Schedule | Scope

COST:

Budget Actual	Budget Planned

There are no changes in budget.

SCOPE:

For those VLA observations where an estimate of atmospheric opacity is needed a tipping scan can be used to derive this quantity. We have implemented old-style "stepped" tipping scans, but they are inefficient, taking longer than needed. "Continuous slew" tipping scans are much faster and so preferred.

SCHEDULE:

Milestone	Schedule	Target
1 System implementation	03/31/2016	12/31/16
2 Post processing heuristics defined	03/31/2016	03/31/17

RISK & MITIGATION:

Risk	Mitigation
1 Continuous slew tipping scans have taken longer than planned to implement, so users continue to use correlations between weather data and opacities derived some years ago, with the associated increase in the uncertainty in the absolute flux density scale.	The mitigation of this problem is for users to ensure they observe their flux density calibrator at a similar elevation as their source.

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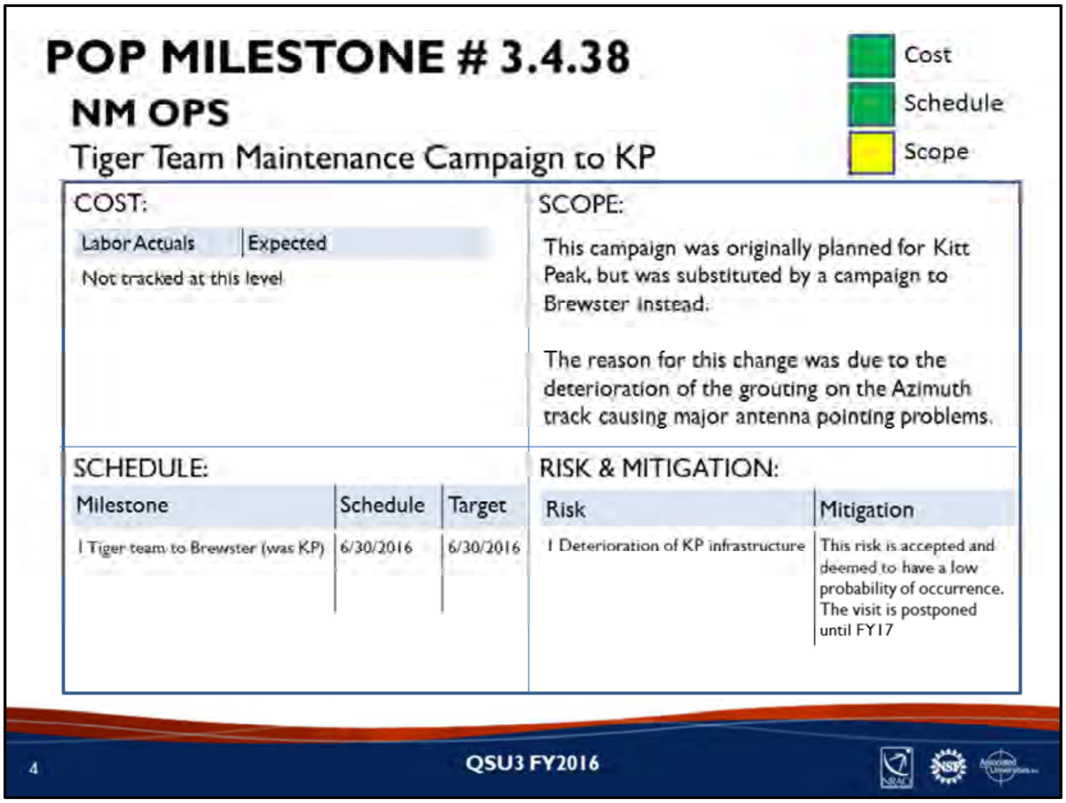
COST: No changes

SCOPE: No changes

SCHEDULE: Stepped tips are already supported in the OPT, and while continuous slew tips are properly supported in the low-level online software, it is not yet possible to set them up in the OPT. Requirements have been written for the necessary changes, but this work is lower priority within DMS than the new archive tool. In addition, post-processing software is still needed. It is now expected that the OPT work will take place in Q1 FY2017. The post-processing heuristics will be defined by the end of Q2 FY2017. Note that both these goals will be tracked separately in the FY2017 Program Operating Plan.

RISK & MITIGATION: In the absence of the ability to use tipping scans users will continue to use the correlations between weather data and opacities derived some years ago for the old VLA, with the associated increase in the uncertainty in the absolute flux density scale. The mitigation of this problem is for users to ensure they observe their flux density calibrator at a similar elevation as their source. Advice for observers is incorporated in the "calibration" section of the online "Guide to Observing with the VLA".



COST: No changes

SCOPE: Change from Kitt Peak to Brewster.

SCHEDULE: No changes

RISK & MITIGATION: The VLBA major maintenance visit (Tiger Team maintenance campaign) originally scheduled for the Kitt Peak VLBA station was cancelled for FY16 and the Brewster VLBA station was substituted instead. The reason for this was due to the deterioration of the grouting on the Brewster Azimuth track that was deemed severe enough to cause major pointing problems and could lead to track failure if not repaired in FY16. Since the Kitt Peak station was deemed to be in good condition, it was decided that its major maintenance visit can be postponed until FY17.

POP MILESTONE # 5.3.14

Central Development Lab

Measure performance of 35-50 GHz feed horn and phase-shifter.

COST:

Labor Actuals	Expected
$	$
Material Actuals	Expected
$	$
Travel Actuals	Expected
$	$

SCOPE:

The milestone was to measure the performance of a 35-50 GHz horn and phase shifter. The predecessor milestone to design the prototype was cancelled.

This milestone is cancelled

SCHEDULE:

Milestone	Schedule	Target
1 Measure horn and phase shifter	6/30/16	Cancelled

RISK & MITIGATION:

Risk	Mitigation
1 Minimal, since customer has changed priorities	

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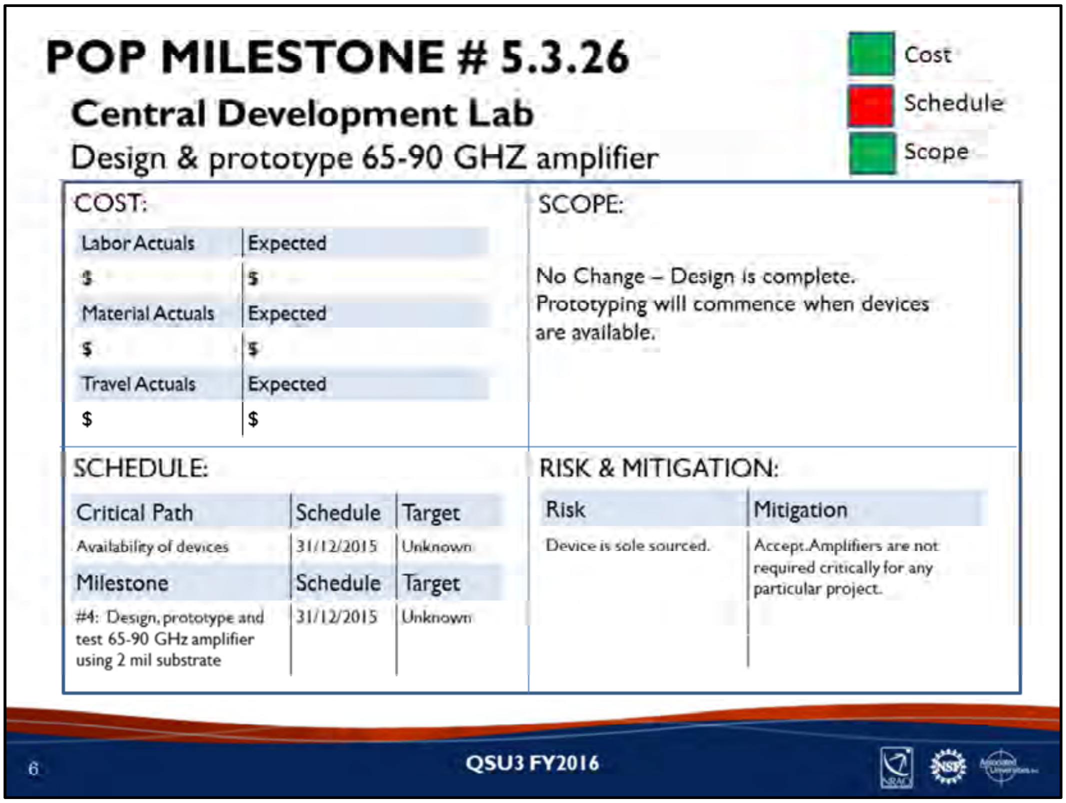
COST: No separate project for this, but included in the CDL budget.

SCOPE: The milestone was to measure the performance of a 35-50 GHz horn and phase shifter. The predecessor milestone to design the prototype was cancelled and therefore it follows that this milestone is cancelled. Change request to cancel was approved 8/4/2016.

SCHEDULE: Cancelled – Higher priorities at Socorro have resulted in this task being delayed, although it is a longer-term priority as the existing Q-band receivers continue to age.

RISK & MITIGATION: Risks are minimal since Socorro considers this a long-term project and they now have higher priorities (such as the VLBA Ka-Band upgrade).



POP MILESTONE # 5.3.26

Central Development Lab

Design & prototype 65-90 GHZ amplifier

Cost — Schedule — Scope

COST:

Labor Actuals	Expected
$	$
Material Actuals	Expected
$	$
Travel Actuals	Expected
$	$

SCOPE:

No Change – Design is complete. Prototyping will commence when devices are available.

SCHEDULE:

Critical Path	Schedule	Target
Availability of devices	31/12/2015	Unknown
Milestone	Schedule	Target
#4: Design, prototype and test 65-90 GHz amplifier using 2 mil substrate	31/12/2015	Unknown

RISK & MITIGATION:

Risk	Mitigation
Device is sole sourced.	Accept. Amplifiers are not required critically for any particular project.

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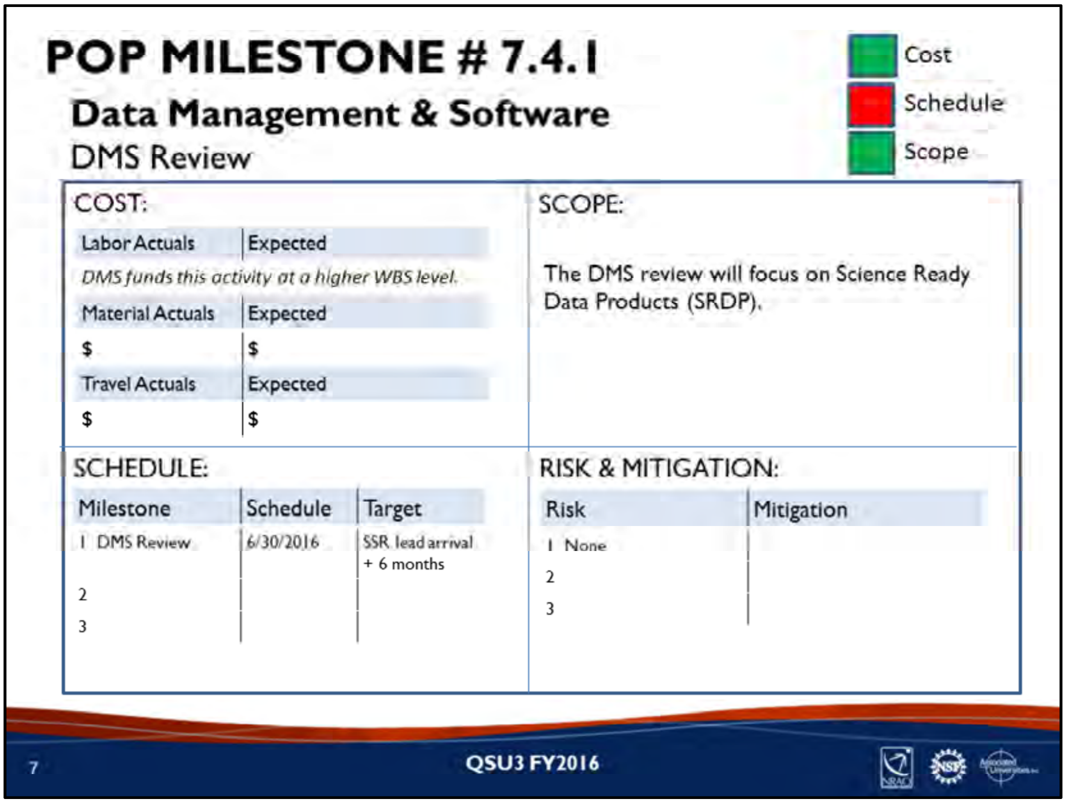
COST: Effort is funded from CDL research account

SCHEDULE: Negotiations for these sole source devices are in progress. Experience has shown that these negotiations do not always conclude in a predetermined time frame.

SCOPE: No Change - Design and prototype 65-90 GHz amplifier with 2 mil substrate thickness (compare to current 3 mil). Goal is improved reliability and performance reproducibility.

RISK & MITIGATION: These devices have a sole source, available only from JPL. We can only accept this risk as JPL has been our sole source for similar devices for decades. A secondary risk is identified as field failures that require the same device, which would compete with the prototype in the event of field failures. In the interest of supporting components in the field, prototyping this amplifier has been delayed until an adequate supply of devices is available.



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

SCOPE: The DMS review will focus on Science Ready Data Products (SRDP).

SCHEDULE: The review is planned to focus on SRDP and will be scheduled approximately 6 months after the arrival of the new SSR lead.

RISK & MITIGATION: N/A

POP MILESTONE # 7.4.16

Data Management & Software

User Portal Redesign

Cost
Schedule
Scope

COST:

Labor Actuals	Expected
DMS funds this activity at a higher WBS level.	
Material Actuals	**Expected**
$	$
Travel Actuals	**Expected**
$	$

SCOPE:

Deploy version 1 of the redesigned NRAO User Portal

SCHEDULE:

Milestone	Schedule	Target
1 Deploy version 1 of redesigned User Portal	6/30/2016	cancelled
2		
3		

RISK & MITIGATION:

Risk	Mitigation
1 None	
2	
3	

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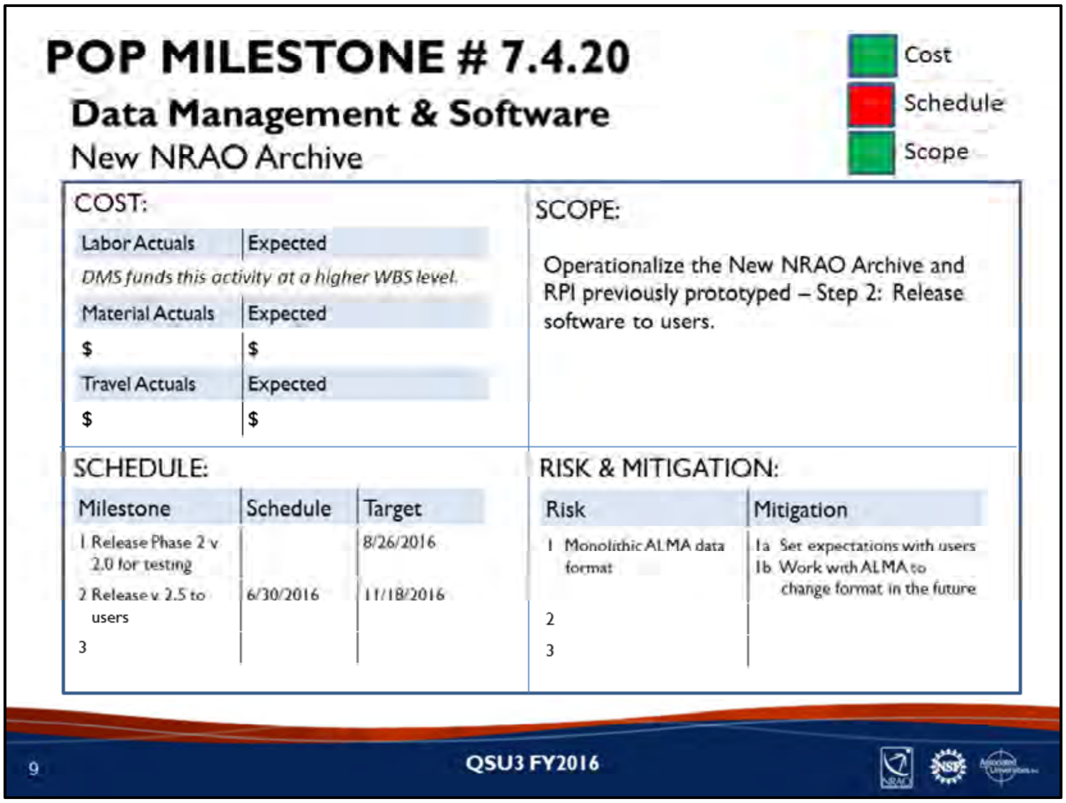
COST: DMS funds this activity at a higher WBS level. Costs are not tracked for this milestone.

SCOPE: Deploy version 1 of the redesigned NRAO User Portal. Change Board approved change request to cancel on 8/4/2016.

SCHEDULE: The requirements were not finalized for this project. Also, with LBO and GBO separating from NRAO in FY17, it is likely that the requirements will change, and may change further with the recompetition of both. This project will be re-evaluated in FY17 as the relationships to the new observatories develop, to see if it should move forward in FY18. This project will be cancelled for FY16.

RISK & MITIGATION: The current portal, while not optimal, is serviceable. No significant risks exist.

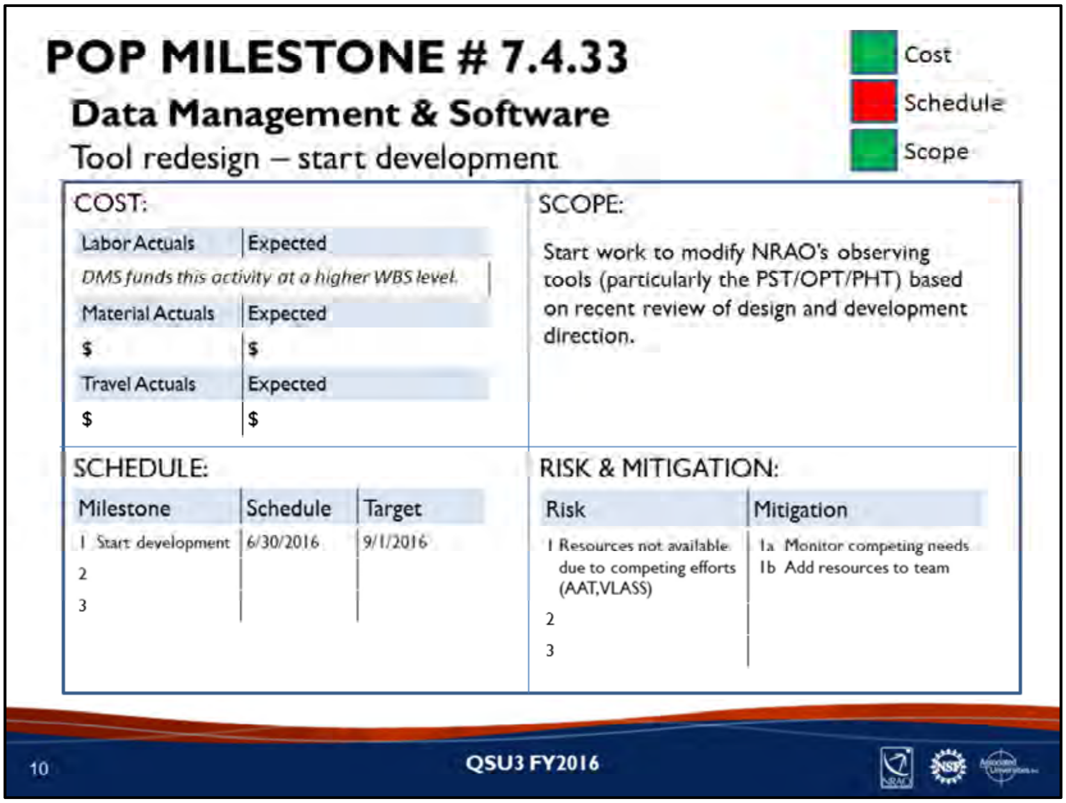


COST: DMS funds this activity at a higher WBS level. Costs are not tracked for this milestone.

SCOPE: Operationalize the New NRAO Archive and RPI previously prototyped – Step 2: Release software to users.

SCHEDULE: Project is recovering from competition with operational priorities and difficulty in hiring resources over the long term. A focus on this project as the top priority over the last six months has led to significant progress. An initial test version was released this quarter, and a second release is planned to internal users and a subcommittee of the NRAO User's Committee in August. A release which is functionally equivalent to the current archive, but with a greatly improved interface, better performance, and inclusion of ALMA data, is planned in November.

RISK & MITIGATION: ALMA observations are stored in a monolithic format, so retrieval may appear to users to be slow. We will work with the ALMA Archive team to see if this can be changed in a future release. In the short term we are likely to need to document this inconvenience for our users.



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

SCOPE: Start work to modify NRAO's observing tools (particularly the PST/OPT/PHT) based on recent review of design and development direction.

SCHEDULE: Resources for this project are currently assigned to the higher-priority AAT/RPI project. Work on the the first improvements to the PST, including removal of sessions and high-priority User Committee requests, is expected to be initiated in September.

RISK & MITIGATION: Resources may not become available due to competing efforts, such as continuing work on the AAT/RPI and VLASS. The effort needed to complete these projects is being monitored, and additional resources are being added to the team.

POP MILESTONE # 8.5.20

PMD Green Bank

Finalize Training Evaluation Criteria

Cost
Schedule
Scope

COST:

Labor Actuals	Expected
$ N/A	$
Material Actuals	Expected
$ N/A	$
Travel Actuals	Expected
$ N/A	$

SCOPE:

Finalize training evaluation criteria. Competency of training will be evaluated by consideration of project case studies to apply lessons learned to workshops in project management and systems engineering practices.

SCHEDULE:

Milestone	Schedule	Target
1 Complete criteria	06/30/16	07/29/16
2		
3		

RISK & MITIGATION:

Risk	Mitigation
1 Training criteria must be finalized before training sessions commence	Complete criteria by 7/29/2016
2	
3	

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COST: No cost implications.

SCOPE: Training sessions pending.

SCHEDULE: Missed target of 6/30/16. Finalize training criteria by 7/29/2016.

RISK & MITIGATION: Finalize training criteria list. Evaluation criteria must be completed before training sessions commence.

POP MILESTONE # 10.3.7

EPO: STEM Education & Outreach

VLA VC Upgrade Architectural/Design Plan

Cost	Schedule	Scope
Green	Red	Green

COST:

Labor Actuals	Expected
No changes	

Material Actuals	Expected
$42,581 /year	$2,750 / year

Travel Actuals	Expected
No changes	

SCOPE:

Schematic design drawings for upgrades to the VLA VC buildings and landscape.

We have parking lot and new road plans, so far. Meetings with architects last week in July to choose one and schedule phase one specification documentation.

SCHEDULE:

Milestone	Schedule	Target
1 VLA VC Ed/Interp plan	12/30/15	09/30/16
2 VLA VC architectural plan	03/30/16	TBD

RISK & MITIGATION:

Risk	Mitigation
1 No seed funds to hire contractor	Mitigate by holding off other expenditures to prioritize this one

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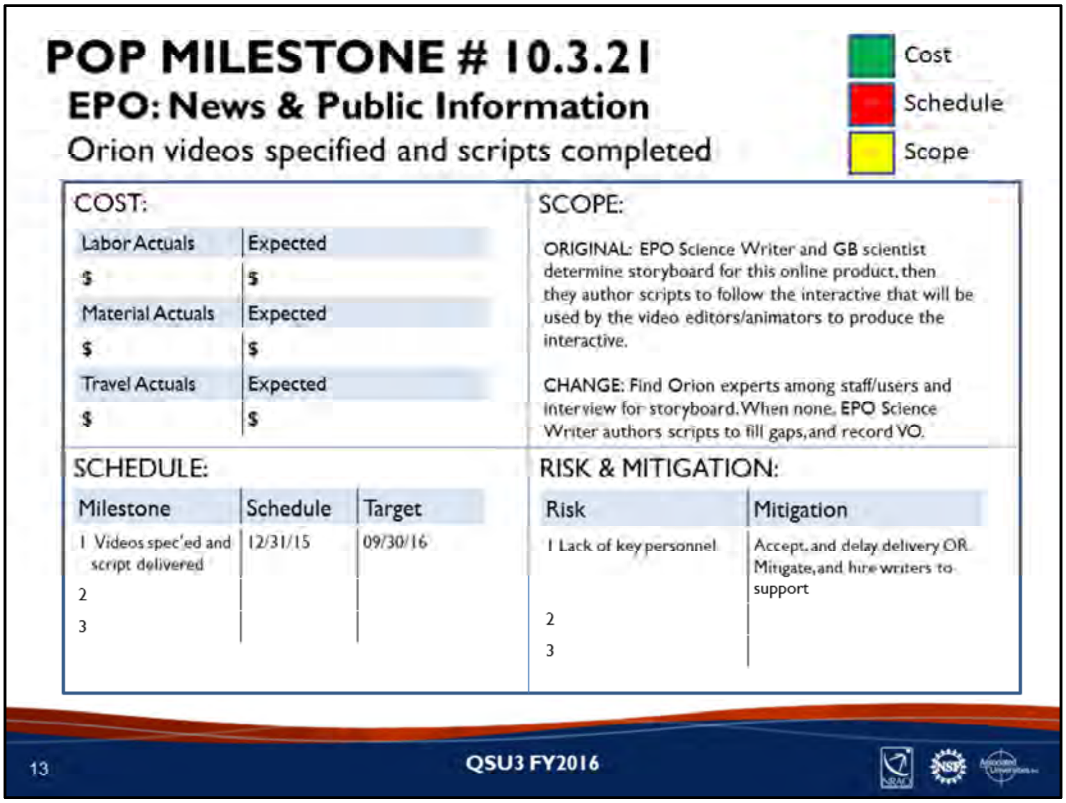
COST: EPO funds this activity at a higher WBS level unless outside funding is acquired for it.

SCOPE: An architect or general contractor is required to survey the site and prepare a detailed building plan for the proposed upgrades to both indoor and outdoor features.

SCHEDULE: New idea has received approval from the Director. We have a plan for the new roads and parking lot construction aspects of the upgrade, but not the VC and classroom upgrades, or the landscaping. We have made preliminary contacts for initial walkthroughs, and have funding set aside to cover the initial specification documents. Two meetings with NM-based architects planned for last week in July.

RISK & MITIGATION: If no seed funds are available to hire the architect, then we shuffle around other budget priorities to scrape the funds together.

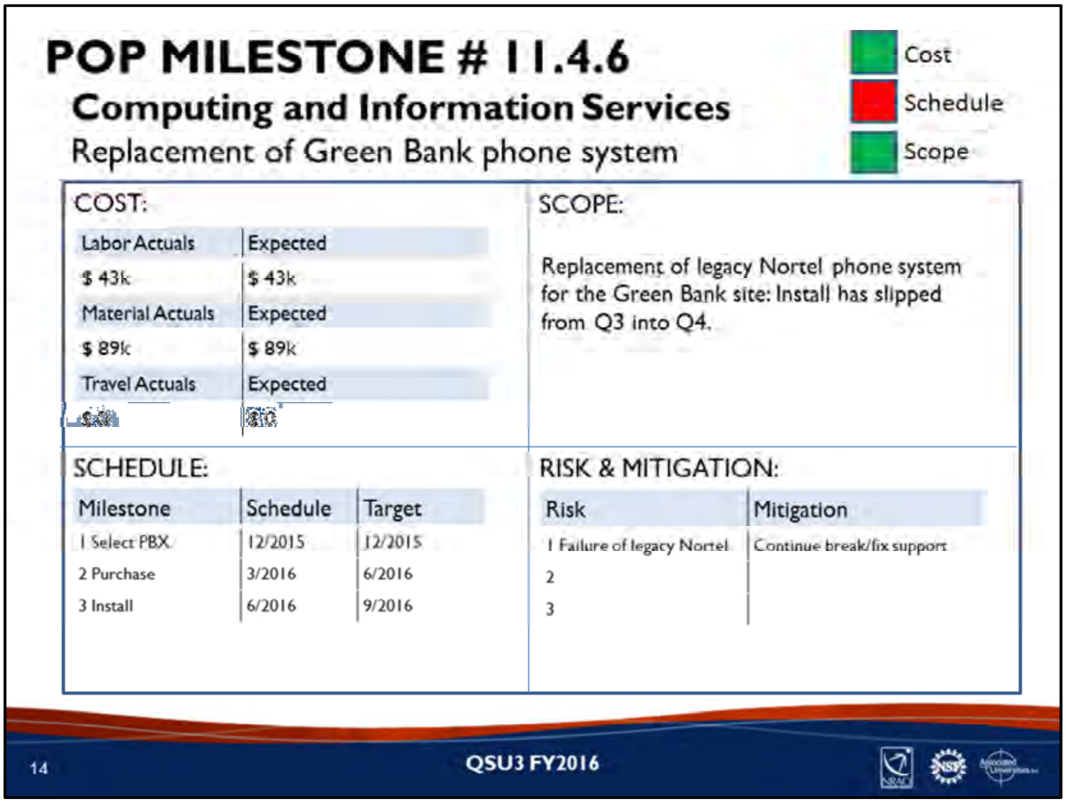


COST: EPO funds this activity at a higher WBS level. Costs are not tracked for this milestone.

SCOPE: Originally, EPO Science Writer works with GB scientist to determine storyboard for this online product, then authors the scripts to follow the interactive that will be used by the video editors to develop the interactive. New scope is to find actual scientists to tell us about these facets of Orion, and when there none suitable, Science Writer will author scripts and EPO will record VO for them. One scientist has already been recorded, and she will be the VO talent. We are continuing to locate and secure additional qualified scientists to interview.

SCHEDULE: EPO Science Writer is also the Interim AD for EPO and interim project lead on VLA VC Upgrade Project. These demanding and critical administrative duties have taken priority over her Science Writer duties for longer than expected. In addition, the degree of writing partnership with a colleague in GB is no longer possible due to his reduced hours. That said, with return of video editor from leave, videos have been specified.

RISK & MITIGATION: Lack of key personnel is the issue here, and we accept that it will delay this milestone until the staffing situation in EPO settles down and scientists with the combination of specific knowledge and layperson communications skills can be found.

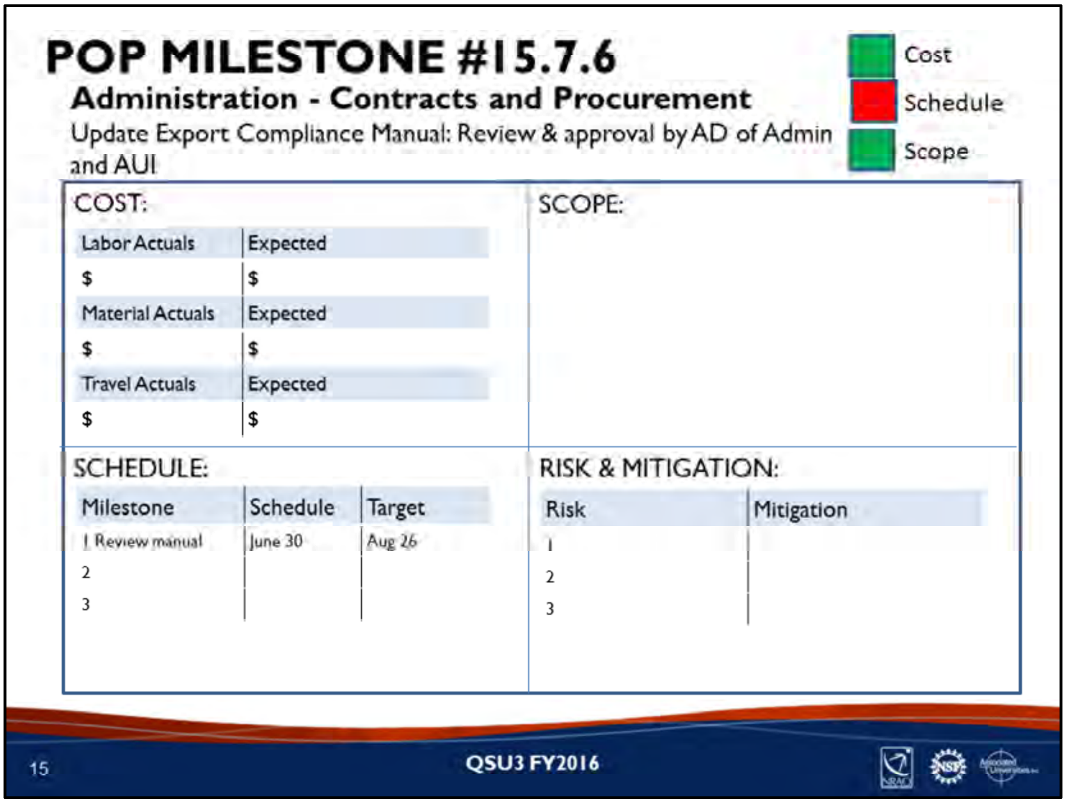


COST: Competitive bit awarded based on cost: no issues.

SCOPE: Replacement of legacy Nortel phone system with supported Cisco system able to support the ~200 analog phones needed for RFI mitigation.

SCHEDULE: The installation of an IP phone system for the Green Bank site was delayed by several months due to a complex multi-round bid process, delay in final funding approval, and the need to employ analog phones for the majority of units due to RFI constraints. Installation will now be complete in mid-September 2016.

RISK & MITIGATION: The legacy Nortel PBX is still functioning, and will continue to be supported on a break/fix basis with CenturyLink.

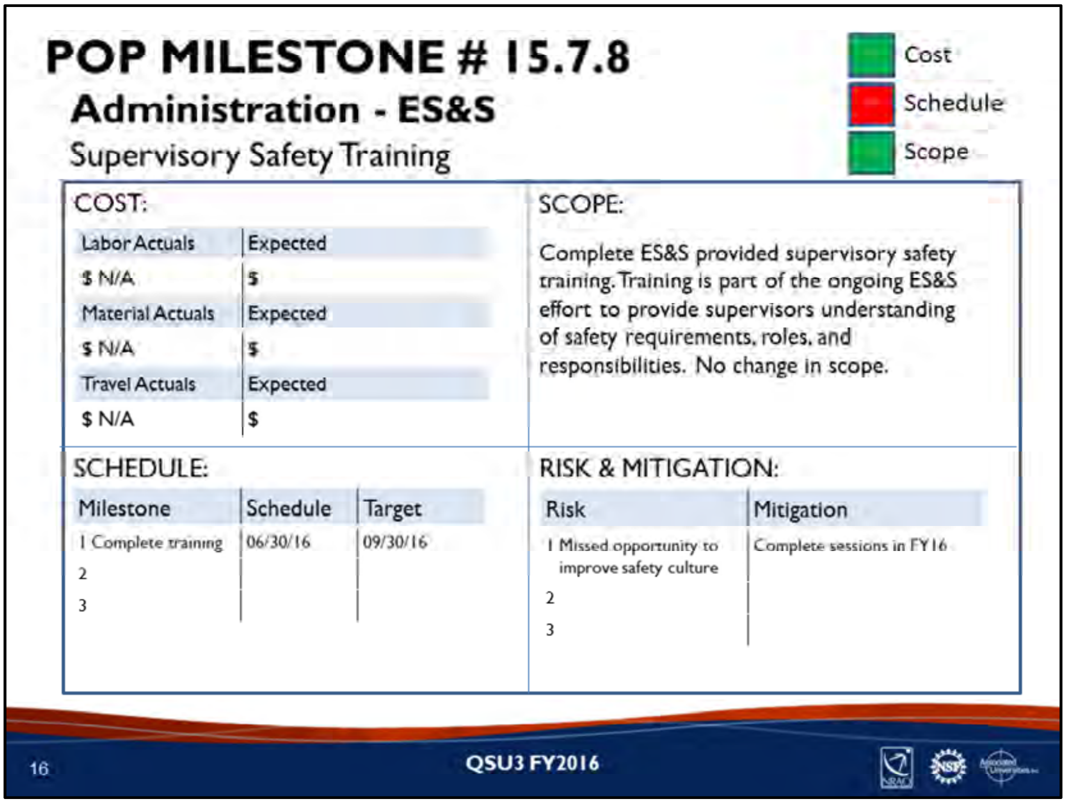


COST: N/A

SCOPE: N/A

SCHEDULE: Updates draft was completed near the end of the quarter. Reviews will take place in late July due to staff vacations. Completion expected by August 26.

RISK & MITIGATION: N/A



COST: No cost implications.

SCOPE: Green Bank training completed. Other locations pending.

SCHEDULE: Missed target of 6/30/16. Scheduling the supervisory sessions for CV in August and/or September 2016.

RISK & MITIGATION: This POP goal was established to further the development of a safety culture within the Observatory. Risk is a missed opportunity to improve supervisor understanding of safety roles and responsibilities. Risk will be mitigated by completion of the training in FY16.

POP MILESTONE # 15.7.12

Administration

Prepare follow-up program based on prior year agenda (for collaborating with UVA and NRAO software imaging designers to gauge interest in medical imaging conference)

COST:

Labor Actuals	Expected
$ 0	$ 0
Material Actuals	**Expected**
$ 0	$ 0
Travel Actuals	**Expected**
$0	$0

SCOPE:

Milestone cancelled – no interest from UVA in FY15, hence no follow-up required.

SCHEDULE:

Milestone	Schedule	Target
1 N/A		
2		
3		

RISK & MITIGATION:

Risk	Mitigation
1 None	
2	
3	

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COST: N/A

SCOPE: Jeff Pixton discussed this idea with UVA in FY15 and found no interest at this time to plan and host a conference. Milestone cancelled. Change Board approved the change request to cancel on 8/4/2016.

SCHEDULE: N/A

RISK & MITIGATION: N/A

QSU3 FY2016 Report

Budget Status Jason Jennings

Overall Status

- Benefits – Running ahead of budget for current fiscal year, effect of y/e accrual + Q1 is 4th quarter of the benefits year ($900K).
- Raises implemented effective in January/February.
- Preparing for contract closeout – managing year end expenses.

FY16 YTD by Major WBS Category

NRAO Ops – Q3

	FY16 POP Budget	FY16 Rev. Budget	FY16 YTD Expenses	YTD % Rev Budget
NSF	41,730	41,730	31,295	75.0%
Telescope Time Sale	3,596	3,596	2,752	76.5%
Carryforward/Other	3,138	4,509	4,183	92.8%
Total CSA-1 Revenues	**48,464**	**49,835**	**38,230**	76.7%
Telescope Ops	18,723	19,916	13,284	66.7%
Development	3,535	3,435	2,234	65.0%
Science Ops	5,860	6,287	3,926	62.4%
Admin Services	15,168	14,900	11,107	74.5%
Director's Office	3,677	3,772	2,830	75.0%
FY16, Total	**46,964**	**48,311**	**33,381**	**69.1%**
FY16 CSA-1 Net	**1,500**	**1,524**	**4,849**	

- Plurality of telescope time sale revenue is associated with Breakthrough Foundation, time did not begin until January – on schedule.
- Difference between Carryforward Budget & Revised is open commitments.
- Director's Office includes fund source adjustments of $385K.

FY16 YTD by Major WBS Category

ALMA Ops Q3

	FY16 POP Budget	FY16 Rev. Budget	FY16 YTD Expenses	YTD % Rev Budget
Telescope Ops	22,851	23,424	15,831	67.6%
Development	5,478	8,516	1,480	17.4%
Science Ops	7,204	8,172	4,675	57.2%
Admin Services	5,013	5,029	3,407	67.7%
Director's Office	3,447	3,503	2,173	62.0%
FY16, Total	**43,993**	**48,644**	**27,566**	**56.7%**
Development Reserve	4,073			
Open Commits	3,521		5,081	
C/F for FY16 Fuel	1,800			
C/F for Future Years	281	1,931		
PPS Budget Adjustment	(714)			
JAO Budget Adjustment	(581)			
Development	(1,400)			
NAOJ	186			
Canada (net)	(584)			
ALL ALMA Resources	**50,575**	**50,575**	**32,647**	**64.6%**

- Development awarded $1.1M in studies, Q1.
- Telescope Ops rec'd $2.1M credit from NAOJ for FY16 activity.
- Below the line changes result of NSF changes in funding timing vis a vis JAO and designation of use of Canadian funds.

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- The original POP included expected CAD funds of 1.7M, which offset the fuel reserve.
- NSF pulled back 1.3M (714+581) and then used the Canadian contribution as the required reserve for the JAO work.
- We recognize that the remaining 575k from CAD is not coming in FY16 (rev budget).
- The fuel reserve was decreased by the difference in order to balance

FY16 YTD by Major WBS Category

ICC – Q3

	FY16 POP Budget	FY16 Rev. Budget	FY16 YTD Expenses	YTD % Rev Budget
Telescope Ops	101	102	71	69.3%
Development	713	726	540	74.4%
Science Ops	1,924	1,951	1,289	66.1%
Admin Services	11,004	11,405	8,011	70.2%
Director's Office	1,514	1,563	1,147	73.4%
FY16, Total	**15,256**	**15,746**	**11,057**	70.2%
Admin Recoveries	**13,938**	**14,428**	**9,929**	68.8%
External Recoveries	**1,318**	**1,318**	**902**	68.4%
FY16 ICC Net	**0**	**0**	**227**	

- ICC currently under-recovered by $227K due to lagging spending in the CSA's & low external recoveries; $70K improvement over Q2.
- Fund source adjustments shown in Director's Office.

CA Close Status

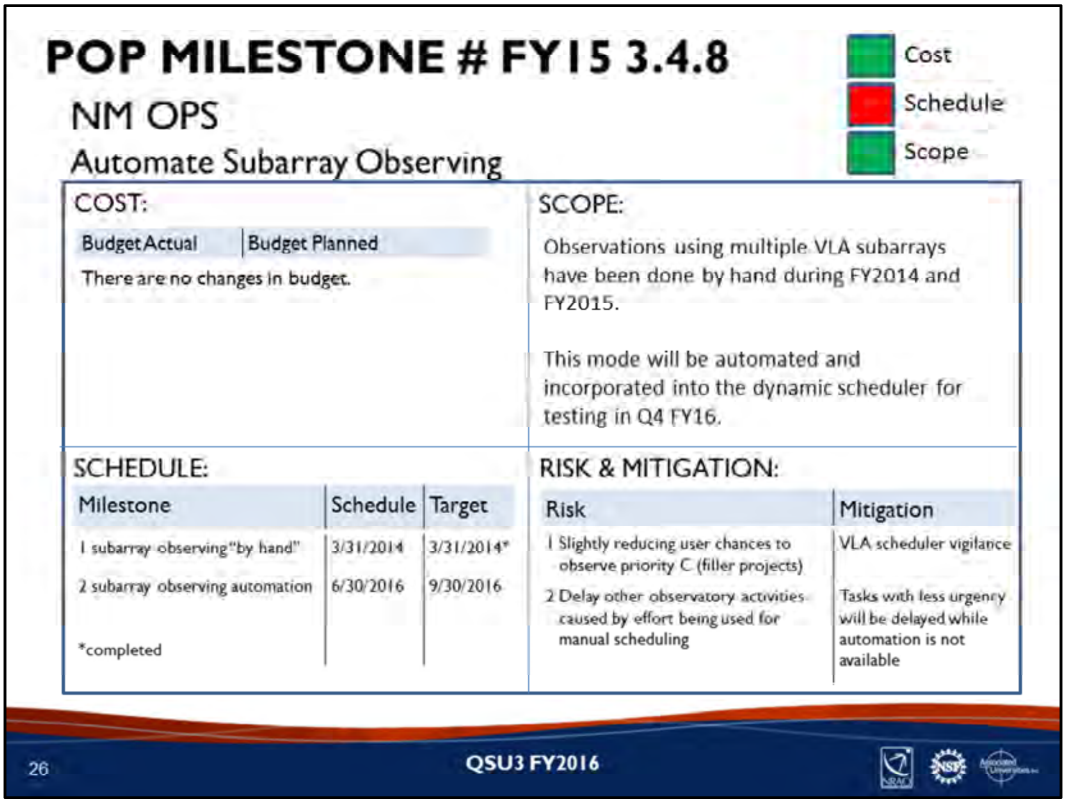
- Both CSA's will close within their budgeted envelopes.
- Preparing to deobligate/reobligate funds for each CSA in late August.
  - CSA-1 <$1M
  - CSA-2 $10M+ (ALMA Development commitments & reserved funding)

Emerging Issue

Benefits in FY16 & FY17

- FY16 Benefits overage able to be accommodated by CSA fund sources; contributor to under-recovery on ICC.
- FY17 anticipating large (double digit) increase in health insurance costs – will absorb through budgeted increase in benefits rate (35.6% -> 36%) and pass through to employees.


FY15 POP Milestones

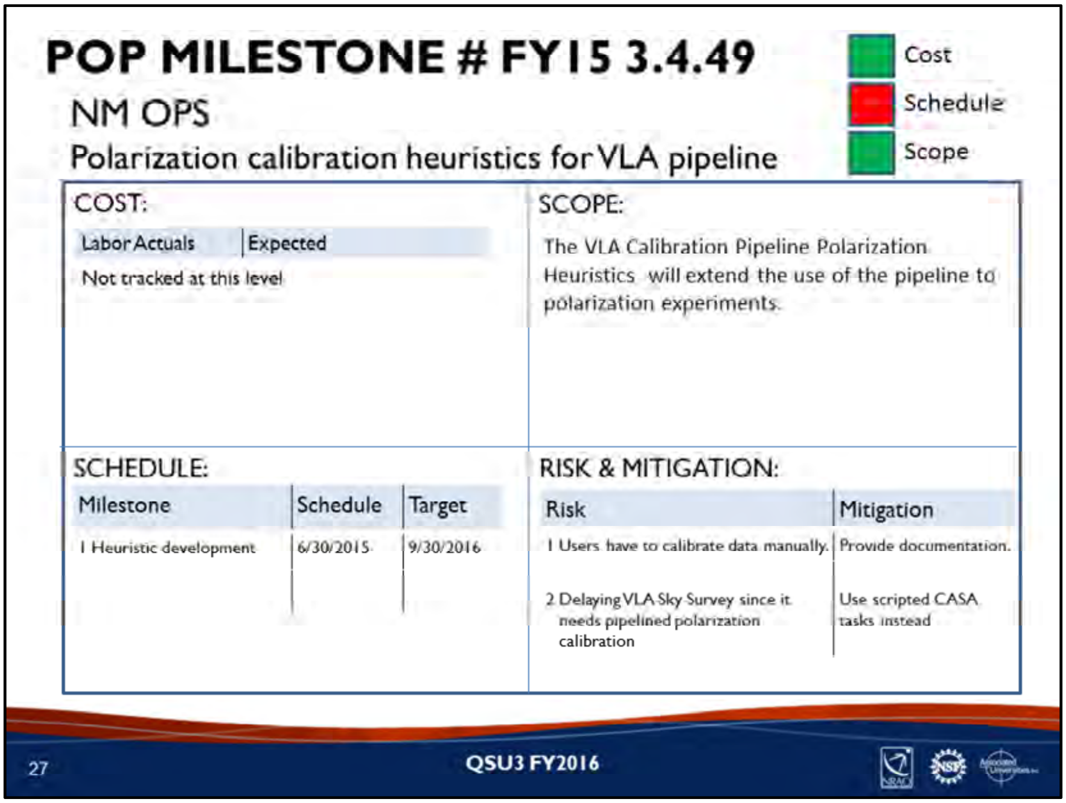


COST: No changes in budget

SCOPE: The VLA can be split up in subarrays. That is, some of the 27 antennas and corresponding baselines can be ordered to do a completely different and independent program than other antennas. Currently, projects requiring multiple subarrays must be handled manually. The goal of this milestone is to enable subarrays to go through the dynamic scheduler.

SCHEDULE: Work on automating subarrays has been slower than planned, mostly because of staffing issues in DMS. The system is now being tested. Note that the full integration of automated, dynamically-scheduled subarray observations into array operations will be carried as a separate goal in FY2017.

RISK & MITIGATION:
1. The risk to users of not having subarray observing automated is a slightly reduced chance of observing for priority C (filler) subarray projects. Mitigation is increased VLA scheduler vigilance, to avoid this happening.
2. The impact on the observatory is that effort is used for manual scheduling that could be used on more important (but less urgent) tasks, while we don't have automation we will continue giving priority to manual scheduling.

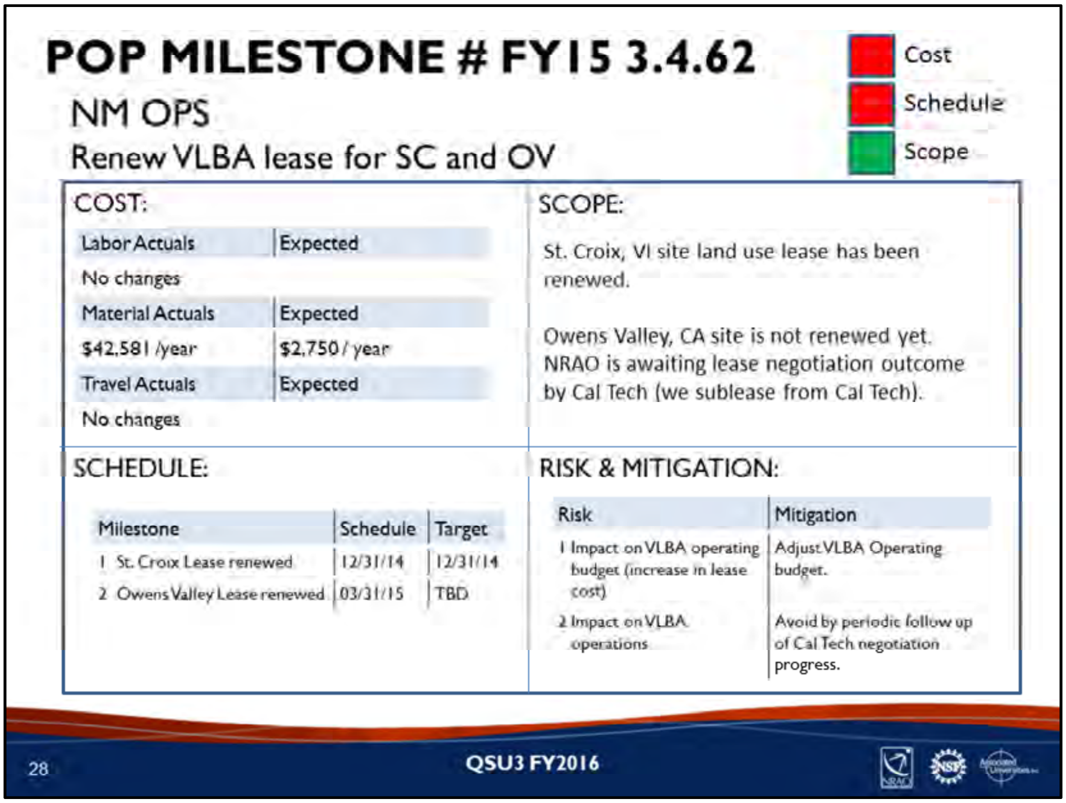


COST: No changes

SCOPE: The VLA calibration pipeline heuristics for Stokes I continuum is well-tested and stable. Calibration heuristics still need to be developed and implemented in the VLA CASA pipeline framework for polarization calibration.

SCHEDULE: A document is being drafted that includes heuristics for observing and calibration strategies for both ALMA and the VLA, enabling general polarization heuristics to be implemented in the CASA pipeline framework appropriate for both telescopes. The inclusion of linear polarization (for ALMA) has delayed the completion of the VLA pipeline heuristics.

RISK & MITIGATION:
1. Without polarization calibration, users will continue to have to calibrate their data by hand. The observatory provides detailed documentation to ensure this is possible.
2. One of the data products from the VLA Sky Survey are Stokes Q and U images. In the absence of polarization calibration being available within the CASA pipeline framework, VLASS polarization calibration will be derived using CASA scripts tuned to the VLASS observing strategy. These will be developed in parallel with the implementation of polarization calibration in the CASA pipeline based on the document described above.



COST: St Croix Lease: The lease has been signed by all parties. The lease is for 10 years with two 5 year options. Its cost increased from $2,750/yr to $42,581/yr.

SCOPE: No changes

SCHEDULE: Owens Valley Lease: Cal Tech negotiates this lease and it has been expired for 2 3/4 years. Los Angeles Water and Power is the lease holder. NRAO sub leases from Cal Tech. Progress has been marginal in the last quarter, according to the Cal Tech Owens Valley Radio Observatory Executive Director. The target date is shown as TBD for now, due to the uncertainty regarding when the lease will be signed.

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.

QSU3 FY2016 Exception Report

EPO/Tania Burchell

Education and Public Outreach

STEM Formal Education

- Renovation of N^2I^2: New Mexico Tech and NRAO Instructional Interferometer underway with PMD/NINE collaboration
- 17 unique overnight student groups at 40ft for observations
- Earth Space Science Passport workshop, 36 WV teachers
- Chautauqua Course in GB, 45 teachers
- Starlab Lessons in Monte Vista, Socorro, Magdalena: 278 learners
- Science Club Connection with NM NRAO REUers: 21 learners from Maine
- REU R

Education and Public Outreach

STEM Informal Education

- 9084 visitors to GB
- 7696 visitors to VLA, and April Open House sees record tour numbers!
- USA Science & Engineering Festival, Astronomy on National Mall Star Party, AAS EPO Live Events: thousands of learners
- Weekly radio broadcasts on Wake-Up Call, 94.7 FM Charlottesville
- SETI Tours launch at Green Bank
- ACE Ambassadors travel to Chile
- Space Race Rumpus, SARA Conferences

- BBC feature: http://www.bbc.com/news/world-latin-america-36357501
- Rolling Stone feature: http://www.rollingstone.com/culture/features/the-100-million-hunt-for-alien-life-20160407
- iOS app, RadioSky: https://itunes.apple.com/us/app/radiosky/id1115228545

NA ALMA Development Program

Quarterly Status Update - QSU3
April – June FY2016

Bill Randolph, Development Program Manager

16 May 2016

NA ALMA Development: QSU3

North American ALMA Science Center

Program Overview

- **Six (6) Projects ongoing (one from Cycle 1; five from Cycle 2)**
- **Seven (7) Studies recently started (Cycle 3)**
- **Thirteen (13) Study Proposals received (Cycle 4)**
  - $ 1.2M award pool
- **Preparing Call for Study and Project Proposals (Cycle 5)**
  - $ 0.5M General Studies award pool
  - $ 2.5M Strategic Studies award pool
  - $ 11.0M Projects award pool (FY2017 and FY2018 Project budgets combined)
  - $ 14.0M Total Cycle 5 award pool

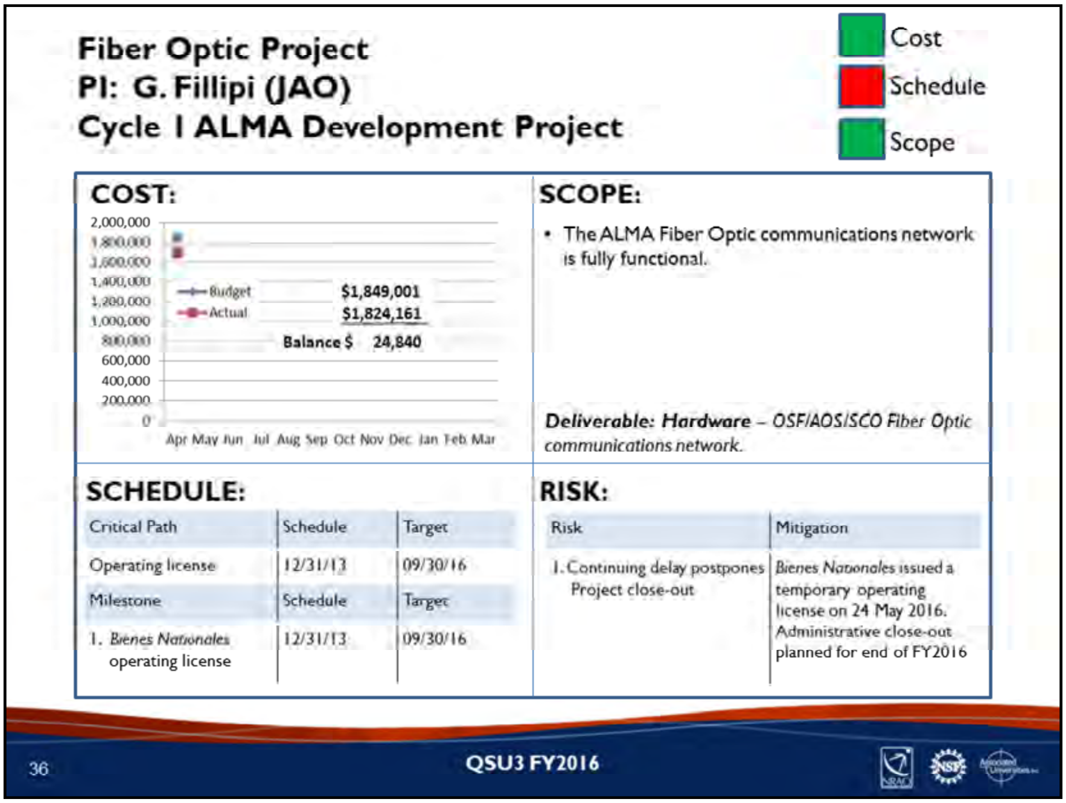
Portfolio of approximately 20 Studies and 5 Projects during FY2017.

NA ALMA Development: QSU3

Current Projects (Cycles 1 and 2)

PMD ID	Status	NRAO Project	PI	Lead Institution	Collaborating Institution(s)	Budget ($)
195	Active	Expansion of the Central LO Article to 5 Subarrays	C. Jacques	NRAO	N/A	339,056.00
197	Active	Design & Testing of a Prototype Band 2 Cartridge	K. Saini	NRAO	VA Diodes, Caltech/JPL	1,493,969.00
					SubTotal	1,833,025.00
PMD ID	**Status**	**External Project**	**PI**	**Lead Institution**	**Collaborating Institution(s)**	**Budget ($)**
N/A	Active	Fiber Optic Project	G. Filippi	JAO	Telefonica Emprasas Chile S.A., Silica Networks Chile S.A.	1,849,001.00
196	Active	The Next Generation ALMA Image Viewer (CARTA)	E. Rosolowsky	U. Alberta	U. Calgary/ U. Cape Town, NRAO	887,666.00
201	Active	ALMA Data Mining Toolkit (ADMIT)	L. Mundy	U. Maryland	UIUC, NRAO	991,160.00
N/A	Active	Band 3 Cold Cartridge Assembly Magnet & Heater Installation for Deflux Operation	L. Knee	HIA	N/A	248,409.00
					SubTotal	3,976,236.00
					Total	5,809,261.00

Only the Band 2 and Band 3 Projects will continue into FY2017.

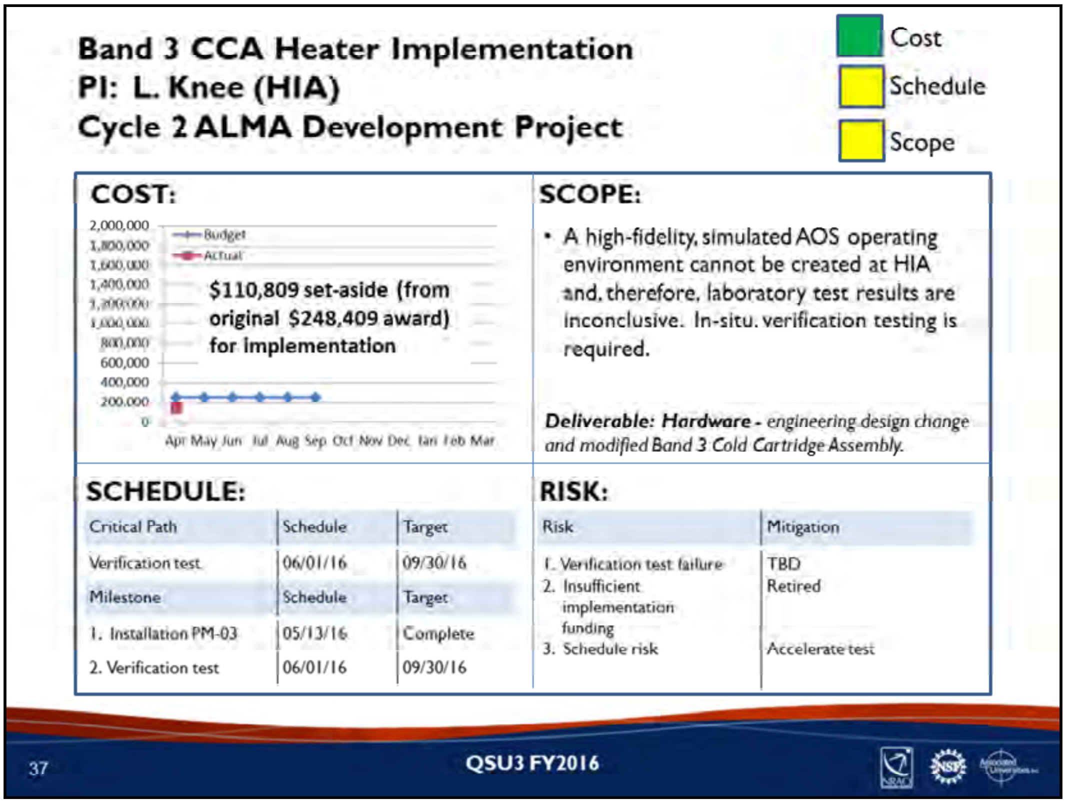


COST: $24K underrun being held in reserve against potential close-out costs. None identified at this time.

SCHEDULE: All legal requirements fulfilled. Waiting on issuance of Operating License from *Bienes Nationales*.

SCOPE: N/A

RISK & MITIGATION:
- Microwave link (100Mbps) will be maintained by Silica – at no cost to ALMA – through the end of CY2016. This includes use of the fiber and DWDM equipment.
- Silica bank guarantees are valid through June 2016.
- AUI has agreed to suspend performance penalties so long as the FO link is available and the bank guarantees are valid.



COST: Sufficient funds are available to support verification testing. TBD if parts procurement and modification of 72 CCAs (by JAO personnel) can be accomplished with remaining funds.

SCHEDULE: B3 CCA Unit No. 33 has been modified and installed into FE 43. FE 43 will be installed into antenna PM-03 for verification testing.

SCOPE: HIA highly confident that the heater will remedy the accumulated flux problem. Uncertain about heater efficacy in solving the total power variation (as a function of azimuth) problem since they are unable to simulate AOS magnetic field variations in their laboratory. (Allen Variance specification)

RISK & MITIGATION:

- Verification test failure – TBD
- Insufficient implementation funding – detailed cost estimate forthcoming from HIA

NA ALMA Development: QSU3

Current Studies (Cycle 3)

PMD ID	Status	NRAO Study	PI	Lead Institution	Collaborating Institution(s)	Budget ($)
365	Active	Spectral Resolution & Bandwidth Upgrade of the ALMA Correlator	R. Lacasse	NRAO	JAO, UVA, U. Bordeaux	196,770.00
385	Active	Improving the Calibration of Atmospheric Spectral Features in ALMA Data	T. Hunter	NRAO	JAO, IRAM	68,411.00
					SubTotal	265,181.00

PMD ID	Status	External Study	PI	Lead Institution	Collaborating Institution(s)	Budget ($)
N/A	Active	Extensions and Enhancements to the ALMA Phasing System	L. Mathews	MIT Haystack	N/A	199,800
N/A-SSR	Active	Pulsars, Magnetars, and Transients with Phased ALMA	J. Cordes	Cornell University	MIT, MPIfR, NRAO	185,267
N/A-SSR	Active	Feature Extraction and Visualization of ALMA Data Cubes through Topological Data	P. Rosen	University of Utah	NRAO	185,133
N/A	Active	Advanced Materials and On-wafer Chip Evaluation for Second Generation ALMA	A. Lichtenberger	UVA	N/A	183,504
384	Active	Digital Correlator and Phased Array Architectures for Upgrading ALMA	J. Weintroub	SAO	U. Bordeaux, NRC, NRAO	147,915
					SubTotal	901,619.00
					Total Cycle 3 Studies Award	1,166,800.00

All Cycle 3 Studies are underway.

NA ALMA Development: QSU3

Current Call for Study Proposals (Cycle 4)

- **Cycle 4 Call released 01 March 2016**
- **Studies only**
  - $1M award pool
  - $0.2M max individual award
  - one year period of performance
- **Thirteen (13) Proposals received**
  - 7 NRAO
  - 1 HIA
  - 5 external institutions

Notification of Awards by 12 August 2016

Cycle 4 budget will be committed during FY2016.

NA ALMA Development: QSU3

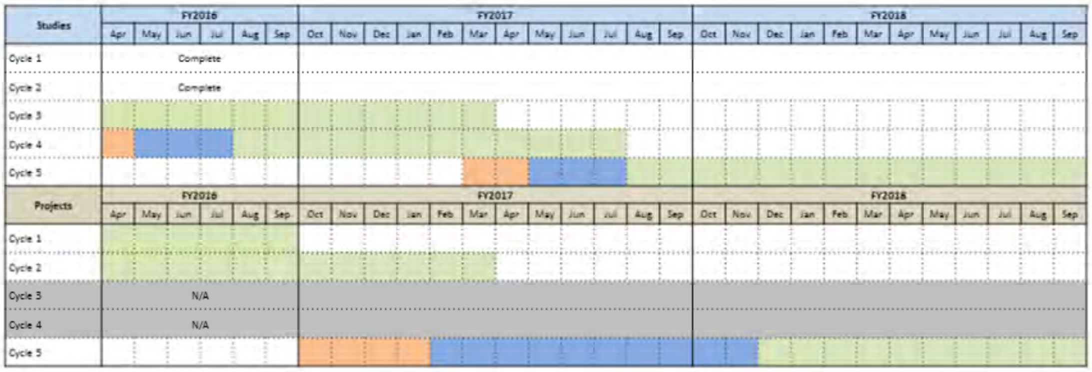
Next Call for Study and Project Proposals (Cycle 5)

- **Preparations**
  - Further alignment with ALMA 2030 goals & objectives (strategic solicitations)
  - ESO ALMA Development Workshop 23-27 May 2016
  - AAS Splinter Session 14 June 2016
  - NA ALMA Development Workshop 24-25 August 2016
- **Cycle 5 Call release 10 October 2016**
- **Studies & Projects**
  - $14M total award pool (FY2017 + FY2018 budgets)
  - General Studies: $0.5M award pool; $0.2M max; 1 year period of performance
  - Strategic Studies: $2.5M award pool; $0.4M max; 2 year period of performance
  - Projects: $11M award pool; $1.5M max annual; 2 to 3 year period of performance
- **Proposal deadlines** Projects: 30 January 2017; Studies: 01 May 2017
- **Notifications of awards** Studies: July 2017; Projects: November 2018

Project awards contingent upon ALMA Board review and approval.

NA ALMA Development: QSU3

Development Program Master Schedule



- *Call for Proposals*
- *Review and Select Study or Project*
- *Conduct Study or Project*
- *No Project Call during this Cycle*

Cycle 5 Project awards will occur in FY2018.

NA ALMA Development: QSU3

Summary

- **Only two of the Current Projects (Prototype Band 2 Cartridge and Band 3 CCA Deflux Operation) will continue into FY2017**
- **All Current Studies (Cycle 3) are underway**
- **Cycle 4 Study Proposals are in review; awards by 12 August**
- **Cycle 5 Call for Proposals will be split into two parts**
  - Project Call in October 2016
  - Study Call (General and Strategic) in March 2017
- **ALMA Board will review Cycle 5 Projects in November 2017 (Q1 FY2018)**

The NA ALMA Development Program is in good condition.

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