Title: QSU1 FY2016	***Author:*** NRAO staff	***Date:*** 02/11/2016
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National Radio Astronomy Observatory

Quarterly Status Update 1 FY2016

October - December, 2015

PREPARED BY	**ORGANIZATION**	**DATE**
M. Shannon/ADs	Director's Office	02/11/2016

APPROVALS (Name and Signature)	**ORGANIZATION**
M. Shannon	NRAO
T Beasley	NRAO
J. Mester	AUI

NRAO Quarterly Status Update
(QSU1 FY2016)
October - December 2015

Q1 Performance Assessment

POP Section Number	POP Milestone	Milestone	Completion Date	Cost	Schedule	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			
	6	Offer data reduction workshop in Charlottesville	12/31/2015			
		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			
	5	Determine baselines and pointing for antennas moving into their D configuration locations	12/31/2015			
		VLA Array Operations				
	8	Complete reconfiguring array to D configuration	12/31/2015			
	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			
		VLA Site Infrastructure Maintenance				
	18	Perform preventive maintenance on VLA site hatch gear	12/31/2015			
		VLBA Science Operations				
	34	Define VLBA capabilities to be offered for semester 2016B	12/31/2015			
		Site Operations				
	41	Renew lease for Pie Town (PT)	12/31/2015			
5.3		**Central Development Laboratory**				
		Repair, Maintenance, Production, Support				
	2	Define and finalize Band-2 prototype cartridge configuration for final evaluation	12/31/2015			
	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			
	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			
	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			
6.5		**Science Support & Research**				
		Telescope Time Allocation (TTA)				
	5	TAC meeting for semester 2016A	12/31/2015			
	7	Update SW tools requirements for TAC support 2016A	12/31/2015			
		Science User Support (SUS)				
	15	NAASC sponsored science workshop	12/31/2015			
	23	Update CASAGUIDES	12/31/2015			

NRAO Quarterly Status Update
(QSU1 FY2016)
October - December 2015

Q1 Performance Assessment

POP Section Number	POP Milestone	Milestone	Completion Date	Cost	Schedule	Scope
7.4		**Data Management & Software**				
		ALMA System Software				
	3	ALMA Fall 2015 Release	12/31/2015			
		Software Development				
	17	Leverage NGAS for Green Bank data archive	12/31/2015			
	21	ALMA Cycle 3 Pipeline Release	12/31/2015			
	23	CASA reliability initiative	12/31/2015			
	24	Release CASA version 4.5	12/31/2015			
	26	Implement PST updates for Semester 2016B Call for Proposals	12/31/2015			
	30	Implement OPT updates for Semester 2016A VLA Observing	12/31/2015			
8.5		**Program Management Department**				
		Headquarters				
	1	Quarterly Status Updates	12/31/2015			
			3/31/2016			
			6/30/2016			
			9/30/2016			
		New Mexico				
	7	DMS Group Practices Assessment	12/31/2015			
	9	Host learning session	12/31/2015			
		CDL/ALMA				
	13	PM/SE Training development	12/31/2015			
	19	Facilitate gate review	12/31/2015			
		Green Bank				
	22	Host learning session	12/31/2015			
10.3		**Education & Public Outreach**				
		STEM Education and Outreach				
	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			
	11	Pocahontas County Science Fair	12/31/2015			
	16	Recruit additional SPOT undergraduate ambassadors	12/31/2015			
		News & Public Information				
	19	WordPress site specified	12/31/2015			
	21	Orion videos specification and scripts completed	12/31/2015			
	25	Beta version iOS "RadioSky" app ready for testing	12/31/2015			
11.4		**Computing & Information Services**				
	5	Selection of Green Bank phone system	12/31/2015			
	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			
	5	Initiate recruitment activities	12/31/2015			
		International Outreach				
	9	NINE Program Plan (existing partners) complete	12/31/2015			
	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			

NRAO Quarterly Status Update
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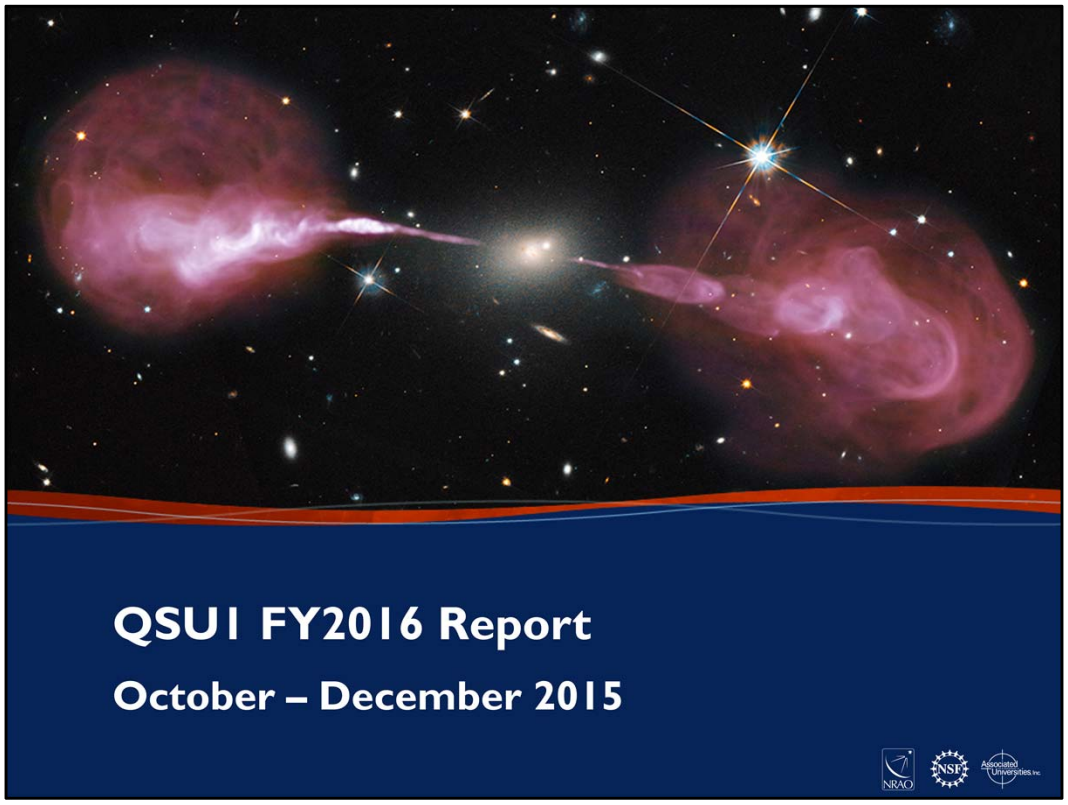
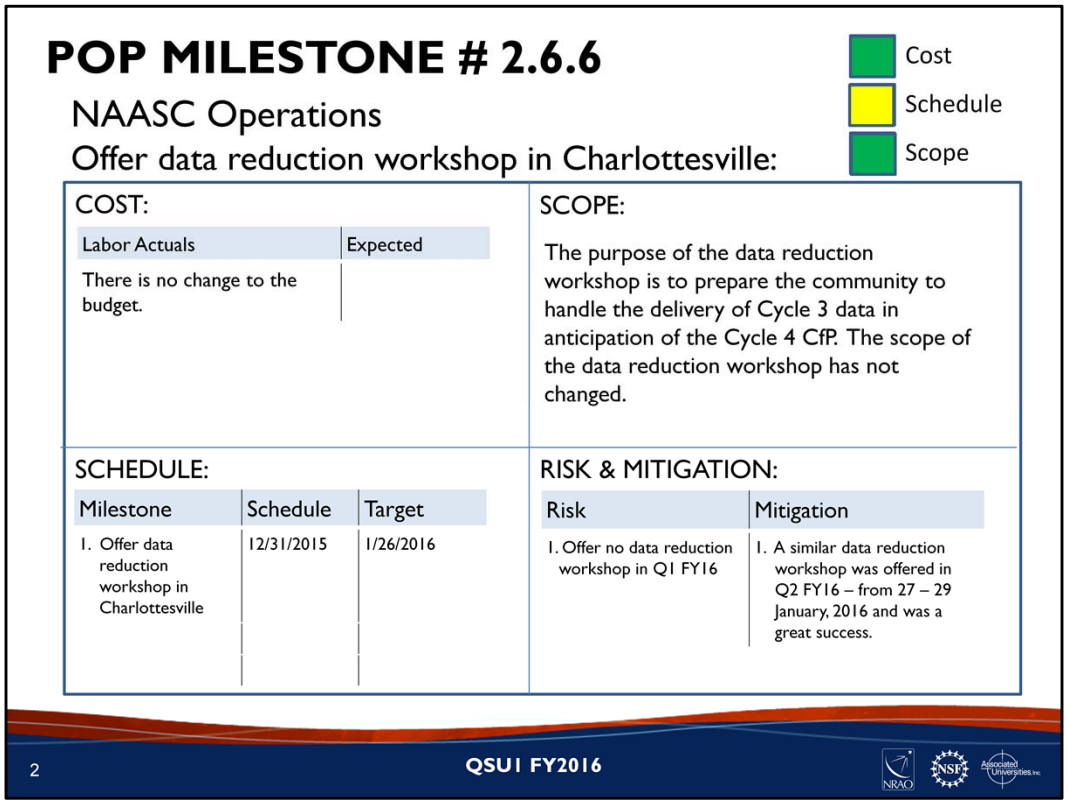
Q1 Performance Assessment

POP Section Number	POP Milestone	Milestone	Completion Date	Cost	Schedule	Scope
13.7		**Human Resources**				
		Compensation				
	3	Annual Performance Review Process	12/31/2015			
		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			
		Recruitment and Employment				
	11	Design and implement a comprehensive recruitment toolkit for hiring managers	12/31/2015			
14.1		**Communications**				
		Science Communications				
	1	Update Research Facilities brochure	12/31/2015			
15.7		**Administration**				
		ES&S				
	7	Determine technical solution to Safety Recordkeeping requirements	12/31/2015			
16.5		**Spectrum Management**				
		Spectrum Management				
	1	ITU-RWRC-15	12/31/2015			
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			
		Science Community				
	6	Appoint new Users Committee members	12/31/2015			
		Management Review				
	8	NSF Annual Program Review	12/31/2015			
	9	All Hands presentation	12/31/2015			
			6/30/2016			



QSU1 FY2016 Report

October – December 2015

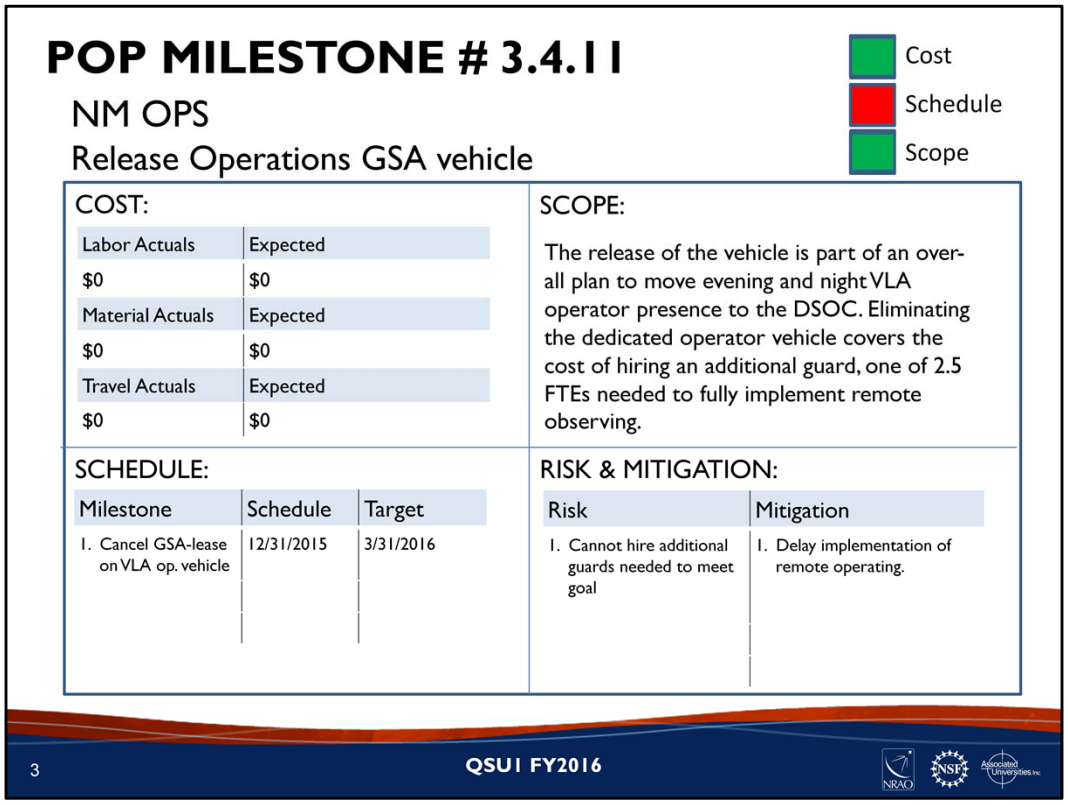


COST: N/A

SCOPE: N/A

SCHEDULE: Behind, offer the data reduction workshop in Q2 instead of Q1.

RISK & MITIGATION: Offer no data reduction workshop in Q1 FY16. Instead we offer the workshop in Q2. There is no risk associated with a slip in the schedule.

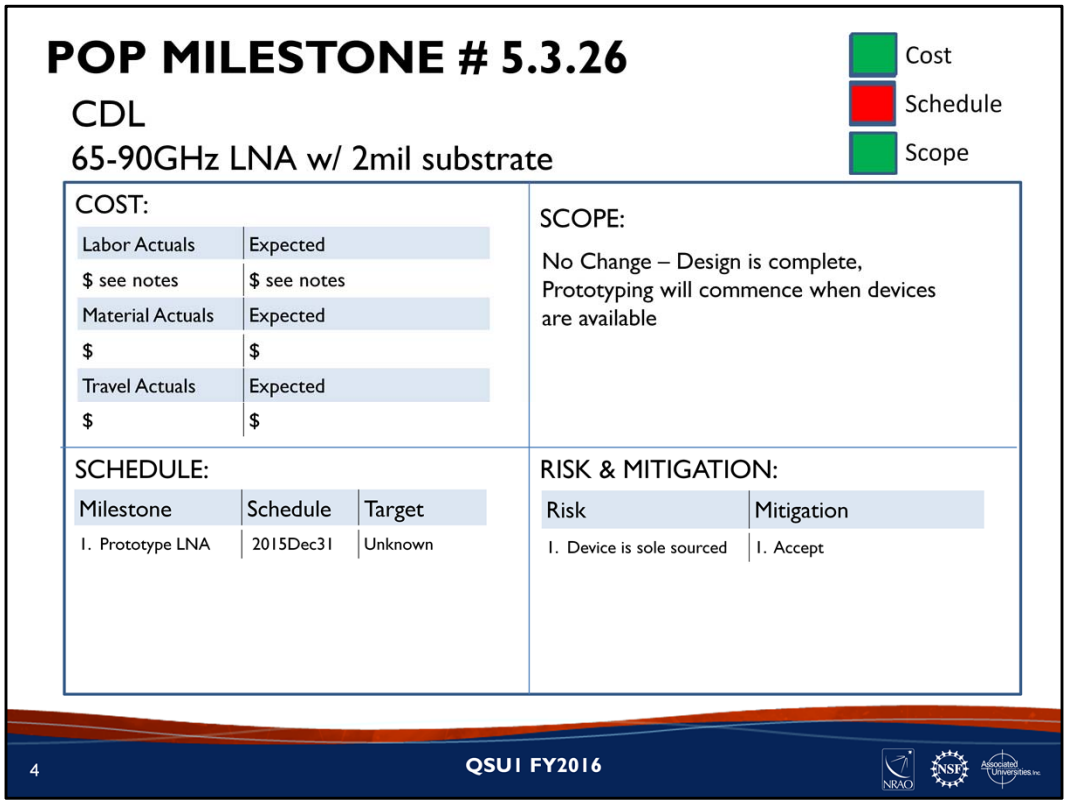


COST: The release of the vehicle will enable NM Ops to pass the cost savings on the GSA-rental to hire an additional guard/custodian for the VLA. The goal to achieve remote telescope operations for the evening and midnight shifts needs to comply with the two-man rule for those time periods, and requires the hiring of additional guards. The release of the GSA rental of a dedicated Operator vehicle will cover the cost of one full-time (40 hours) guard.

SCOPE: Remote operation of the VLA is desirable for a number of reasons. It will enable cross-training of VLA and VLBA operators; it will provide a proof of concept for remote operations of the ngVLA; it may create some small cost savings that will be used to create additional support to the guard/custodial staff at the VLA; it will also offer flexibility to the operator staff to avoid dangerous driving conditions.

SCHEDULE: For safety reasons, we require two persons on site at all times. Turn-over in the guard/custodial staff has left that group short-handed, so the operator continues to serve as the second person on site.

RISK & MITIGATION: The risk of not meeting this goal delays the transition of the evening and night shifts of the VLA operators to the DSOC. Although desirable, remote operations can be implemented at a later date, when resources are available, or if there are continued difficulties in hiring guards.

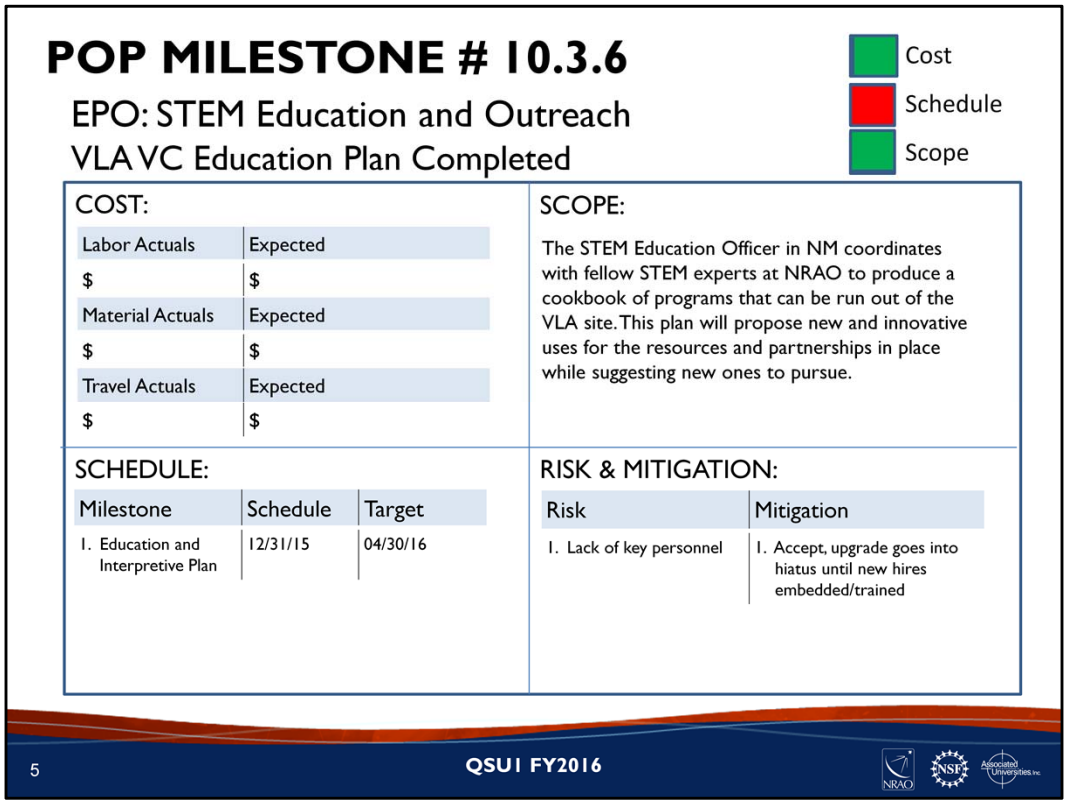


COST: Effort is funded from CDL research account

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

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.

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.

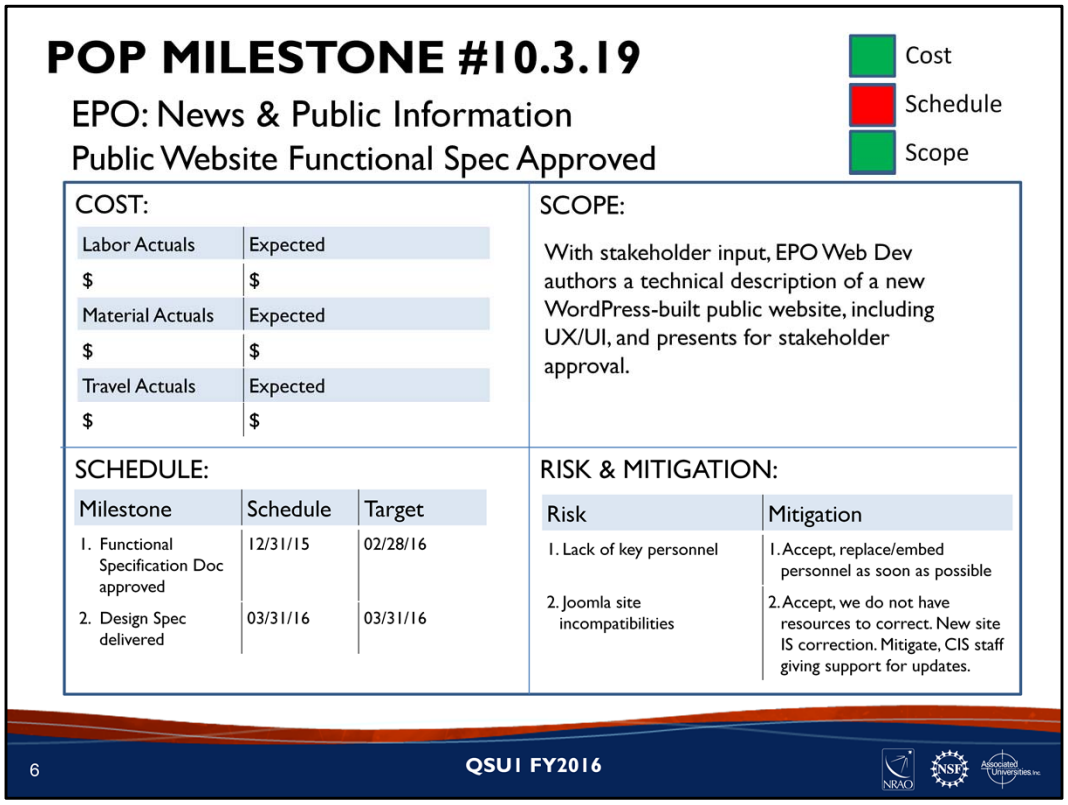


COST: EPO funds this activity at a higher WBS level. Costs are not tracked for this milestone.

SCOPE: The STEM Education Officer in NM coordinates with fellow STEM experts at NRAO to produce a cookbook of programs that can be run out of the VLA site. This plan will propose new and innovative uses for the resources and partnerships in place while suggesting new ones to pursue.

SCHEDULE: The NM STEM Education Officer is also the Gift Shop supervisor, and unexpected but acute personnel/retail issues this quarter have demanded priority. That said, the draft plan is already underway, and we will pick it back up as soon as the shop is stabilized.

RISK & MITIGATION: Lack of key personnel is always a risk, and so we accept this, knowing that it puts this aspect of the project into hiatus until we can hire/train talented staff. Recruitment for an experienced STEM Dev officer is underway, and this position will contribute to this milestone.

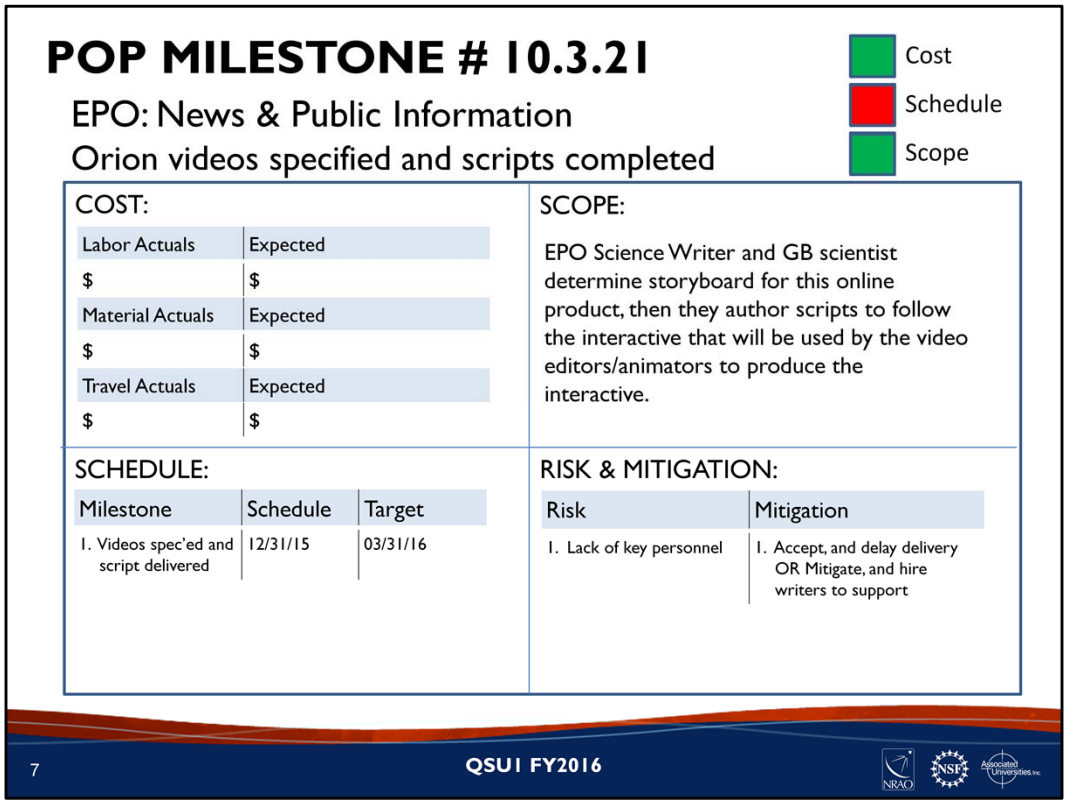


COST: EPO funds this activity at a higher WBS level. Costs are not tracked for this milestone.

SCHEDULE: The Web Dev for EPO did not come on board until the end of October, so schedule is shifted from originally specified. However, the draft is underway, expected delivery in mid-Q2.

SCOPE: With stakeholder input, EPO Web Dev authors a technical description of a new WordPress-built public website, including UX/UI, and presents for stakeholder approval.

RISK & MITIGATION: With only one web developer as our resource, the loss of this resource is our greatest risk. We accept this, and hire/train as effectively as possible. Also, the Joomla site is being maintained, but retains incompatibilities with search engines and mobile platforms. We have to accept this, because we do not have access to developers who can code the fixes, but we mitigate with the help of CIS staff who are keeping it updated and security-tight.

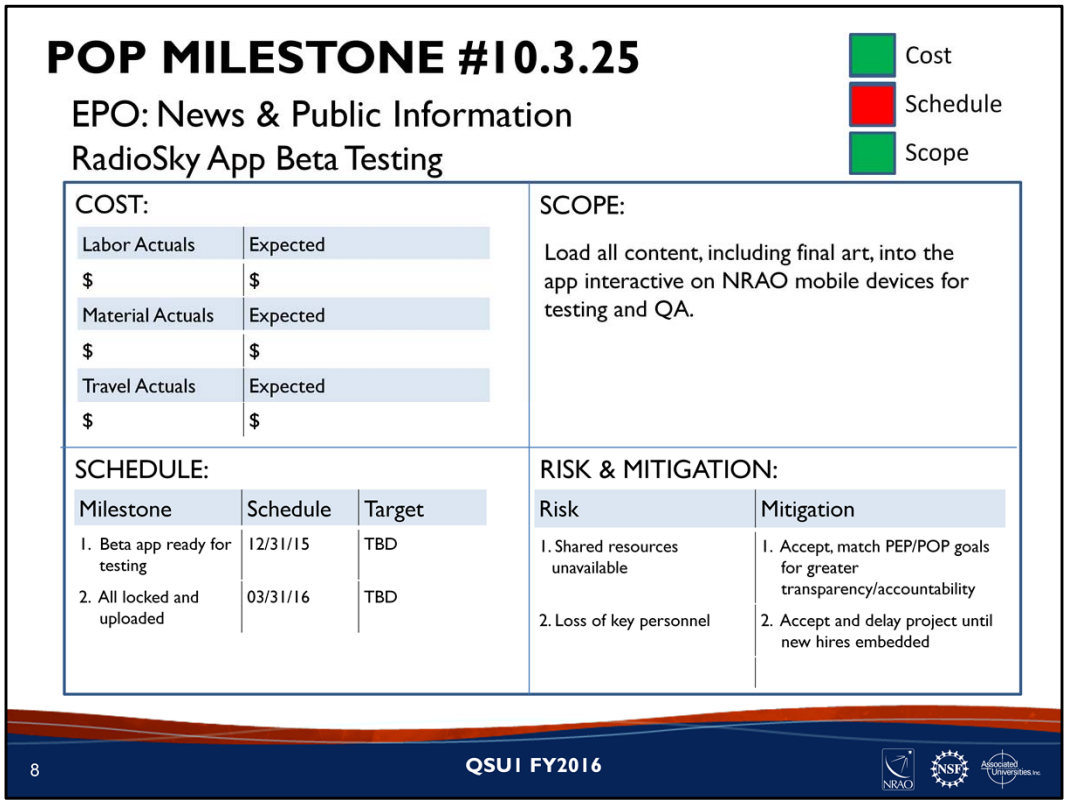


COST: EPO funds this activity at a higher WBS level. Costs are not tracked for this milestone.

SCOPE: 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.

SCHEDULE: EPO Science Writer is also the Interim AD for EPO. Demanding and critical AD duties have taken priority over Science Writer duties. In addition, the degree of writing partnership with a colleague in GB is no longer possible due to his reduced hours. Staffing additions/changes this coming quarter will aid this milestone to be on track for return of assigned video producer who is on leave until March, anyway.

RISK & MITIGATION: Lack of key personnel is the issue here, and we accept that it will delay this milestone. We now have a science writer on contract, and recruitment is underway for an experienced STEM educator.

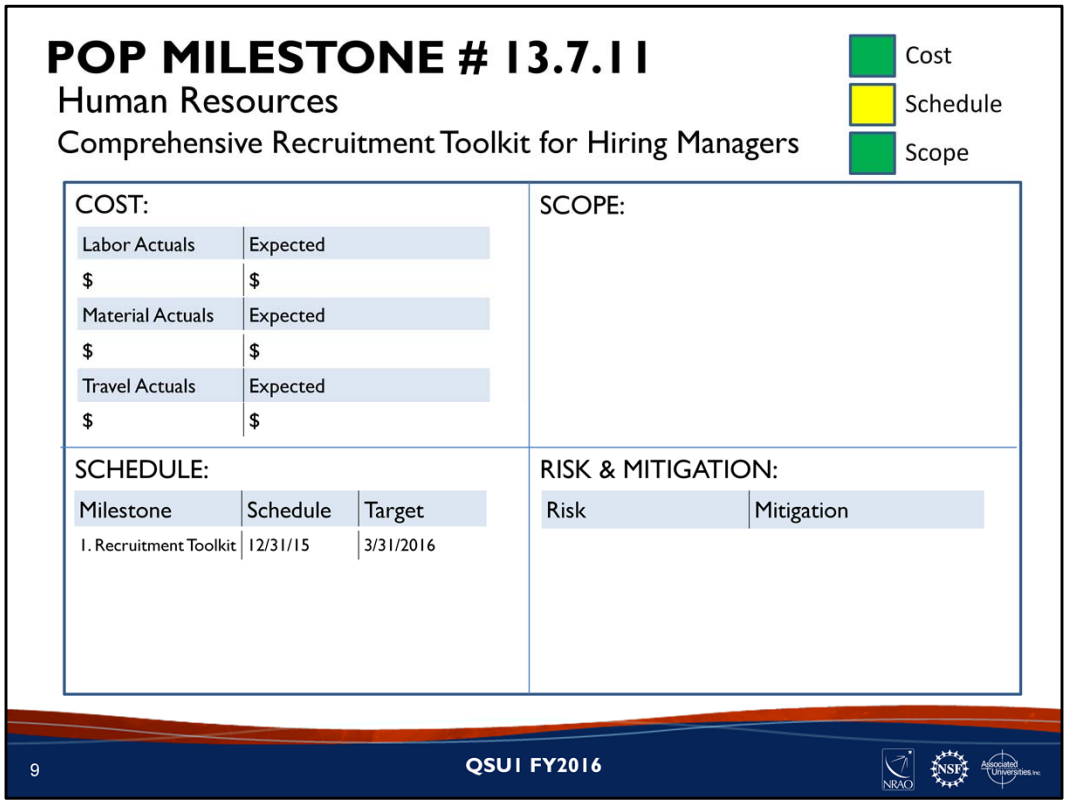


COST: EPO and DMS fund this activity at a higher WBS level. Costs are not tracked for this milestone.

SCHEDULE: The milestone is typically reached by coordinated effort between EPO and DMS; however, the GBT and VLA pipelines, transition planning, plus VEGAS spectrometer real time data display projects have been given higher priority by supervisors of the developers assigned to this project.

SCOPE: Load all content, including final art, into the wireframe app interactive for testing and QA.

RISK & MITIGATION: Sharing resources across two busy departments is fraught with compromise. We accept that the data pipeline takes precedence over our fledgling app activities. In future, we will think more carefully about milestones that require shared resources. Loss of key personnel is a common threat to our projects, and we accept that we cannot afford to hire contractors for this work at this time.



COST: N/A

SCOPE: N/A

SCHEDULE: Hiring Manager Toolkit has been designed. Needs to be socialized with HR Team and Coordination Group. Expected implementation by 3/31/16. Due to multiple competing, Observatory-wide HR initiatives (PEP, salary review, CDL recruitment, training, etc.) the toolkit guide was not a top priority.

RISK: N/A

North American ALMA Development Program

FY2016, Quarter 1 – Program Status

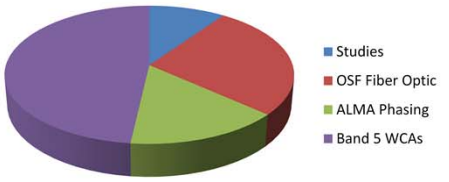
Bill Randolph, Program Manager

11 February 2016

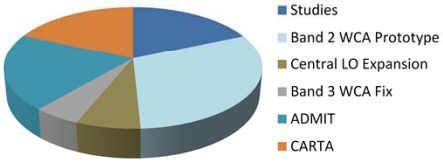
NA ALMA Development Program

Program Overview

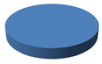
Cycle	Studies	Projects
1	**8**	**3**
2	**6**	**5**
3	**7**	**0**
4	TBD	TBD



Cycle 1 Total $6.7M



Cycle 2 Total $4.9M



Cycle 3 Total $1.2M

Program has accumulated approximately $6.4M in uncommitted funds.

NA ALMA Development Program

North American ALMA Science Center

Financial Status

Actual costs incurred from inception through 31 December 2015

Studies	Budget ($K)	Commited Budget ($K)	Expended Budget ($K)	Balance ($K)	Uncommitted Budget ($K)	FY2016 ($K)				New Cooperative Agreement FY2017 ($K)				FY2018 ($K)				FY2019 ($K)			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Cycle 1	500.0	482.5	494.0	-11.5	17.5																
Cycle 2	1,000.0	895.2	754.8	140.4	104.8	14.90															
Cycle 3	1,000.0	1,166.4	0.0	1,166.4	-166.4			0.29	0.29	0.29	0.29										
Cycle 4	TBD																				
Studies Totals ($K)	**2,500.0**	**2,544.1**	**1,248.8**	**1,295.3**	**-44.1**	14.90	0.00	0.29	0.29	0.29	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Projects	Budget ($K)	Commited Budget ($K)	Expended Budget ($K)	Balance ($K)	Uncommitted Budget ($K)	FY2016 ($K)				FY2017 ($K)				FY2018 ($K)				FY2019 ($K)			
						Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Cycle 1	1,792.8	6,232.0	5,474.9	757.1	-4,439.2	80.60															
Cycle 2	5,997.7	3,960.3	3,286.4	673.9	2,037.4	750.50															
Cycle 3	8,882.6	0.0	0.0	0.0	8,882.6																
Cycle 4	TBD																				
Projects Totals ($K)	**16,673.1**	**10,192.3**	**8,761.3**	**1,431.0**	**6,480.8**	831.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

PROGRAM TOTALS ($K)	19,173.1	12,736.4	10,010.1	2,726.3	6,436.7

Figures exclude FY2017 funds

Development Cycle 4 Award Pool to be determined.

NA ALMA Development Program

Cycle 4 Call for Study Proposals - Calendar

Milestone	Date
Release of Cycle 4 Call for Study Proposals	2016 March 01
Informational Meeting (Webinar)	2016 March 09
Notice of Intent	2016 March 15
Proposal Deadline (closing date)	2016 May 02
Notification of Awards	2016 July 30
Validity Date of Proposals	2016 September 30
Study Completion Date	2017 September 30

On schedule for the Study Call Release Date.

NA ALMA Development Program

Cycle 4 Call for Project Proposals – Tentative Calendar

Milestone	Date
Release of Cycle 4 Call for Project Proposals	2016 March 01
Informational Meeting (Webinar)	2016 March 09
Notice of Intent	2016 March 15
Proposal Deadline (closing date)	2016 June 30
Notification of Awards	2016 December 16
Validity Date of Proposals	2016 December 16
Project Completion Date	2018 January 02

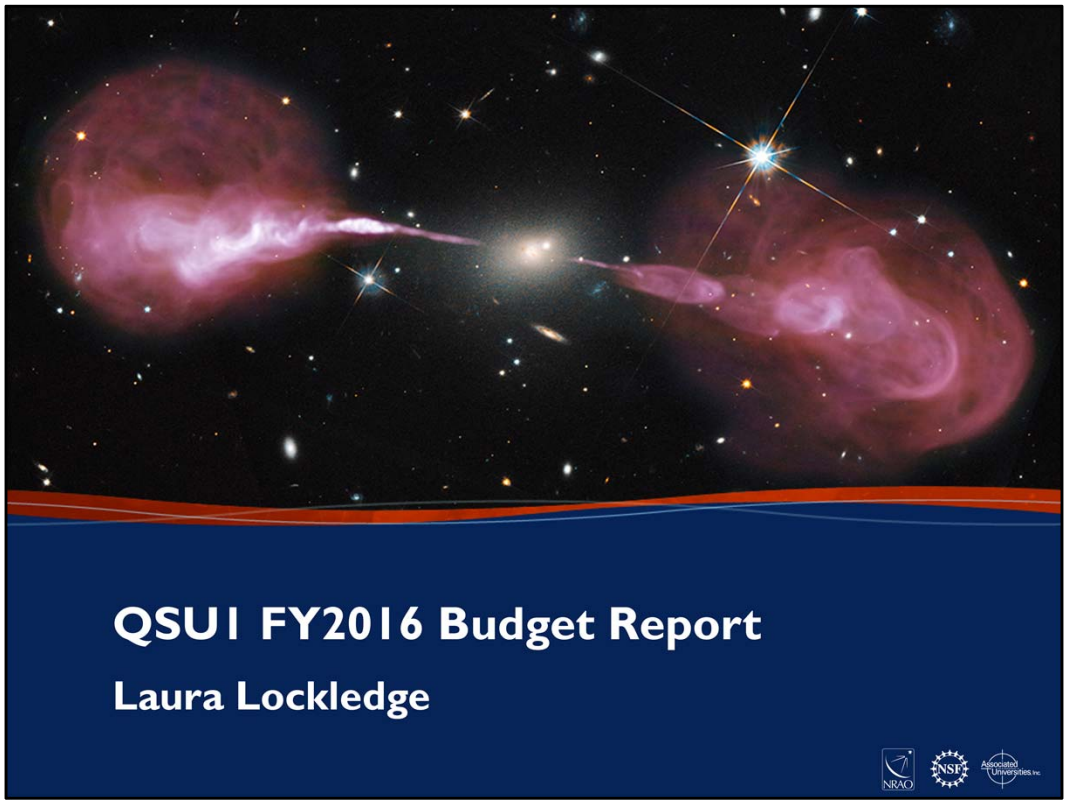
Project schedule must factor in prolonged JAO review & approval cycle.

NA ALMA Development Program

Summary

- **Program has accumulated approximately $6.4M in uncommitted funds.**
- **Development Cycle 4 Award Pool TBD**
- **On schedule for Cycle 4 Call for Study Proposals**
- **Final schedule for Cycle 4 Call for Project Proposals TBD**
- **Issues:**
  - FY2017 funding level
  - Band 2 technology readiness
  - Review Committee workload capacity
  - Cycle 4 call strategy (combined call for Studies and Projects?)
  - Status of unfunded Cycle 3 Studies
  - Implementation cost sharing with JAO

The Program is healthy, but lagging in its ALMA value-balancing commitment.



QSU1 FY2016 Budget Report

Laura Lockledge

NRAO Q1

- Overall Issues
  - Benefits – Running marginally ahead of budget for current fiscal year, effect of y/e accrual + Q1 is 4th quarter of the benefits year.
  - Raises to be implemented effective in January/February.
  - Preparing for contract closeout. Guidance to be issued in February.
  - Impact/timing of ICC status change unclear.

FY16 YTD by Major WBS Category NRAO Ops – Q1

	FY16 POP Budget	FY16 Rev. Budget	FY16 YTD Expenses	YTD % Rev Budget
NSF	41,730	41,730	10,430	25%
Telescope Time Sale	3,596	3,596	337	9%
Carryforward/Other	3,138	4,509	4,087	91%
Total CSA-1 Revenue	**48,464**	**49,835**	**14,854**	30%
Telescope Ops	18,723	18,653	4,370	23.4
Development	3,535	3,535	693	19.6
Science Ops	5,860	6,005	1,146	19.1
Admin Services	15,168	16,378	3,486	21.3
Director's Office	3,677	3,568	715	20.0
FY15, Total	**46,964**	**48,139**	**10,411**	**21.6**
FY15 CSA-1 Net	**1,500**	**1,696**	**4,444**	

- Plurality of telescope time sale revenue is associated with Breakthrough Foundation, time does not begin until January.
- Difference between Carryforward Budget & Revised is open commitments.

FY16 YTD by Major WBS Category ALMA Ops – Q1

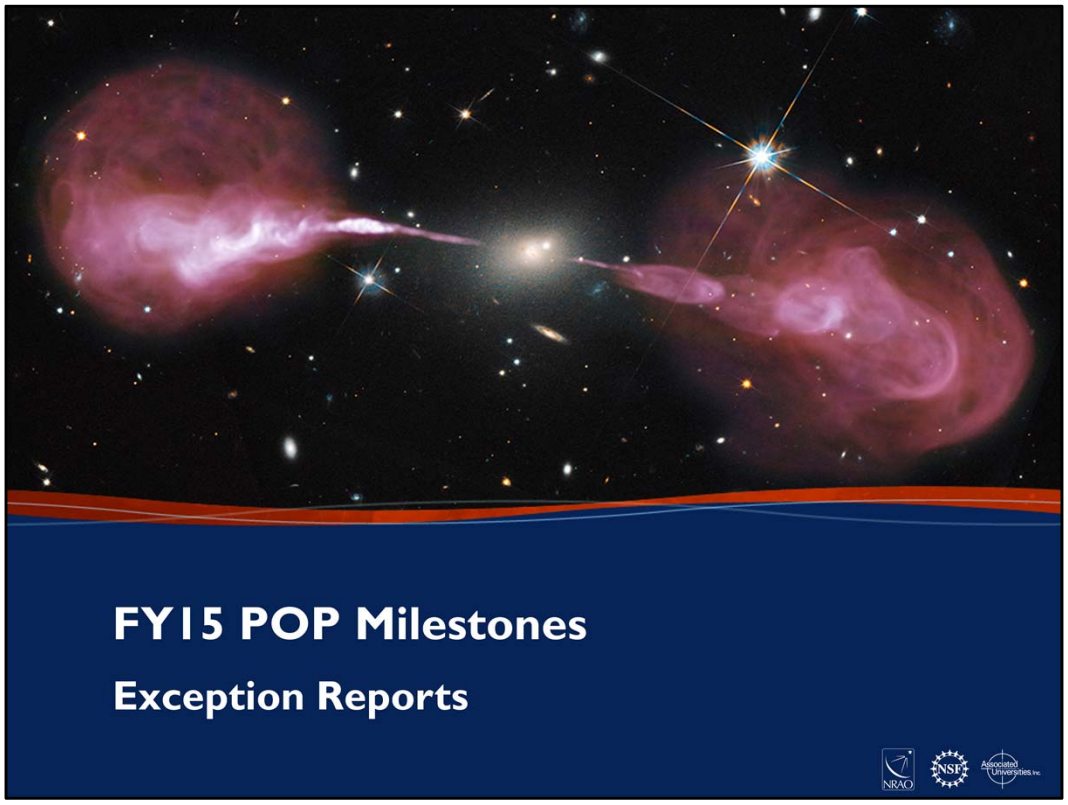
	FY16 POP Budget	FY16 Rev. Budget	YTD Expenses	YTD % Rev Budget
Telescope Ops	22,851	24,219	3,475	13.90%
Development	5,478	10,231	403	3.90%
Science Ops	7,204	8,172	1,238	15.10%
Admin Services	5,013	5,029	957	19.00%
Director's Office	3,447	3,503	640	18.30%
FY16, Total	**43,993**	**51,154**	**6,713**	**12.90%**
Development Reserve	4,073			
Open Commits	3,521		3,981	
C/F for FY16 Fuel	1,800	1,800		
C/F for Future Years	281			
PPS Budget Adjustment	(714)			
ALL ALMA Resources	**52,954**	**52,954**	**10,694**	**19.90%**

- Development awarded $1.1M in studies, Q1
- Telescope Ops rec'd $2.1M credit from NAOJ for FY16 activity.

FY16 YTD by Major WBS Category ICC Ops – Q1

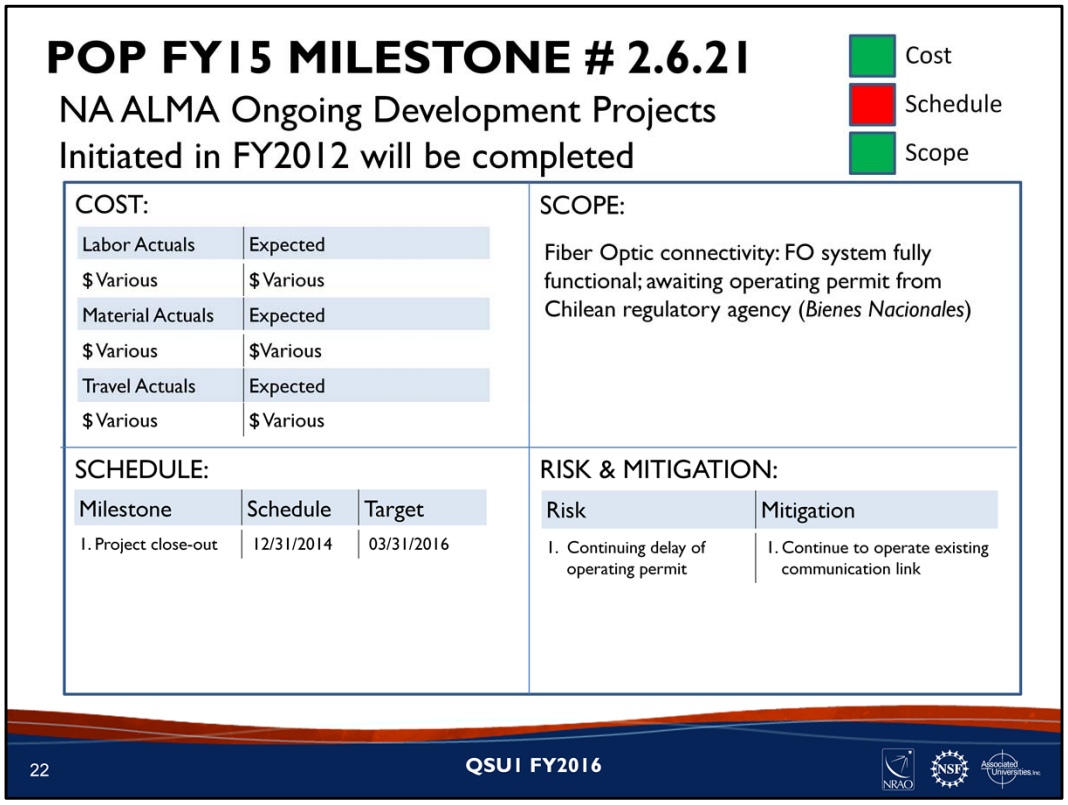
	FY16 POP Budget	FY16 Rev. Budget	FY16 YTD Expenses	YTD % Rev Budget
Telescope Ops	101	101	22	21.8%
Development	713	719	179	24.9%
Science Ops	1,924	1,930	452	23.4%
Admin Services	11,004	11,236	2,712	24.1%
Director's Office	729	732	143	19.6%
FY16, Total	**14,471**	**14,718**	**3,508**	23.8%
Admin Recoveries	**13,153**	**13,400**	**2,912**	21.7%
External Recoveries	**1,318**	**1,318**	**247**	18.7%
FY16 ICC Net	**0**	**0**	**349**	

- ICC currently under-recovered by $349K due to lagging spending in the CSA's & low external recoveries.



FY15 POP Milestones

Exception Reports

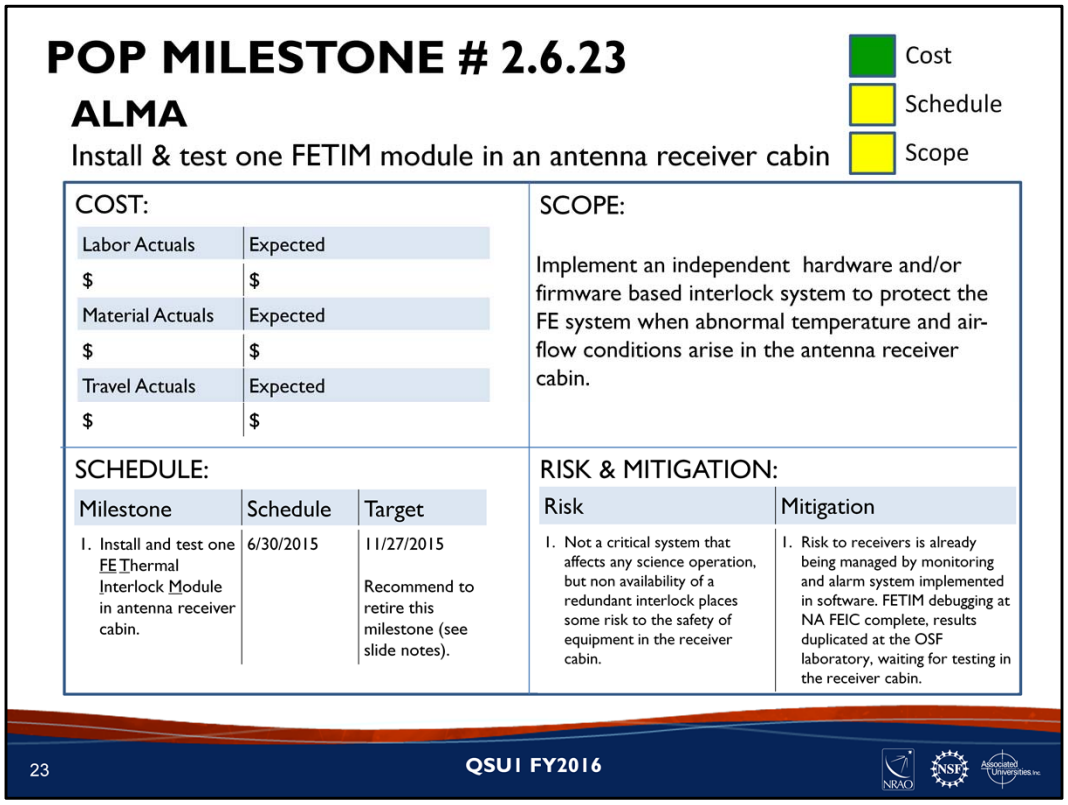


COST: N/A

SCHEDULE: Fiber Optic Connectivity: System is fully functional. We are waiting for Silica (FO contractor) who is actively working on the transfer of the access rights from Gas Atacama Silica. This is done with the Chilean competent authority (Bienes Nacionales).

SCOPE: N/A

RISK & MITIGATION: While awaiting the Permits for the Fiber Optic Connection we will continue to fund and use the current microwave shot at no additional cost to the project.



COST: Not applicable, hardware is already delivered, might need firmware/software updates.

SCOPE: The FETIM was tested at the OSF laboratory by the NA team visiting the OSF in March 2015, and was found to be operational. However, when the staff at the OSF installed it on an antenna they could not turn on the turbo pump for FE 059, (same FE was used for FETIM testing earlier). The problem seems to be associated with the removal of the FETIM to compressor M&C interlock cable, which is not present on the antennas (ESO deliverable). Although unexpected, the possibility of such an error was not recognized earlier and was not tested for previously or during the visit.

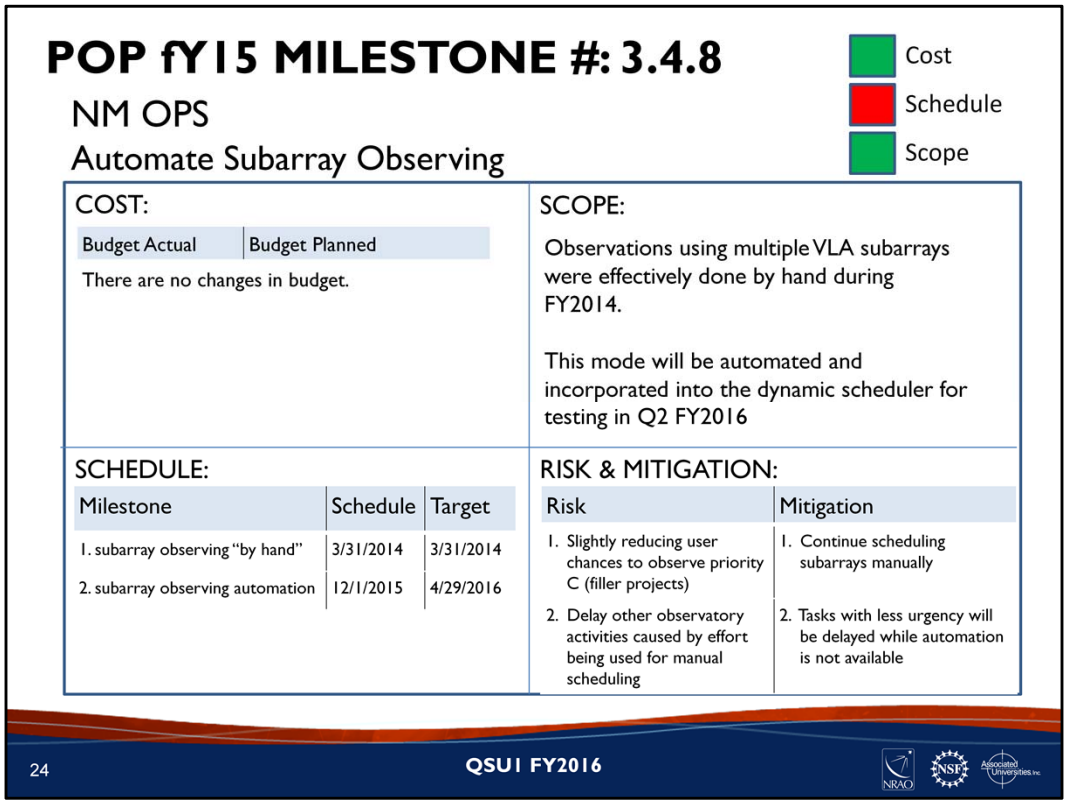
During a subsequent visit to the OSF during the reporting period (September 2015), the FE team installed and tested the FETIM on FE-01 using LabVIEW software, and confirmed that it worked identically to the prior tests at the NTC. Follow up testing with CCL was carried out by JAO staff (see JIRA ticket FETIM-13) successfully on this installation in the laboratory. The next step to carry out an installation in the receiver cabin and compare the results with this laboratory installation was initiated (see JIRA ticket FETIM-14). One FETIM was installed in FE-22 and evaluated to function correctly at the OSF. Subsequently, FE-22 has been installed in DV10, and follow up work continues on debugging the cause of the turbo pump start-up problems at the high site (which were not seen at the OSF laboratory during previous testing).

We now await testing at the OSF (in an antenna), but this work is delayed owing to scheduling issues outside of NA IET control. Testing was set to resume around 12 Jan with FE-01 in DV-08, but was delayed due to the DV-08 move to the high site. This work will have to be completed using the next antenna that is brought down to the OSF.

SCHEDULE: New Target date of 11/27/2015 was provided in the 2015QSU3 update, and while progress was made in this quarter and we retired a suspected risk by demonstrating the functionality (in the OSF laboratory) for the desired configuration with an absent interlock cable using laboratory as well as ALMA CCL software, the letter of the milestone has not yet been met for reasons beyond NA IET control. NA IET

has provided all of the assistance that it can for this low priority (from JAO perspective) task. Recommend to retire this milestone, since no problem has been identified from all of the tests carried out till date. The remaining work of actually commissioning this interlock is to be considered routine and is heavily dependent of JAO priorities and scheduling.

RISK & MITIGATION: Explained on the slide.



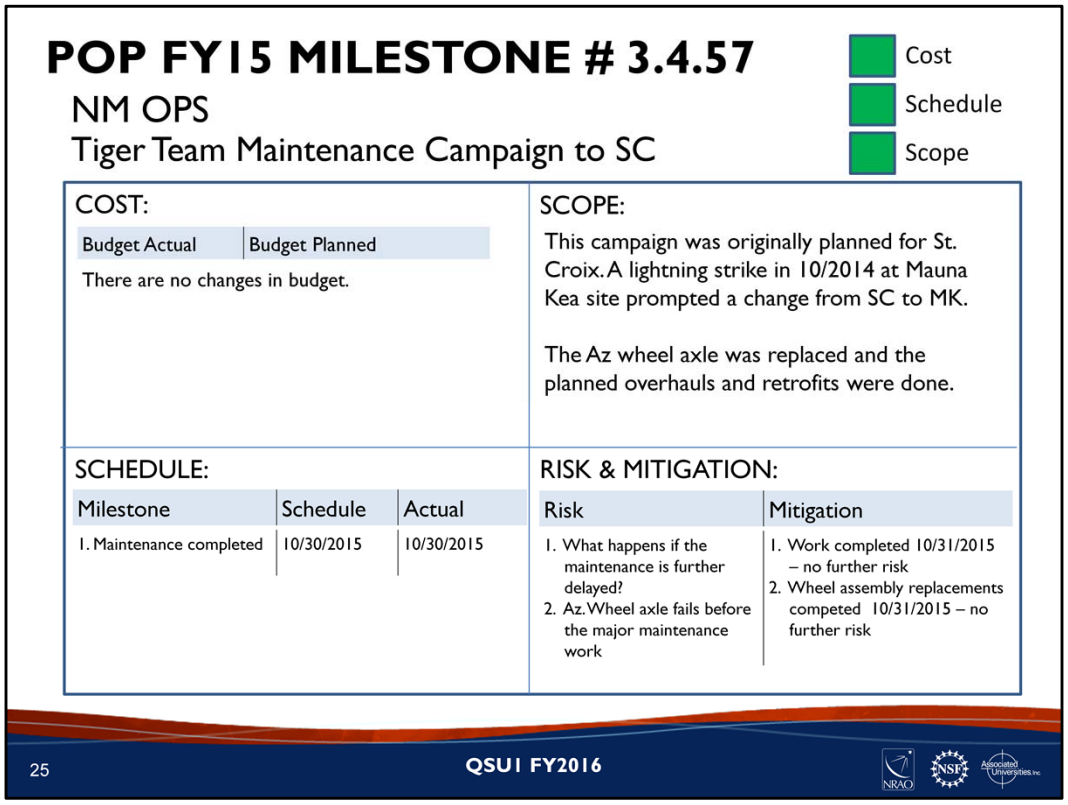
COST: N/A

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. This may be the case when an observer has asked to divide up the array for a single project to observe a source simultaneously in multiple bands or to observe multiple different sources simultaneously that do not need the full array, or when one antenna is split off from the main array for inclusion in a VLBI array by another user (though this last option, also called "Y1", is not currently offered for general observing).

SCHEDULE: Observations using multiple subarrays were stabilized during FY2014, but must still be scheduled by hand and cannot go through the dynamic scheduler. Work on automating subarrays has been slower than planned, mostly because of staffing issues in the SSA software group, but we continue to schedule multiple subarray observing by hand quite effectively. Progress rate with the new SSA hires indicates that we will finish this milestone in 4/29/2016 now.

RISK & MITIGATION:

1. The risk to users of not having subarray observing automated is a slightly reduced chance of observing for priority C (filler) projects. Mitigation is to continue scheduling subarrays manually.
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.

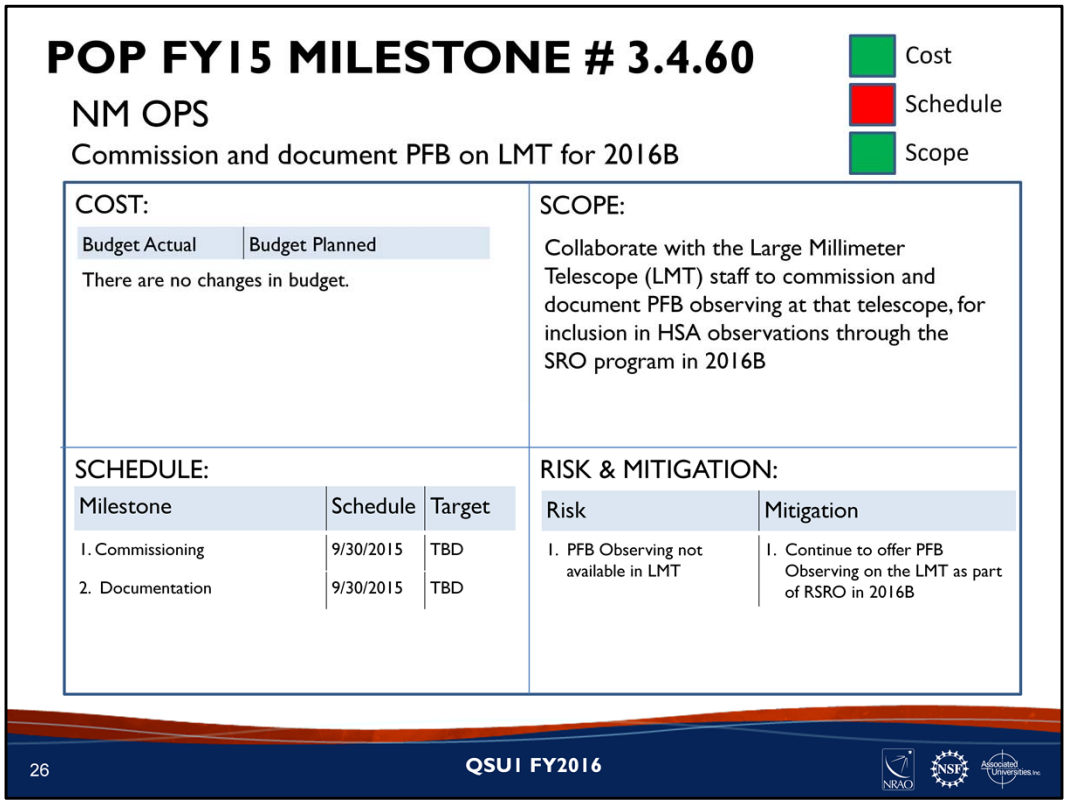


COST: The cost to delay the MK visit negligible. Some minor, additional costs may be incurred if changes to ticket dates are made after tickets are purchased. The cost for the VLBA Major Maintenance visits are tracked in the NM Ops budget

SCOPE: St. Croix was the site originally planned for FY15 major maintenance. A lightning strike in Oct. 2014 at the Mauna Kea site prompted a change from SC to MK when, even after extensive repairs to damaged systems, it was determined that some electronic components were behaving unreliably. This station is in daily use for USNO observations and we wanted to maintain optimal reliability for this station.

SCHEDULE: The original schedule for the visit was set for late September. However, the move from A to D array on the VLA and the VLA electrical maintenance work required some of the same people, so the trip to MK was delayed. The VLA electrical work was delayed due to personnel issues (electrical engineer resigned in July) and delays in contracting training for the electricians in preparation for the VLA work. It was more convenient to delay the VLBA Tiger team visit than to delay the other work. The work was begun Oct.18, 2015 and completed Oct.31, 2015.

RISK & MITIGATION: All retired

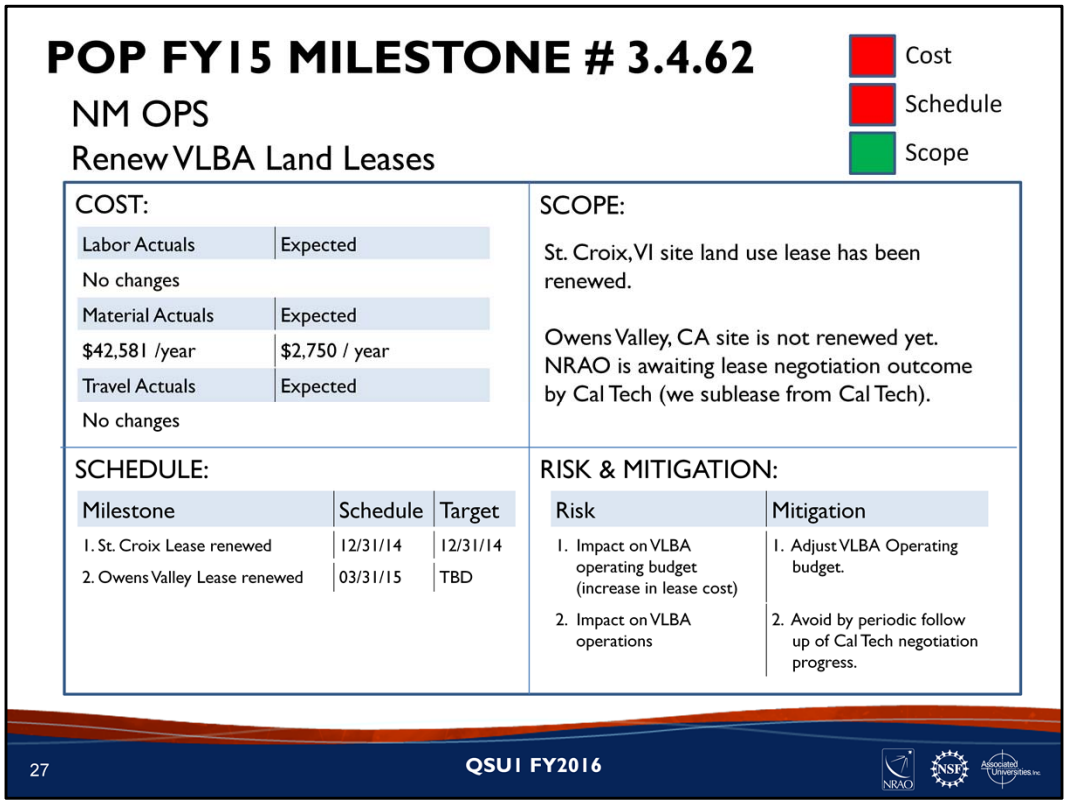


COST: N/A

SCOPE: The Polyphase Filterbank (PFB) observing system provides sixteen 32 MHz channels with a fixed 2048 Mbps recording rate. The channels can be selected flexibly between two VLBA IF inputs. Channel placement is restricted to 32 MHz steps along the frequency axis. This milestone tracks the collaboration with the Large Millimeter Telescope (LMT) staff to commission and document PFB observing at that telescope, for inclusion in HSA observations through the SRO program in 2016B

SCHEDULE: With further experience of the VLB observing system on the LMT this year, it has become clear that its digital backend (DBE) and its recording system (both provided by Haystack Observatory) are not fully compatible with those of the VLBA, and that new hardware will be required to make it compatible. Further commissioning of this system has been put on hold while the LMT seeks funding to acquire this hardware. Unfortunately, the CONACYT rejected last LMT proposal to fund this, but they continue to seek alternatives. In the mean time, access to the LMT as part of the HSA will continue to be offered through the VLBA Resident Shared Risk Observing program for 2016B.

RISK & MITIGATION:
1. PFB Observing not available in LMT: Continue to offer as part of RSRO in 2016B.

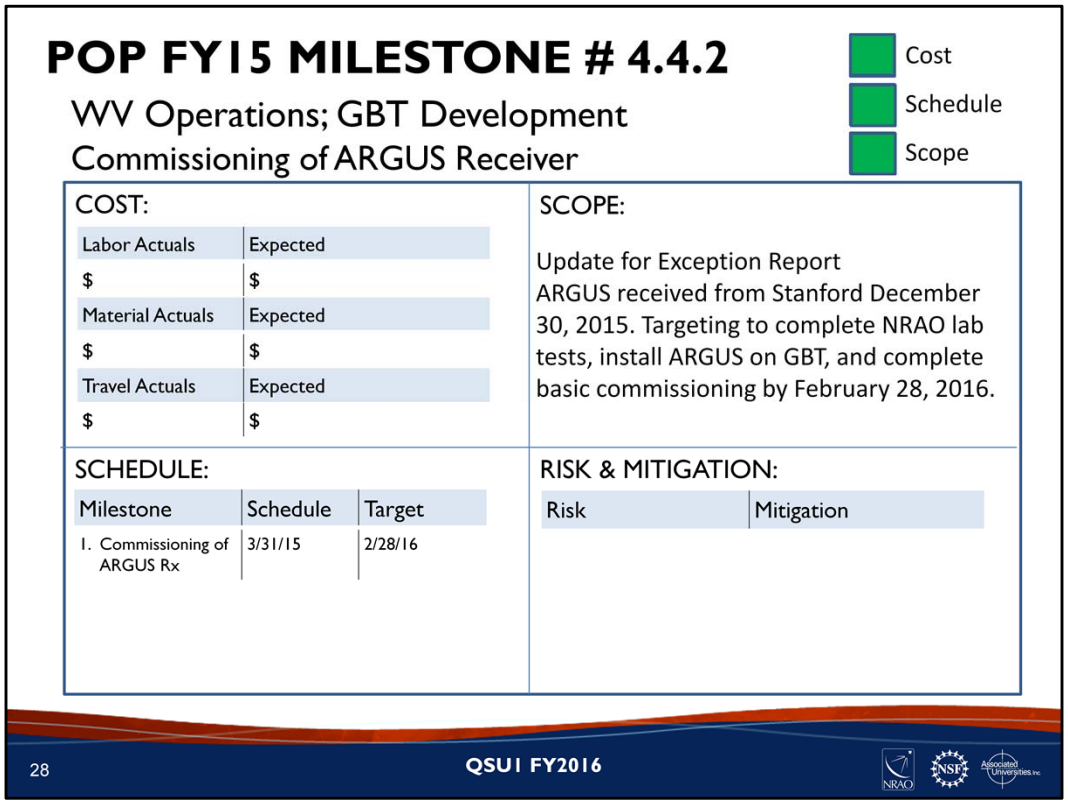


St Croix Lease: The lease has been signed by all parties. The lease is for 10 years with two 5 year options. Its cost increased from $2,750/yr to $42,581/yr.

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.



COST: N/A

SCOPE: N/A

SCHEDULE: The project executed a Change Request in October 2015 for schedule extension because the Stanford led collaboration was late in their integration process. They encountered technical problems that made the integration take longer than originally planned, delaying the delivery of the receiver to NRAO. Based on the change request, the project is on track based on the revised schedule for FY2016 Quarter 1.

RISK & MITIGATION: N/A

Exception Report

Office of Diversity & Inclusion

Summer School Internships in Chile

New Initiative

In collaboration with the NRAO/AUI office in Santiago, two Chilean undergraduate students were identified, and have begun NRAO-sponsored summer internships in Santiago.

- Mentors are Observatory scientists
- Internship period January 11- February 22, 2016

As part of our new initiative to broaden participation in Chile, an NRAO representative will also:

- Give a series of lectures at University Antofagasta to identify one or two students to serve internships at the Observatory
- Form a committee to define the terms "underserved" and "underrepresented" in the context of broadening participation activities in Chile

Exception Report

Education & Public Outreach

Education and Public Outreach

STEM Formal Education

- Renovation of N^2I^2: New Mexico Tech and NRAO Instructional Interferometer underway, curriculum under review and update
- Pocahontas County Math Field Day
- Pocahontas County Science Fair
- STEM-ID (New PSC) underway
- RET grant proposal to NSF Engineering directorate
- 20 unique overnight student groups at 40ft for observations
- 7 Starlab lessons in Rio Rancho, 138 students
- 5 Starlab lessons in Albuquerque, 129 students
- 6th GTTP workshop with Faculty of Education and Institute of Astrophysics from Pontificia Universidad Católica de Chile

Education and Public Outreach

STEM Formal Education

Education and Public Outreach

STEM Informal Education

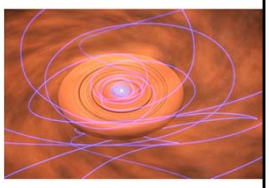
- 7005 visitors to GB (up 38% from 2014)
- 5658 visitors to VLA (up 7% from 2014)
- 4-H National Science Experiment in GB
- Family Science Lab in GB
- Elderhostel Workshop near Blacksburg, VA
- Fall Autumn House at VLA
- Enchanted Skies Star Party nr VLA
- First Saturday Tours at VLA
- Breakthrough Listen tour under development at Green Bank
- New exhibit inside 140ft control room
- NRAO science and technology trading cards

Education and Public Outreach

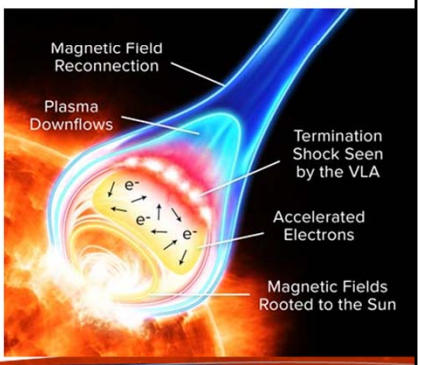
STEM Informal Education

Education and Public Outreach

Media and Online Engagement

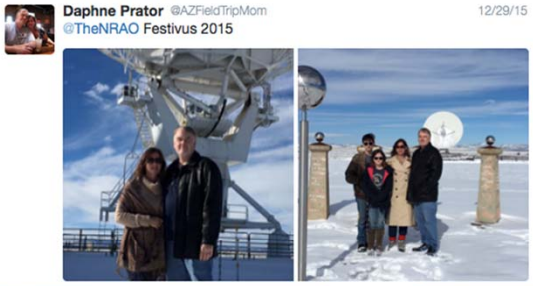


- 19 press releases and announcements
  - 8 ALMA, 3 GBT, 3 VLA, 5 People and Events
- ~1500 unique visitors to public website every day
- ~1000 reached via social media every day, 66,500 total followers



Education and Public Outreach

Media and Online Engagement



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