***Title*:** QSU3 FY2017	***Author*:** Thisdell/ADs	***Date*:** 09/05/2017
NRAO Doc. #: PMD00218		***Version*:** Final

National Radio Astronomy Observatory

Quarterly Status Update 3 FY2017

April – June 2017

PREPARED BY	ORGANIZATION	DATE
Thisdell/ADs	Director's Office	09/05/2017

APPROVALS (Name and Signature)			ORGANIZATION
Nicole Thisdell	Nicole Thisdell	Digitally signed by Nicole Thisdell Date: 2017.09.06 08:44:10 -04'00'	NRAO
Tony Beasley		Digitally signed by Tony Beasley Date: 2017.09.06 13:09:14 -04'00'	NRAO
Dave Curren	David Curren	Digitally signed by David Curren Date: 2017.09.07 14:38:06 -04'00'	AUI

NRAO Quarterly Status Update
(QSU3 FY2017)
April - June 2017

				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section	**POP Milestone**	**Milestone**	**Completion Date**	**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									
	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	12/31/2016									
			3/31/2017									
			6/30/2017									
	4	The NAASC will provide a technical secretary(s) that will attend the ALMA Proposal Review and Time Allocation Committee meeting	6/30/2017									
	5	The NAASC will review all the Phase 2 Scheduling Blocks submitted by PIs for ALMA Cycle 4	12/31/2016									
			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	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 (C5R1) requirements	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	6/30/2017									
	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	12/31/2016									
			3/31/2017									
			6/30/2017									
	18	NAASC staff will take part in the Phase 3 testing of the AAT/PPI	3/31/2017									
	20	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									
	21	NAASC staff will act as CSs and liaisons to the NA ALMA PI observing programs	12/31/2016									
			3/31/2017									
			6/30/2017									
	22	NAASC staff will initiate the ALMA Ambassadors program and train the scientific community to run outreach events	12/31/2016									
			3/31/2017									
	23	NAASC staff will host 2 data reduction workshops in Charlottesville	3/31/2017									
			6/30/2017									
	24	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									
		Developments										
	26	FY2016 (Cycle 4) Studies Complete	6/30/2017									
	27	FY2017 (Cycle 5) Call for Project Proposals (CfPP)	12/31/2016									
	28	FY2017 (Cycle 5) Call for Study Proposals (CfSP)	3/31/2017									
		Maintenance, Renewal, and Warranty Claims										
	30	Front End Handling Vehicles delivery to the JAO	3/31/2017									
		NRAO-Chile Office										
	33	Implementation and monitoring of the 2015 local staff collective contract	12/31/2016									
			3/31/2017									
			6/30/2017									
	34	Preparations for 2018 collective bargaining	3/31/2017									
	35	Periodic interaction with local staff on payroll matters	12/31/2016									
			3/31/2017									
			6/30/2017									
	36	Team building workshops focused on vision, mission, objectives and performance metrics	12/31/2016									
			3/31/2017									

NRAO Quarterly Status Update
(QSU3 FY2017)
April - June 2017

				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section	**POP Milestone**	**Milestone**	**Completion Date**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**
	37	Oversight of environmental issues	12/31/2016									
			3/31/2017									
			6/30/2017									
	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									
	42	NINE: implementation of hub	6/30/2017									
3.5		**Very Large Array**										
		VLA Science Operations										
	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									
	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									
	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									
		VLA Array Operations										
	10	Reconfigure array to D configuration	3/31/2017									
	11	Reconfigure array C configuration	6/30/2017									
	13	Complete VLA Operators cross-training on the VLBA	3/31/2017									
		VLA Development										
	16	Conduct VLA Sky Survey Critical Design Review	3/31/2017									
	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									
	24	Develop VLA 4 Band implementation plan	6/30/2017									
		VLA Antenna Maintenance										
	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									
		VLA Site Infrastructure Maintenance										
	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									
		VLA Technical Upgrades and Enhancements										
	42	L-band solar upgrade, install 4 additional receivers (#11 - #14) with full RF upgrade	3/31/2017									
	44	Ku-band solar upgrade, install one additional receiver (#6) with solar Tcal path plus 20 dB switched attenuators	3/31/2017									
	46	FE card cage upgrades, complete replacement of all legacy card cages (53 remaining)	6/30/2017									
		VLA Observing Capability Enhancements										
	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									
		VLA Operational Enhancements										
	54	Integrate automated subarray observing into operations	3/31/2017									

NRAO Quarterly Status Update
(QSU3 FY2017)
April - June 2017

				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section	**POP Milestone**	**Milestone**	**Completion Date**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**
4.3		**Central Development Laboratory**										
		Repair, Maintenance, Production, Support										
	1	Evaluate Band 6 mixer with LNF preamp and gain-slope equalizer	3/31/2017									
	2	Build and test twelve (12) Band 1 amplifiers	12/31/2016									
			3/31/2017									
			6/30/2017									
		Research and Development										
	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	Submittal of 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, I/Q 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									
	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		**Science Support and Research**										
		Telescope Time Allocation										
	1	CfP for semester 2017B	3/31/2017									
	3	SRP and tech review process, semester 2017B	3/31/2017									
	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									
	11	Update documentation for CfP and tools 2017B	3/31/2017									
	13	TTA SW tool suite requirements	6/30/2017									
		Science Users Support										
	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									
	23	Student observing support selection	12/31/2016									
	24	Student observing support selection	6/30/2017									
	25	Reber predoc selection	3/31/2017									
		SSR Services										
	27	Bibliometrix applications development	12/31/2016									
	28	Bibliometrix beta release	3/31/2017							Cancelled		
	29	Bibliometrix production release	6/30/2017							Cancelled		
		Scientific Staff Support										
	30	Scistaff performance review	12/31/2016									
	31	Scistaff promotions review	3/31/2017									
	32	Post-tenure reviews	3/31/2017									
6.4		**Data Management & Software**										
		Scientific Information Services										
	1	Upgrade of NAASC Cluster	3/31/2017									
	2	Enforced Lustre storage quotas	6/30/2017									
	3	Processing workflow overview	6/30/2017									
	6	External computing service provider engagement	12/31/2016									
	7	Disaster recovery for Lustre storage	12/31/2016									
	8	Disaster recovery for Lustre storage	6/30/2017									
		ALMA System Software										
	9	ALMA Q2 Release	3/31/2017									
	12	Update Scheduling software	3/31/2017									
		VLA System Software										
	13	Deploy software to support Semester 2016B observing	3/31/2017									
	14	Deploy software to support Semester 2017A commissioning	3/31/2017									

NRAO Quarterly Status Update
(QSU3 FY2017)
April - June 2017

				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section	**POP Milestone**	**Milestone**	**Completion Date**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**
	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									
		Software Development										
	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									
	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									
	35	CI testing plan released	12/31/2016									
	36	CI testing implemented	3/31/2017									
	38	AAT/RPI build testing	3/31/2017									
7.4		**Program Management Department**										
		New Mexico Operations										
	1	NM Documentation Support	12/31/2016									
			3/31/2017									
			6/30/2017									
	2	NM PM/SE Learning Opportunities	12/31/2016									
			3/31/2017									
			6/30/2017									
	3	NM Proposal Development Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
	4	NM PM/SE Project Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
		Long Baseline Observatory										
	5	LBO Documentation Support	12/31/2016									
			3/31/2017									
			6/30/2017									
	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									
	10	LBO PM/SE Project Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
		CDL/ALMA										
	11	CDL Documentation Support	12/31/2016									
			3/31/2017									
			6/30/2017									
	12	CDL PM/SE Learning Opportunities	12/31/2016									
			3/31/2017									
			6/30/2017									
	13	CDL Proposal Development Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
	14	CDL PM/SE Project Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
		Green Bank Observatory										
	15	GBO Documentation Support	12/31/2016									
			3/31/2017									
			6/30/2017									
	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									

NRAO Quarterly Status Update
(QSU3 FY2017)
April - June 2017

				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section	**POP Milestone**	**Milestone**	**Completion Date**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**
	19	GBO Proposal Development Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
	21	GBO PM/SE Project Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
		DMS/CASA										
	22	DMS Documentation Support	12/31/2016									
			3/31/2017									
			6/30/2017									
	23	DMS Define CASA Development Processes	12/31/2016									
	24	DMS PM/SE Learning Opportunities	12/31/2016									
			3/31/2017									
			6/30/2017									
	25	DMS Perform Retrospective on CASA Processes	6/30/2017							Cancelled		
	27	DMS Proposal Development Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
	28	DMS PM/SE Project Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
		Headquarters										
	29	PMHQ Observatory-wide Documentation Support	12/31/2016									
			3/31/2017									
			6/30/2017									
	31	PM/SE Training/Workshop	12/31/2016									
			3/31/2017									
			6/30/2017									
	32	PMHQ PM/SE Project Leadership	12/31/2016									
			3/31/2017									
			6/30/2017									
8.5		**Education & Public Outreach**										
		STEM Education										
	1	Sister Cities Phase Two STEM development	3/31/2017									
	2	Sister Cities Phase Two STEM activities	6/30/2017									
	4	Three-element Teaching Interferometer pilots	3/31/2017				Cancelled					
	5	Third Dish Installation complete	12/31/2016									
	6	STEM Career Day at Dominion Virginia Electric	12/31/2016	Cancelled								
	7	10th Grade STEM Day at Piedmont Virginia Community College & Ruckersville STEM Expo	3/31/2017									
	8	Summer Camp Assessment Plan	3/31/2017									
		News and Media Relations										
	9	NASW Session Plan	3/31/2017									
		Multimedia Engagement										
	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									
		Visitor Center Operations										
	17	VLA Visitor Center Education and Interpretive Plan completed	6/30/2017									
	18	VLA Visitor/Education Center architectural schematic designs completed	6/30/2017									
9.4		**Computing & Information Services**										
	1	Business Process Review	3/31/2017									
	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									
	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		**Office of Diversity & Inclusion**										
		Diversity Council										
	1	Diversity Council Meeting	12/31/2016									
			3/31/2017									
			6/30/2017									
		Local and National Programs										
	2	SEDLE, LSAMP, AATF, NAC	3/31/2017									
			6/30/2017									

NRAO Quarterly Status Update
(QSU3 FY2017)
April - June 2017

				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section	**POP Milestone**	**Milestone**	**Completion Date**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**
	3	NAC Expansion	6/30/2017									
	4	Summer program orientations	6/30/2017									
		International Programs										
	7	ODI Chile undergraduate research experience recruitment	12/31/2016									
	8	ODI Chile undergraduate research experience initiated	3/31/2017									
	9	NINE program expansion	12/31/2016									
			3/31/2017									
			6/30/2017									
	10	Sister Cities	3/31/2017							Cancelled		
		Diversity & Cultural Awareness										
	11	DCA Program plan developed and implemented	12/31/2016									
			3/31/2017									
			6/30/2017									
11.7		**Human Resources**										
		Policy										
	1	Provide ongoing updates and develop and disseminate a Workplace Violence Prevention Policy in coordination with ESS	12/31/2016									
		Training & Development										
	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									
		Compensation										
	7	Implement new FLSA regulations	12/31/2016									
	8	Electronic Performance Appraisal Process	12/31/2016									
	9	Salary Review	3/31/2017									
		Benefits										
	11	Electronic Open Enrollment Process Development	12/31/2016									
	12	Electronic Open Enrollment (non-Open Enrollment)	6/30/2017									
		Recruitment										
	13	Applicant Tracking System	12/31/2016									
		Employment										
	14	Workforce Management Plan	3/31/2017									
		Human Resources										
	15	Succession Planning Guide	3/31/2017									
	16	Employee Climate & Engagement Survey	12/31/2016									
	17	JAO Collective Bargaining Planning	12/31/2016									
	19	Employee Hardship Program	6/30/2017							Cancelled		
	21	HR Web Page Re-Design	6/30/2017									
12.1		**Communications**										
	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									
13.7		**Administration**										
		Contracts and Procurement										
	1	Investigate best practices at other FFRDCs. Create goals and implement plan to meet goals	6/30/2017									
		Environmental, Safety and Security										
	2	Review and Safety Manual and Policies	6/30/2017									
		Management Information Services										
	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							Cancelled		
		Technology Transfer Office										
	5	Acquire license to Wellspring intellectual property management software	12/31/2016									
	6	Loading of NRAO Intellectual Property information	3/31/2017									
		Budget										
	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									
14.3		**Spectrum Management**										
	1	WP 7D Meeting	12/31/2016									
	2	1A, 5B Meeting	12/31/2016									
	3	7D Meeting	6/30/2017									
	4	WP 1A meeting	6/30/2017									
	5	CORF Meeting	6/30/2017									
	6	SFCG Meeting	6/30/2017									

NRAO Quarterly Status Update
(QSU3 FY2017)
April - June 2017

				Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment		
POP Section	**POP Milestone**	**Milestone**	**Completion Date**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**	**Cost**	**Schedule**	**Scope**
15.1		**Director's Office**										
		ALMA										
	1	ALMA Board Meeting	12/31/2016									
			6/30/2017									
	2	ALMA Director's Council	12/31/2016									
			3/31/2017									
			6/30/2017									
		Corporate Meetings										
	3	AUI Board of Trustees meetings	12/31/2016									
			3/31/2017									
			6/30/2017									
	4	AUI Executive Committee meetings	12/31/2016									
			6/30/2017									
		Science Community										
	5	Appoint new Users Committee members	12/31/2016									
	6	Users Committee meeting	6/30/2017									
		Management Reviews										
	7	NSF Annual Program Review	12/31/2016									
	8	All-Hands presentations	12/31/2016									
			6/30/2017									

QSU3 FY2017 Report
April - June 2017

POP MILESTONE 2.6.23

ALMA OPS - NAASC

Will host two data reduction workshops in Charlottesville

Cost
Schedule
Scope

COST:

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

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Will host a data reduction workshop in FY17 Q3	30 June 2017	None

RISK & MITIGATION:

Risk	Mitigation
1 The data reduction workshop did not take place in Q3 FY17	1 Support more one-on-one data reduction visitors to the NAASC instead of a large workshop

2 QSU3 FY2017

COST: No impact.

SCOPE: No impact.

SCHEDULE: It was anticipated that the NAASC would host 2 data reduction workshops in FY17 in support of Cycle 4 ALMA programs. With the loss of key personnel in community outreach and support, the second workshop in Q3 was cancelled.

RISK & MITIGATION: The risk involved was to not host the data reduction workshop which happened in Q3. 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.

POP MILESTONE #2.6.26

ALMA Development

FY2016 (Cycle 4) Studies Complete

Cost
Schedule
Scope

COST:

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

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Cycle 4 Studies Complete	FY2017 Q4	FY2018 Q1

RISK & MITIGATION:

Risk	Mitigation
1 None	

3 QSU3 FY2017

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.

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 POP) list 9/30/2017 as the end date: https://science.nrao.edu/facilities/alma/alma-develop-old-022217/call-for-proposals-study.

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.

POP MILESTONE # 2.6.30

NA ALMA Warranty

Front End Handling Vehicles Delivery to the JAO

Cost
Schedule
Scope

COST:

Labor Actuals	Expected
$184,014	$175,000
Material Actuals	**Expected**
$277,567	$365,000
Travel Actuals	**Expected**
$16,465	$ 10,000

SCOPE:

Chassis fabrication (welding) transferred to Green Bank Observatory.

SCHEDULE:

Milestone	Schedule	Target
1 FEHV 1	3/31/2017	10/01/2017
2 FEHV 2	3/31/2017	12/15/2017
3 FEHVs 3 & 4	3/31/2017	06/01/2018

RISK & MITIGATION:

Risk	Mitigation
1 Mechanical (dimensional) interference during reassembly of the FEHVs.	1 Assemble first vehicle and verify form, fit, and function before fabrication of units 2, 3, and 4.

4 QSU3 FY2017

COST: Additional cost incurred for engagement of Green Bank Observatory weld shop and shipping of components/welded chasses from/to Santiago, Chile, to Green Bank, West Virginia, and return. Cost adjustment (+$59,441 salary and benefits) for under-reported Q2 cost.

SCOPE: The NA ALMA Construction Project delivered four Front End Handling Vehicles to the Joint ALMA Observatory. The function of each FEHV is to allow removal and replacement of any Front End Cryostat from any of the four ALMA antenna cabin configurations. Numerous anomalies and Non-Conformances were discovered during performance testing of the first vehicle at the Array Operating Site (AOS), and during Preliminary Acceptance Inspections (PAI) of the other three FEHVs at the supplier. Foremost among these problems was the misapplication of one material, a 7000-series aluminum alloy, which proved unsuitable for welding. Because of resultant flaws in the welding, the original chasses had to be discarded and four new chasses will be fabricated. Associated costs will be shared between the vehicle designer (ProLaser Ltda. of Valdivia, Chile) and the NRAO since this error was overlooked during the design reviews. The cost to reproduce and reinstall the chasses is approximately $250K. All four (4) FEHVs will be delivered to the Joint ALMA Observatory by late Q2 FY2018.

SCHEDULE: The Chilean firm chosen to perform the rework had difficulty meeting AWS standards. Management made the decision to move the work to the Green Bank Observatory (GBO) shop, where experienced machinists and welders were available, and where the work can be more easily monitored. The first chassis has been welded, passed inspection, and shipped to Valdivia, Chile for fit check and reassembly into a FEHV. Barring any significant fit-up problems, this vehicle should be ready to deliver to the JAO in early Q1 FY2018.

RISK & MITIGATION: Possible re-assembly problems associated with corrective actions. The first finish-welded chassis will be returned to Valdivia, Chile (Walper, SA) where it will be re-assembled into a finished FEHV. After verification of dimensional form and fit, the other three chasses will be finish-welded.

POP MILESTONE # 4.3.8

Central Development Laboratory

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

Cost
Schedule
Scope

COST:

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

SCOPE:

This work has been put on hold pending the acquisition of the desired FPGA.

SCHEDULE:

Milestone	Schedule	Target
4.3.8 Implementation of the "F" part of the correlator in a state-of-the-art FPGA	6/30/2017	TBD, after the new FPGA is procured and on hand.

RISK & MITIGATION:

Risk	Mitigation
1 The submitted ALMA study proposal under which the new FPGA hardware is to be procured, might not materialize (has not materialized.)	1 Could allocate CDL CSA-V funds for the buy, or exploit synergy with ngVLA (would probably lead to longer procurement horizon.)

5 QSU3 FY2017

COST: Not Applicable.

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: 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

Cost
Schedule
Scope

COST:

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

SCOPE:

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.

SCHEDULE:

Milestone	Schedule	Target
1 Development of a pre-processing technique to detect interferences and/or non stationary signals.	9/30/2017 **We expect that this milestone will be missed in FY2017Q4.**	TBD. The implementation of the RFI excision architecture will be revisited at the end of the new 16 GHz study, if funded.

RISK & MITIGATION:

Risk	Mitigation
1 Long delay before this milestone is realized.	1 Not a priority goal anymore

6 QSU3 FY2017

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.

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

POP MILESTONE # 4.3.11

Central Development Laboratory

Finalize polarization synthesis firmware

Cost
Schedule
Scope

COST:

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

SCOPE:

Given considerable expertise of the IRD team, this effort was completed with fewer than anticipated issues and the polarization-synthesis firmware was demonstrated to be fully functional in mid-May 2017.

SCHEDULE:

Milestone	Schedule	Target
1 Finalize polarization synthesis firmware	9/30/2017	Early complete

RISK & MITIGATION:

Risk	Mitigation
1 Not applicable	

7 QSU3 FY2017

COST: No impact.

SCOPE: Full scope of the milestone realized earlier than anticipated.

SCHEDULE: Given considerable expertise of the IRD team, this effort was completed with fewer than anticipated issues and the polarization-synthesis firmware was demonstrated to be fully functional mid-May 2017.

RISK & MITIGATION: No impact.

POP MILESTONE # 5.5.13

Science Support and Research

TTA tool suite requirements

Cost
Schedule
Scope

COST:

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

SCOPE:

Uncertainty due to divestment implications

SCHEDULE:

Milestone	Schedule	Target
1 Detailed requirements	30 Jun 2017	31 Mar 2018

RISK & MITIGATION:

Risk	Mitigation
1 No impact	

8 QSU3 FY2017

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).

RISK & MITIGATION: No impact.

POP MILESTONE # 5.5.17

Science Support and Research

CASA guides

Cost
Schedule
Scope

COST:

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

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Update guides	30 June 2017	30 Sept 2017

RISK & MITIGATION:

Risk	Mitigation
1 Minimal	

9 QSU3 FY2017

COST: No impact.

SCOPE: No impact.

SCHEDULE: Not completed because of delayed release of CASA 5.0 (delivered first week of July 2017). Milestone expected to be completed by end Q4.

RISK & MITIGATION: No impact.

POP MILESTONE # 5.5.18

Science Support & Research

SRDP Requirements Development

Cost
Schedule
Scope

COST:

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

SCOPE:

No change to project scope

SCHEDULE:

Milestone	Schedule	Target
1 SRDP Req. Dev.	3/31/2017	9/30/2017
2 SRDP Proj. Plan and Sched Complete	6/30/2017	9/30/2017
3 SRDP Proj. Launch	9/30/2017	Q1 FY18

RISK & MITIGATION:

Risk	Mitigation
1 Delay in Req Committee Appointment	1 Continue communication with ADs until sufficient appointments have been made

10 QSU3 FY2017

COST: No changes to project cost.

SCOPE: No changes to project scope.

SCHEDULE: Milestone 1 is in the FY17 POP; 2 and 3 are project-level milestones. We reported last quarter the Mar 21, 2017 SRDP Director appointment did not provide sufficient time to satisfy the milestone for requirements development by Mar 31 and proposed to extend project commitments by six months. The charge to the SRDP Requirements committee has since been drafted and circulated to ADs for review. The ADs are asked to appoint committee members to represent interests from within VLA Ops, NM Ops, DMS, and SSR; where these committee members will also develop stakeholder-level requirements for SRDP. The Project Management Plan, SE Management Plan, and subsidiary documents are on track to meet milestone 2 (project plan and schedule). The Project Scientist position has been defined submitted for authorization to recruit. Resources 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: Appointment of the requirements is not under control of the SRDP project office. Committee members are appointed under their departmental supervision and serve the project with contributed effort. In this sense, SRDP is competing for scarce resources and must appeal to potential committee members with the challenge and satisfaction of participation in the project. In the event a full appointment is delayed or not made in a timely matter, the SRDP project office may need to proceed with a partial committee.

POP MILESTONE # 5.5.28

Science Support & Research (Library)

BiblioMetrix beta release

COST:

Labor Actuals	Expected
$81K	$ ~150K FY18
Material Actuals	**Expected**
$ none	$7K
Travel Actuals	**Expected**
$ N/A	$

SCOPE:

Milestone cancelled
Oracle-Express APEX (free) was targeted for use to develop the NRAO publications bibliography. Interfaces with scripts and other complexities have lead to the reevaluation of an in-house developed database using the public license APEX in favor of out-sourcing the work. The Beta test will not occur in FY2017.

SCHEDULE:

Milestone	Schedule	Target
1 Beta Test	3/31/2017	See proposed direction under scope
2 Production release	6/30/2017	Stalled

RISK & MITIGATION:

Risk	Mitigation
1 Catastrophic failure of DB	1 CIS triage if possible
2 Study not acceptable	2 None
3 No funding for project	3 Support provided by end-users

11 QSU3 FY2017

COST: At present, the budgetary estimate for a new database is $150K with a range of uncertainly of 50%.

SCOPE: The scope of the project is under review.

SCHEDULE: The project has been put on indefinite hold while options are assessed. We request this milestone be cancelled and the evolving plan will be addressed in the 2018 POP.

RISK & MITIGATION: The major risk is catastrophic failure of the present database. The options are to continue with the present database but with the age of the program and major changes at ADS, this is problematic.

POP MILESTONE # 5.5.29

Science Support & Research (Library)

BiblioMetrix production release

COST:

Labor Actuals	Expected
$81K	$ ~150K (FY18)
Material Actuals	**Expected**
$ none	$7K
Travel Actuals	**Expected**
$ N/A	$ N/A

SCOPE:

Milestone cancelled

The Oracle-Express APEX (free) proved non-viable for the intricacies of the system requirements. The project stalled with no clear way forward, but without the Beta release, the Production Release will not happen. We are examining options, including the use of an outside vendor.

SCHEDULE:

Milestone	Schedule	Target
1 Beta Test 5.5.28	3/31/2017	See proposed direction @ scope
2 Production Release	6/30/2017	Project stalled; at Beta release

RISK & MITIGATION:

Risk	Mitigation
1 Catastrophic failure of present DB	1 CIS triage
2 Study unacceptable	2 None
3 Lack of funding for project	3 Support provided by end-users

12 QSU3 FY2017

COST: At present, the budgetary estimate for a new database is $150K with a range of uncertainly of 50%.

SCOPE: The scope of the project is under review.

SCHEDULE: The schedule will not be met in FY2017 due to the lack of flexibility of the Oracle-Express APEX system, in addition to it being several generations out-of-date. We request this milestone be cancelled and the evolving plan will be addressed in the 2018 POP.

RISK & MITIGATION: The risks with the present system are: the age of the db, lack of NRAO expertise on the system, no NRAO support for the platform on which the db operates, and changes at ADS (with our gateway being shut down no later than June of 2018). If the consultant's study is deemed unacceptable, there are no other vendors willing to work on the project. If funding is an issue, the end-users of the data could be asked to contribute.

POP MILESTONE # 6.4.17

DMS

Support pulsar phase bin development

Cost
Schedule
Scope

COST:

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

SCOPE: Support of pulsar phase binning to make it available in the low level software.

SCHEDULE:

Milestone	Schedule	Target
1 Support pulsar phase bin development	3/31/2017	Completed July 2017

RISK & MITIGATION:

Risk	Mitigation
1 Resources	1 Completed Q4

13 QSU3 FY2017

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

SCOPE: Using the WIDAR correlator for phase-binned observations of pulsars has been commissioned in FY2016, but it is not possible to set up these observations in the current software. Development of support for phase-binned observations in low level software was conducted in Q2, but is was not completed by the end of the quarter. Remaining work includes 1) changes needed for the CMIB and 2) changes to the Configuration Manager and the VCI schema.

SCHEDULE: Key people were pulled away for higher priority tasks and were not available to finish work on schedule.

RISK & MITIGATION: The key people for development and testing need to be available. This item was completed July 14 2017.

POP MILESTONE # 6.4.18

DMS

Solar Capabilities

Cost
Schedule
Scope

COST:

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

SCOPE:

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

SCHEDULE:

Milestone	Schedule	Target
1 Implement in VLA model	4/15/2017	Completed
2 Implement in OPT	6/30/2017	Sept 29 2017

RISK & MITIGATION:

Risk	Mitigation
1 Time for manual config	Accept risk

14 QSU3 FY2017

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 testing but falls behind VLASS in queue.

POP MILESTONE # 6.4.21

DMS

NRAO Archive Release 3.0

Cost
Schedule
Scope

COST:

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

SCOPE:

Extend the capabilities of the archive to address critical VLASS requirements - Release 3.0.

SCHEDULE:

Milestone	Schedule	Target
1 Release 3.0	3/31/2017	9/8/2017
2 Release 3.0 (public)	3/31/2017	11/30/2017

RISK & MITIGATION:

Risk	Mitigation
1 Schedule depends on key team staff	1 Cross-train new and existing staff to expand delivery capability

15 QSU3 FY2017

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.

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 team's other responsibilities.

POP MILESTONE # 6.4.23

DMS

CASA 5.0 Release

Cost
Schedule
Scope

COST:

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

SCOPE:

CASA 5.0 Release, VI/VB2 rewrite was added to original scope.

SCHEDULE:

Milestone	Schedule	Target
1 Deploy CASA 5.0	6/30/2017	Completed 7/19/2017

RISK & MITIGATION:

Risk	Mitigation
1 No risk	1 Deployed

16 QSU3 FY2017

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

SCOPE: Develop and deploy CASA 5.0.

SCHEDULE: Schedule was delayed due to the rewrite of the VI/VB2. This was additional scope added due to the impending departure of the person responsible for maintaining it, and required additional testing. Software was finished and tested by 6/30, but was not deployed until 7/19 due to the 4th of July holiday and vacations.

RISK & MITIGATION: No risk, software has been deployed.

POP MILESTONE # 7.4.25

Program Management Department

DMS Perform Retrospective on CASA Processes

COST:

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

SCOPE:

Milestone cancelled
No change in scope. Closing project. New management in place. Original project scope and milestones overcome by events.

SCHEDULE:

Milestone	Schedule	Target
1 Perform Retrospective	6/30/2017	9/30/2017
2 New CASA management in place	TBD	

RISK & MITIGATION:

Risk	Mitigation
1 Close project without performing final steps	1 Retrospective cannot be completed as the project has new management

17 QSU3 FY2017

COST: Contributed Effort. Budget tracked at a higher level.

SCOPE: 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 adopt a continuous release process wherein each change to the code base generates a new release of CASA, 4) CASA team co-locate staff within Charlottesville and Socorro to promote serendipitous encounters and exchange of information, and 5) provide 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 appropriate.

SCHEDULE: Delay caused by transfer of the Project Manager and CASA Lead to different departments.

RISK & MITIGATION: No impact.

POP MILESTONE #8.5.17

Cost
Schedule
Scope

EPO

VLA VC Education and Interpretive Plan completed

COST:

Labor Actuals	Expected
$0	$5000
Material Actuals	Expected
$0	$0
Travel Actuals	Expected
$0	$0

SCOPE:

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.

SCHEDULE:

Milestone	Schedule	Target
1 Interpretive plan	Q3 FY17	Q1 FY18

RISK & MITIGATION:

Risk	Mitigation
1 Definition of exhibits before funds are secured. In the time it takes to raise the funds, more interesting technologies may be available.	1 Re-scope milestone to define interpretive themes and priorities without specific definition of the exhibits.

18 QSU3 FY2017

COST: Specific budget lines did not indicate funds for this project. The current plan is to use salary breakage to contract with consultants to develop an interpretive plan.

SCOPE: Definition of exhibits is premature until fund raising has begun, as they can be scaled to the available funds. The important first step is to define interpretive themes for the visitor experience. Science is why the array is there, but there is an opportunity to give visitors a more engaging experience that gives insights into the natural history of our location, the intersectionality of the emergence of our science from advances in WWII technology and role that our Navajo neighbors played in WWII as radio codetalkers, the amazing discoveries that have been made at the VLA, the impact that visitors have on our ability to do science, and the impact that our advances have on society are all possible themes.

SCHEDULE: I am currently screening a handful of consultants to assist with the interpretive plan, which should be complete by Q1 of FY18.

RISK & MITIGATION: 1) 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

COST:

Labor Actuals	Expected
$	$50,000
Material Actuals	**Expected**
$	$
Travel Actuals	**Expected**
$	$

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Architectural sketches	Q3 FY17	Q1 FY18

RISK & MITIGATION:

Risk	Mitigation
1 Designing a plan for the wrong building	1 A structural engineer will inspect both the existing VC and the former cafeteria before an RFP goes out for bid on a concept design

19 QSU3 FY2017

COST: This was not a budget item in FY17, but salary breakage makes possible contracting for a full concept design.

SCOPE: No impact.

SCHEDULE: We expect to put out an RFP for concept designs in Q4 for completion of the project in Q1 of FY18.

RISK & MITIGATION: 1) One architect has suggested the cafeteria as a more appropriate target for refurbishing because it would enhance the visitor experience by giving them an unobstructed view of the array. Before we move forward with that suggestion, we will have a structural engineer inspect both the cafeteria and the current VC to give us information on the expected longevity of both buildings given the predicted uses.

POP MILESTONE #10.3.10

ODI

Sister Cities – Needs Assessment

COST:

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

SCOPE:

Milestone cancelled
A formal needs assessment for the science component of the Sister Cities-NM program was anticipated, but could not be performed as scheduled due to loss of key personnel at the Alamo Navajo School. A Needs Assessment at the Likanantai C-30 High School in San Pedro, Chile, was completed.

SCHEDULE:

Milestone	Schedule	Target
1 Needs Assessment	3/31/17	canceled

RISK & MITIGATION:

Risk	Mitigation
1 None	

20 QSU3 FY2017

COST: No impact.

SCOPE: A formal needs assessment for the science component of the Sister Cities-NM program was anticipated, but could not be performed as scheduled due to loss of key personnel at the Alamo Navajo School. Instead, informal needs assessments have been, and will be, performed on an ongoing basis by the NRAO EPO STEM Education Lead. Note that a Needs Assessment at the Likanantai C-30 High School in San Pedro, Chile, was completed.

SCHEDULE: Originally scheduled for completion by 3/31/17; no longer needed since informal needs assessments have been completed, and will be ongoing. Milestone cancelled.

RISK & MITIGATION: No impact.

POP MILESTONE # 11.7.12

Human Resources

Electronic Benefit Enrollment (Non-Open Enrollment)

Cost
Schedule
Scope

COST:

Labor Actuals	Expected
$ see comments	$ see comments
Material Actuals	Expected
$ n/a	$ n/a
Travel Actuals	Expected
$ n/a	$ n/a

SCOPE:

Create electronic enrollment for new hires, qualifying event changes, and voluntary benefit enrollment changes.

DBA Audit uncovered incompatibility issues between current setup and enrollment workflow. Must revise DBA instructions.

SCHEDULE:

Milestone	Schedule	Target
1 Deliver electronic benefit enrollment	June 30, 2017	June 30, 2018

RISK & MITIGATION:

Risk	Mitigation
1 MIS support delayed while searching for appropriate candidate.	1 Brij Consultant support to develop project and/or newly hired MIS representative.
2 JDE DBE setup not optimized for use of enrollment workflow.	2 Audit of DBAs to determine correct setup so workflow can run appropriately.

21 QSU3 FY2017

COST: Labor is all contributed effort covered by ICC departmental budgets. No budget was specifically built for this milestone in FY17. Additional budget for training and/or setup support has been identified for FY18. 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, and 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 FY17. Inclusion of additional audit step, combined with open enrollment deliverables, will push this milestone to third quarter FY18. 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 FY17.

POP MILESTONE # 11.7.14

Human Resources

Workforce Management Plan

Cost
Schedule
Scope

COST:

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

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Develop/Distribute WFM Plan	3/31/2017	9/30/2017

RISK & MITIGATION:

Risk	Mitigation
1 No risk	

22 QSU3 FY2017

COST: No impact.

SCOPE: No impact.

SCHEDULE: The WFM Plan development requires collaboration with senior-level stakeholder across the Observatory. The AD of Observatory Budgets and the AD of HR incorporated the WFM Plan into the Observatory's Strategic Budget and Resource Summit held in June 2017. Budget, HR, and PMD have developed a work process flow and documents to incorporate WFM planning into the budget process. Budget and HR met with senior management to inform them of this process and to set expectations regarding their participation in developing a meaningful and relevant WFM Plan. Senior Managers will utilize input from the Recompetition Proposal, Program Operating Plan, and Long Range Plan writing assignments to codify the WFM Plan. The final WFM plan will be fully executed in Q4.

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

POP MILESTONE # 11.7.19

Human Resources

Employee Hardship Program

COST:

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

SCOPE:

Milestone Cancelled
Implement a program providing financial and sick leave donation support for hardship cases. Milestone eliminated as Q3 project, moved under umbrella of Q4 Leave Mgmt Policy and Process Improvement deliverable to develop Donation Program for Hardship Sick Leave situations HR 11.7.20

SCHEDULE:

Milestone	Schedule	Target
1 Program	6/30/2017	n/a

RISK & MITIGATION:

Risk	Mitigation
1 No impact	

23 QSU3 FY2017

COST: Financial infrastructure would be difficult to develop for a Hardship Program where employees donate cash and cash is dispersed for a qualifying hardship. The Vacation Donation Program (for purposes of hardship/illness situations) will be developed by integrating with current development of Leave Management enhancements for consistency. This part of the deliverable does not need financial infrastructure but will need a tracking process for incoming donated vacation leave, decremented balances, and incremented leave given to employees through this program.

SCOPE: Re-scoped to reside within the Q4 Leave Management Project to also include the development of a Donation Program for Hardship Sick Leave situations. Current deliverable for the Leave Management Process Improvement encompasses "Review current leave policies, procedures, and processes with goal of improving current sick leave and leave of absence policies to assess improvements." Canceling and incorporating the Q3 deliverable with the Q4 deliverable creates coherence in the assessment and process improvement effort.

SCHEDULE: Program design complete by end of Q4 to include implementation plans.

RISK & MITIGATION: No impact.

POP MILESTONE # 13.7.3

ADMIN

MIS Equipment Purchase for JDE Upgrade from 9.0 to 9.2

Cost
Schedule
Scope

COST:

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

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Order and Install Equipment	12/31/2016	07/14/2017

RISK & MITIGATION:

Risk	Mitigation
1 No impact	1 9.0 Installed

24 QSU1 FY2017

COST: No impact.

SCOPE: No impact.

SCHEDULE: The equipment order was delayed due to MIS Manager efforts in Q1 for electronic open enrollment and report writing for the new Chart of Accounts. AUI Fiscal has an acting CFO and acting Controller and is behind on reviewing and approving the reports prepared, requiring additional support from the MIS Manager.

RISK & MITIGATION: Items are on hand and installed. Failover of data scheduled for Friday July 14.

POP MILESTONE # 13.7.4

ADMIN

MIS Equipment Installation/Training for JDE Upgrade

COST:

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

SCOPE:

Milestone cancelled

SCHEDULE:

Milestone	Schedule	Target
1 Complete installation and perform any necessary training with ERP user base.	06/30/2016	Cancelled (perform JDE Upgrade installation in FY2018)

RISK & MITIGATION:

Risk	Mitigation
1 No impact	

25 QSU1 FY2017

COST: No impact.

SCOPE: No impact.

SCHEDULE: The equipment order (milestone 13.7.3) was delayed due to MIS Manager efforts in Q1 for electronic open enrollment and report writing for the new Chart of Accounts. AUI Fiscal has an acting CFO and acting Controller and is behind on reviewing and approving the reports prepared, requiring additional support from the MIS Manager. Given the delay, the arrival of a new Controller in the early spring, and the other deliverables for the MIS Manager (for example: AUI Report design review, change processing, and approval awaited the arrival of the new Controller, start of 2018 Open Enrollment), it was decided to perform the upgrade in FY18.

RISK & MITIGATION: Items are on hand and installed. Failover of data scheduled for Friday July 14.

POP MILESTONE #13.7.6

ADMIN

Loading of NRAO Intellectual Property information

Cost
Schedule
Scope

COST:

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

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Implement Software	FY2017 Q2	FY2017 Q4

RISK & MITIGATION:

Risk	Mitigation
1 No impact	

26 QSU2 FY2017

COST: No impact.

SCOPE: No impact.

SCHEDULE: The integration and loading of data is stalled. Early use indicates Wellspring may not be the best choice for us. Reviewed with Steven Geiger and decided to take a different path. Wellspring is paid as an annual fee (not a software purchase) so it can be cancelled without significant sunk cost. However, an alternate approach has been identified – using the software available (at no cost) through the Federal Labs Consortium. All of the NRAO IP information should be loaded by 08/31/2017.

RISK & MITIGATION: No impact.

POP MILESTONE # 15.1.8

Director's Office

All-Hands Presentation

Cost
Schedule
Scope

COST:

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

SCOPE:

No change

SCHEDULE:

Milestone	Schedule	Target
1 Presentation	6/30/2017	9/30/2017

RISK & MITIGATION:

Risk	Mitigation
1 No impact	

27 QSU3 FY2017

COST: No impact.

SCOPE: No impact.

SCHEDULE: All-Hands Presentation will be presented in September 2017 (Quarter 4).

RISK & MITIGATION: No impact.

QSU3 FY2017 Report
Laura Lockledge, Budget

Q3 Overall Comments

- Benefits @36.2% vs. 36% budget.
- Significant over-recovery in ICC
  - Rate change submitted to NSF 6/2. Awaiting response.
- Expecting increase in AUI IDC rate – will be partially offset by ICC decrease.

Q3 CSA V Results

	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%
Total CSA-V Revenues	**32,000**	**32,099**	**32,099**	100.0%
Telescope Ops	10,672	11,034	7,741	70.2%
Development	3,276	3,324	2,412	72.6%
Science Ops	6,026	5,934	3,787	63.8%
Admin Services	9,179	9,032	6,062	67.1%
Director's Office	1,987	1,955	1,291	66.0%
Education & Public Outreach	644	654	319	48.8%
FY17, Total	**31,784**	**31,933**	**21,612**	**67.7%**
FY17 CSA-V Net	**216**	**166**	**10,487**	

- VLA Infrastructure project on track.
- Tight budgets in NM Ops and CDL, monitoring closely.
- Strong revenues and breakage in EPO offsetting expenses.
- Includes fund source adjustments of ($54K).

Q3 CSA-A Results

	FY17 POP Budget	FY17 Rev. Budget	FY17 YTD Expenses	YTD % Rev Budget
NSF	43,250	43,250	24,905	57.6%
Carryforward	12,385	14,076	14,399	102.3%
Canadian Contribution	1,528	1,528		0.0%
Other	345	697	352	50.5%
Total CSA-A Revenues	**57,508**	**59,551**	**39,656**	66.6%
Telescope Ops	22,431	25,609	9,247	36.1%
Development	5,313	12,406	1,615	13.0%
Science Ops	7,756	8,207	6,439	78.5%
Admin Services	6,819	9,059	8,221	90.7%
Director's Office	2,406	3,521	3,938	111.8%
Education & Public Outreach	694	694	369	53.2%
FY17, Total	**45,419**	**59,496**	**29,829**	**50.1%**
FY17 CSA-A Net	**12,089**	**55**	**9,827**	

- Includes Q1 NSF funding adjustments (reclass of $352K to ASIAA line). $700K reduction replaced – expect in FY18.
- Carryforward includes multicancha funding.
- Includes fund source adjustments of $21K.

Q3 ICC Results

	FY17 POP Budget	FY17 Rev. Budget	FY17 YTD Expenses	YTD % Rev Budget
NRAO Recoveries	11,931	11,931	8,845	74.1%
External Recoveries	4,501	4,501	3,454	76.7%
Total ICC Revenues	**16,432**	**16,432**	**12,299**	74.8%
Telescope Ops	103	104	102	98.1%
Development	442	445	234	52.6%
Science Ops	1,850	2,018	1,381	68.4%
Admin Services	11,897	11,675	8,085	69.3%
Director's Office	2,140	2,140	1,368	63.9%
FY17, Total	**16,432**	**16,382**	**11,170**	**68.2%**
FY17 ICC Net	**0**	**50**	**1,129**	

- Over-recovered by $1.1M; includes fund source adjustments of $2K.
- External recoveries on track. Internal recoveries ahead of internal MTDC spending.
- Underestimate of MTDC, awaiting NICRA adjustment.

FY15 POP Milestones

POP MILESTONE # FY15 3.4.62

Cost
Schedule
Scope

Admin (from NM Ops)

Renew VLBA leases for Owens Valley (OV)

COST:

Labor Actuals	Expected
No changes	
Material Actuals	Expected
Travel Actuals	Expected
No changes	

SCOPE:

OV CA site lease is not renewed. LBO is awaiting lease negotiation outcome by Caltech (we sublease from Caltech) 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.

SCHEDULE:

Milestone	Schedule	Target
Owens Valley Lease renewed	03/31/15	Unknown

RISK & MITIGATION:

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.

34 QSU3 FY2017

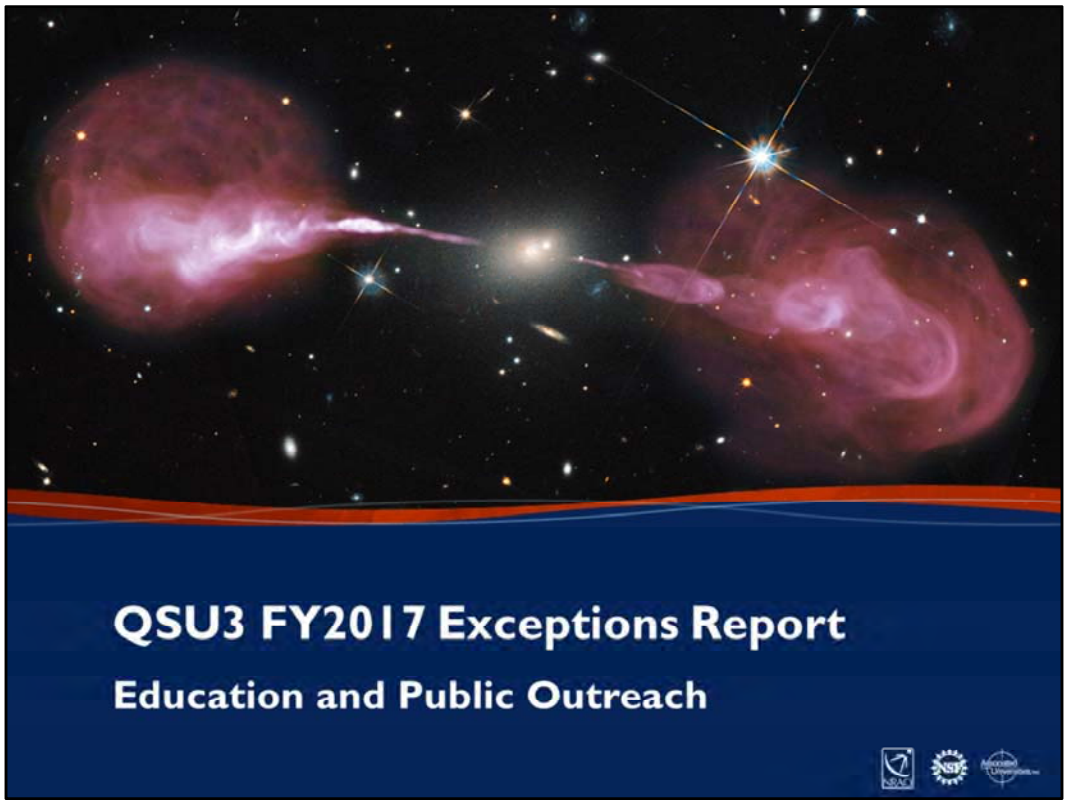
COST: Future lease costs are subject to the status of Caltech's re-negotiation of the lease with Los Angeles Water and Power.

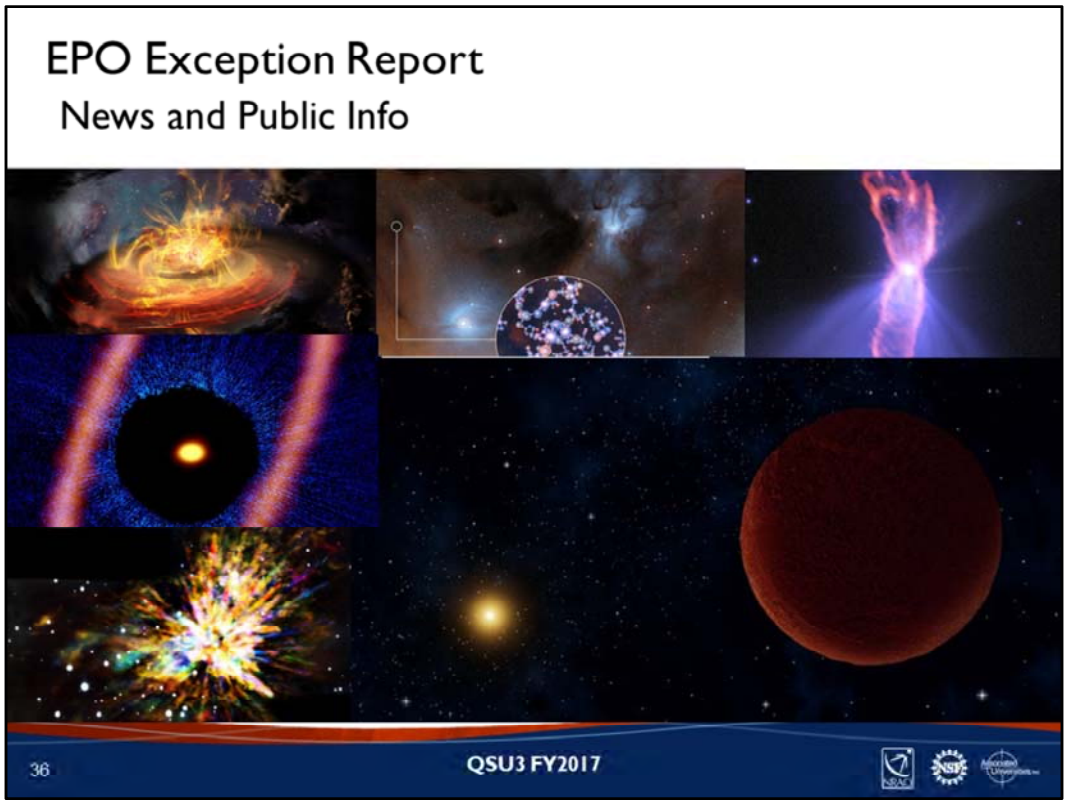
SCOPE: No changes.

SCHEDULE: <u>Owens Valley Lease</u>: 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 FY15 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. Caltech 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.

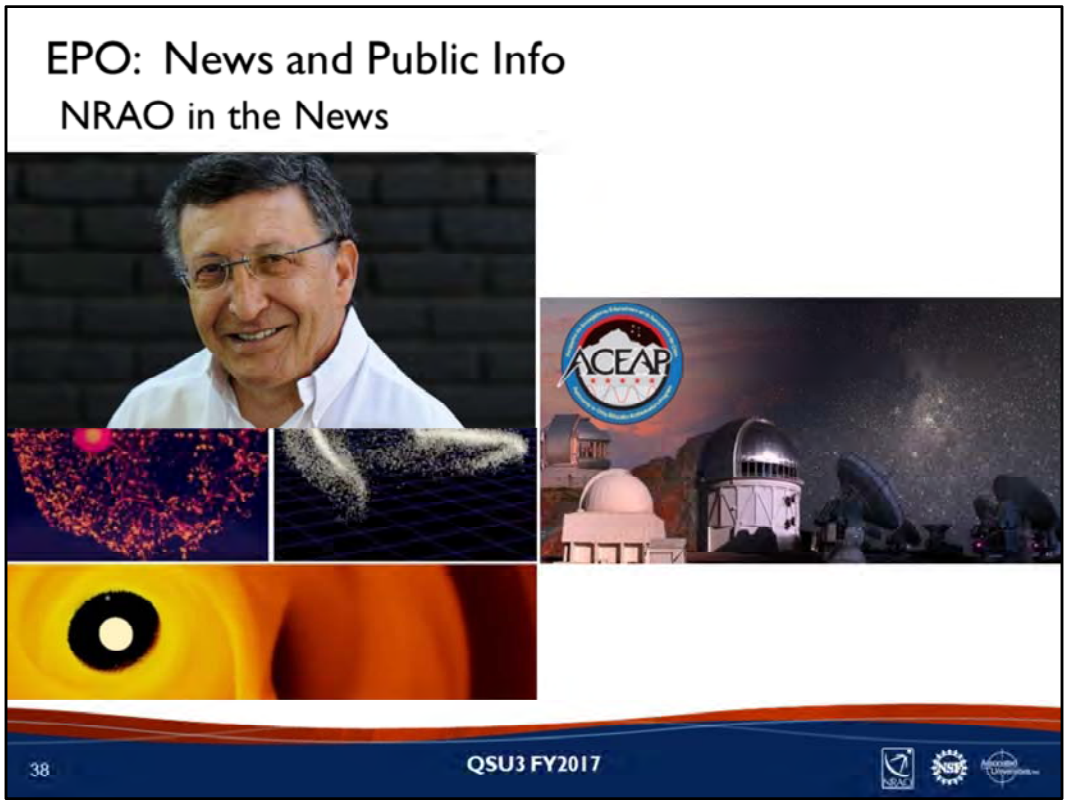

QSU3 FY2017 Exceptions Report
Education and Public Outreach



It was a good quarter for news, with 14 press products, which generated news about NRAO (programs, telescopes, milestones, and science) that appeared in 259 national (U.S.) and 355 international media stories, as reported by the Meltwater media monitoring service.

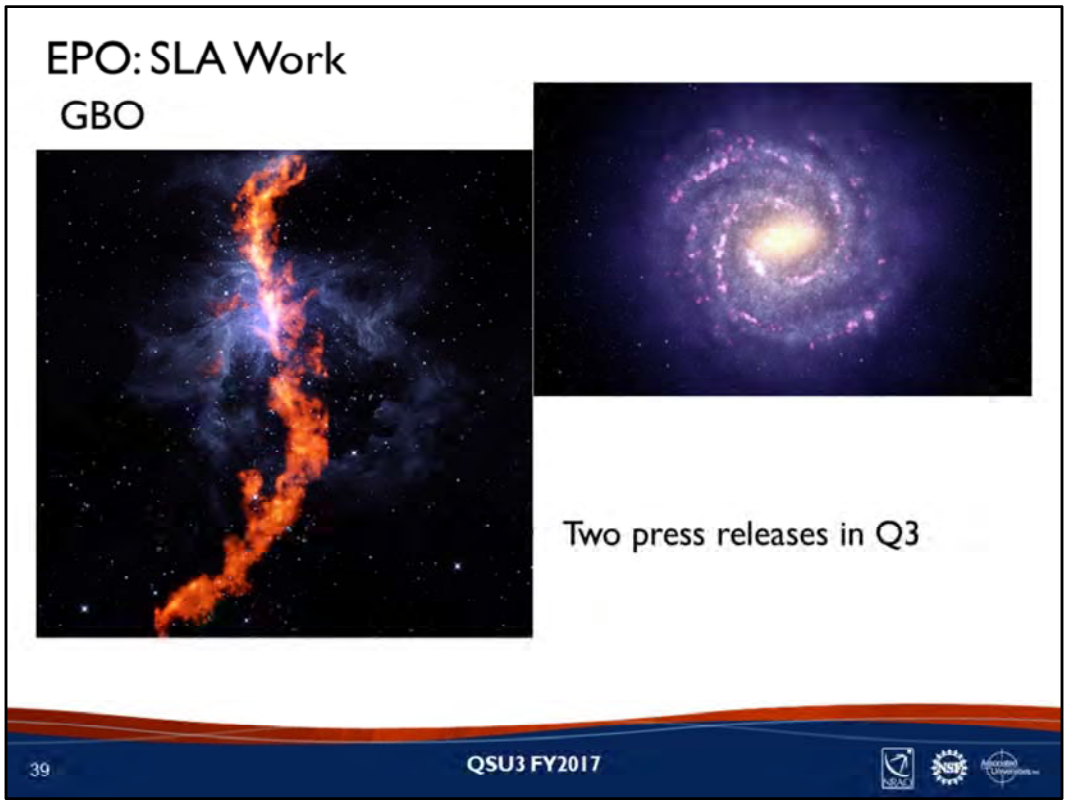
Six press releases were generated from ALMA science. While mysterious molecules, star birth and death discoveries generated some interest, little icy Dee Dee at the edge of the solar system was the top attention getter in April.

VLA had four press products this quarter. And while we co-released a spectacular image of the Crab Nebula that inspired a colorizing app on our public website, the discovery that got the most attention in May was from the Perleys. Was it the intrigue of a possible new supermassive black hole, Bill Saxton's stunning art, or Dave Finley's choice to not name Cygnus A, but instead simply call it a Famous Galaxy, that got this one noticed? We may never know, but we do know that Dave's choice got some fun snarky responses on Facebook: "No one wants to hear about a black hole from some obscure, D-list galaxy."



News Release: June 29, 2017 at 10:45am
2017 Jansky Lectureship Awarded to South African Astronomer Bernie Fanaroff

Announcement: June 12, 2017 at 3:31pm
Nine Astronomy Outreach Professionals Selected for Prestigious ACEAP Ambassador Program
and our own **Brian Kent with a data visualization press conference at the June AAS**



They are doing a lot of their own stories, but had us do the releases for the these two. Ammonia gas in Orion and ageless silicon throughout the MQ. The Orion story was just featured on CNN this week. http://www.cnn.com/2017/07/21/opinions/dune-ground-break-opinion-lincoln/index.html

EPO: News and Public Info

VLBA in the News

This discovery was the top click bait for the quarter.

EPO

Social Media

- Even though humor gets the most likes, we're taking a measured strategy on social media and our audiences are steadily growing on all three platforms.
- Twitter 11,447 followers
- Facebook 60,118 page likes
- Instagram 104 followers

41 QSU3 FY2017

Twitter 700 more followers
Facebook up by 600
Instagram up from none, we started the account 4/21/17

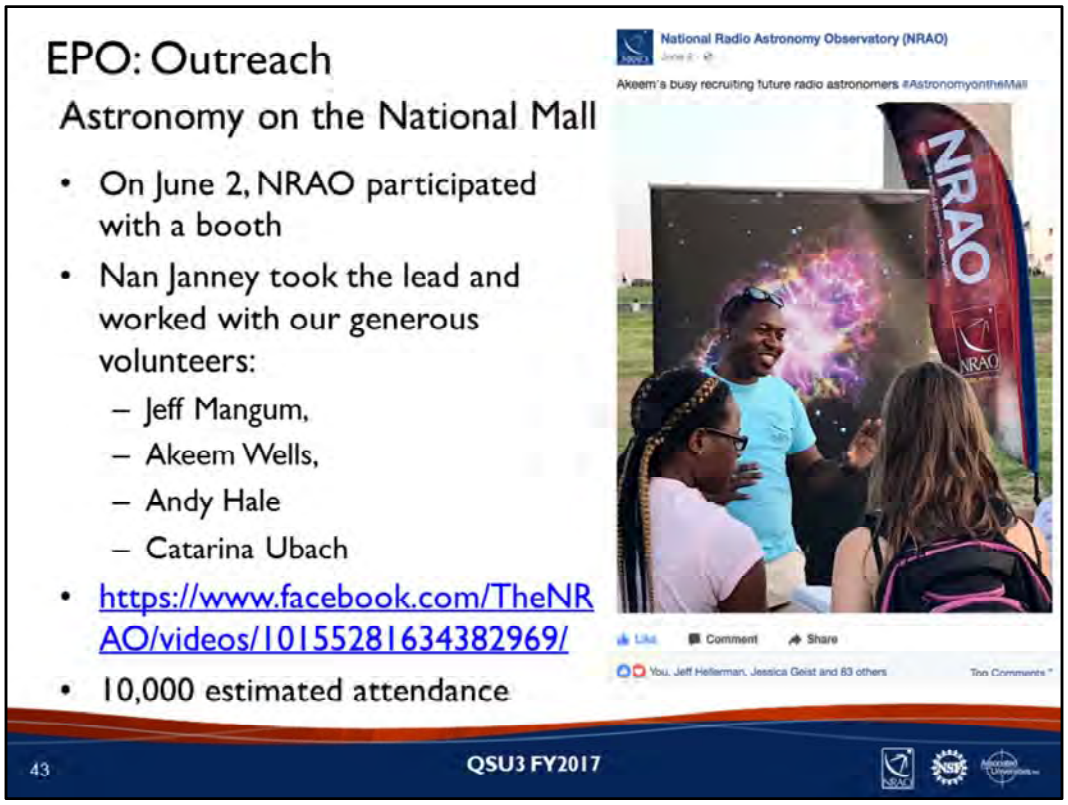
Reach/Impressions (the number of unique visitors who saw our page tweets per day): 3.4K/day

@almanrao - 5,719 followers

Facebook
Engagement rate: Per post roughly 3-5 % of our audience likes, comments, and/or shares. I'm still trying to make sense of this number, i.e., what percentage is a good measure of engagement.

Both our Facebook and Twitter are roughly 70% men/30% women, and 68% of our audience on FB is 18-44, which is much younger than I thought.

Held June 9-11 following the summer AAS meeting in Austin
This was a pretty successful partnership with ODI, they sponsored the meeting, we provided social media coverage and will produce a final short video for them.



This annual event is coordinated by Hofstra University. Nan Janney took the lead, and since it gets dark so late, many folks waiting for something to see through the telescopes seem to appreciate booths like ours. Our theme is revealing the invisible universe. This event was also our first experiment with Facebook Live. The spectacular image of the Crab had just been release including a layer of VLA data, so Nan interviewed Jeff Mangum about pulsars and the Crab. https://www.facebook.com/TheNRAO/videos/10155281634382969/

Late June ACEAP educators learn about ALMA and Charles Blue accompanied them. Tim Spuck, the PI, will submit the annual report with metrics in November.

EPO:

VLA Visitors

New Mexico Tech
Music Program
Gaby Benalil, Director of Music

Recital at Very Large Array
May 20 at 11 am
Gaby Benalil, Cello
Yuri Santos, Violin

Monthly	Apr-17	Apr-16	Difference	May-17	May-16	Difference	Jun-17	Jun-16	Difference	FY17 Q3	Differnce
visitors	2341	2130	211	2120	2135	(15)	2176	2266	(90)	6426	106
admission	1180	965	215	1445	1389	56	1224	1330	(106)	3634	165
revenue	6201	$4,991.00	1210	$7,677.00	$7,539.00	$138.00	$6,508.00	$6,922.00	($414.00)	$19,176.00	$934.00
gift shop sales	28798.13	$23,807.40	4991	$27,635.91	$25,653.77	$1,982.14	$30,569.51	$29,650.20	$919.31	$82,012.82	$7,892.18
1st Saturday			0							101188.82	
visitors	581	810.00	(229)	154	159	(5)	191	196	(5)	1155	(239)
admission		0.00	0	138	127	0	151	170	(19)	289	(19)
revenue		$0.00	0	$666.00	$648.00	$0.00	$811.00	$899.00	($88.00)	$1,477.00	($88.00)
gift shop sales	4983.95	$4,733.22	251	$2,320.25	$1,909.49	$410.76	$3,498.20	$4,623.64	($1,125.44)	$10,551.67	($463.95)

45 QSU3 FY2017

Our quarterly attendance at the VC was up slightly from last year, with a corresponding increase in revenue for both admissions and gift shop sales. Ironically, the big dip was in attendance for our free event, the April Open House. It's a shame because we had big things planned. The NM Tech music department came out and gave a performance. The plan was to have them live at the sundial, but it snowed. The musicians, however, still showed up and the concert went on in the cafeteria. That snowy performance was followed up with a recital on May 20. Since these are acoustic performances, with no amplification, there's no interference and the music director loves bringing her students out there to perform.

EPO

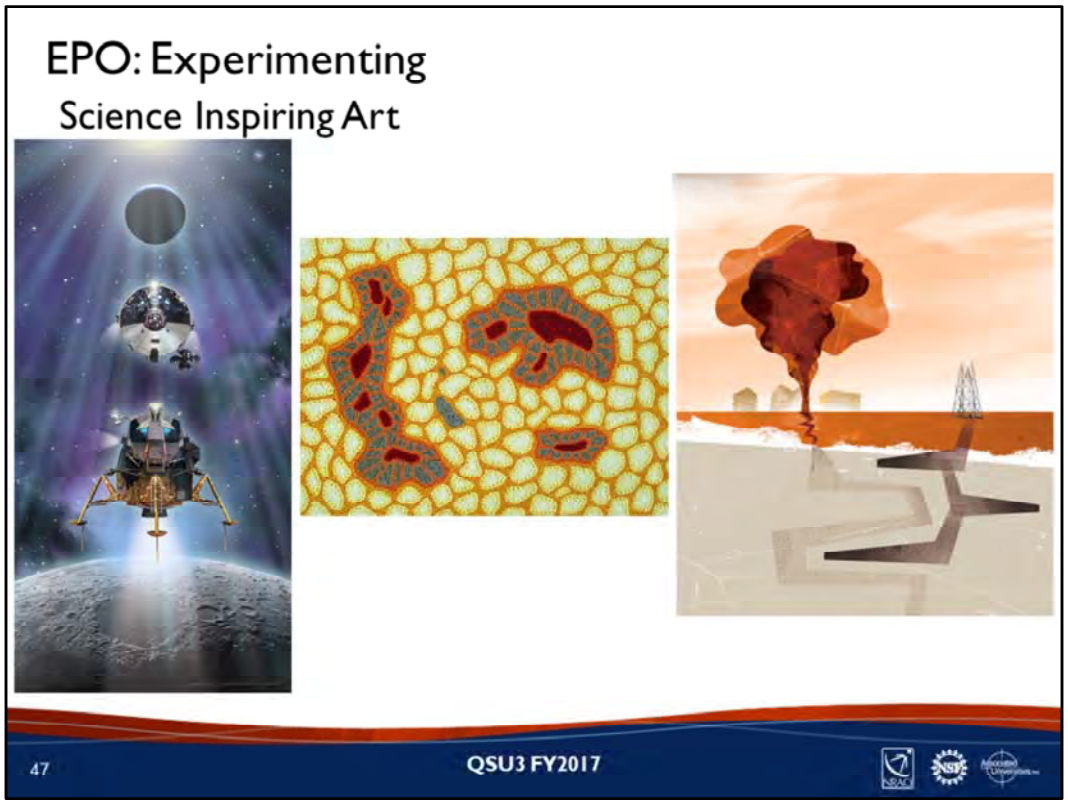
VLA Tours and Outreach

Groups	Adult	School	Outreach
4/5/17 Cottonwood school outreach			72
4/5/17 High School tour from Norway		38	
4/8/17 Montoya Tour International Group		56	
4/14/17 NMSU tour	19		
4/15/17 Adult learner tour (Rhodes Scolars)	30		
4/18/17 Roswell Schools Box of Stars			15
4/26/17 Alamo school visit to promote RAP			25
5/1/17 Corrales Adult Learners tour	38		
5/1/17 Magdalena School class visit			19
5/4/17 Chinese students from Robotics Competition tour		31	
5/9/17 Magdalena School RAP recruiting			22
5/17/17 Magdalena School RAP recruiting			19
5/18/17 Zimmerly Elementary school 4th graders		80	
5/19/17 Dave Moffet College tour	16		
5/20/17 NM Tech Concert at the Sundial	14		
5/22/17 Zimmerly Elementary School starlab			80
6/1/17 Upward Bound UNM High School tour		46	
6/8/17 Magdalena School summer youth program		27	
6/12/17 Science Journalist tour	8		
6/13/17 Wabash Middle School tour		32	
6/16/17 Star lab teacher training			3
6/22/17 Tech Trek Girls tours		76	
6/23/17 Sandia Lab REU students		20	
6/28/17 Science Club Connection: Maine HS			18
Totals	125	406	273

46 QSU3 FY2017

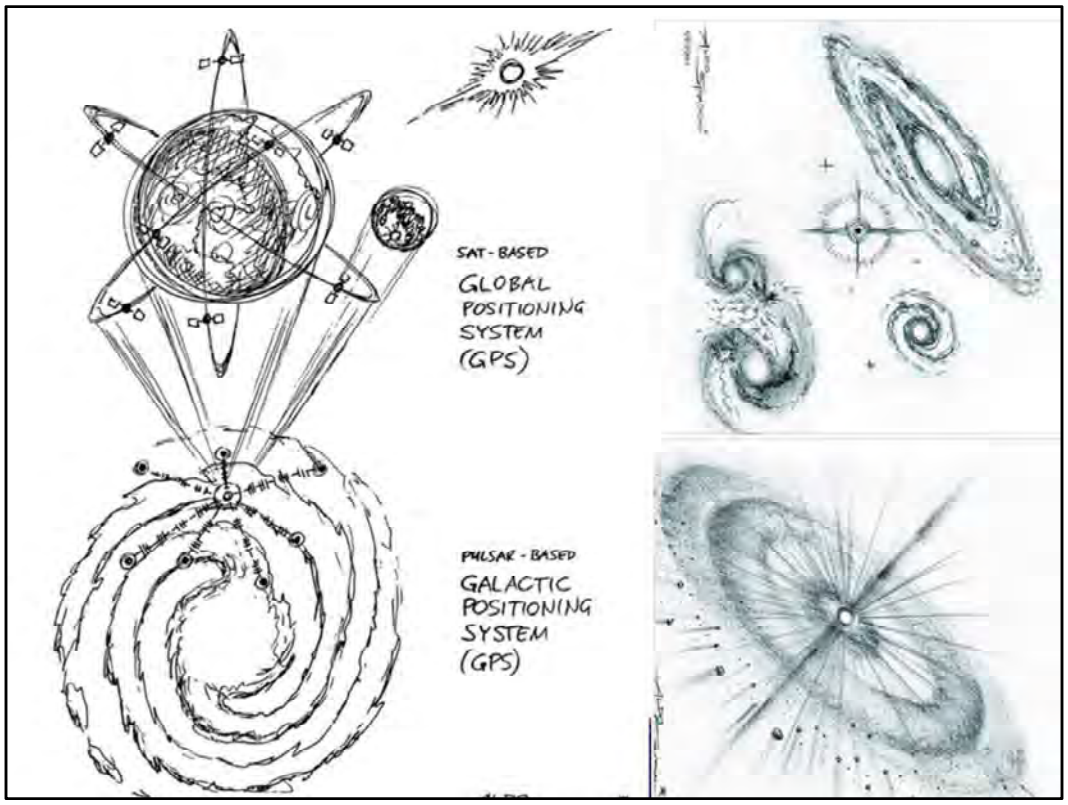
We're serving more schools than adults in our tours, but you may notice that it's a wide variety of students from elementary schools to REU students from NM Tech. The outreach events serve both students and teachers. The Starlab events traditionally involve some teacher professional development and leaving the equipment in the school for a week, so there is a multiplying effect and the teachers can provide programming over an extended period of time.

Some of the outreach is also done via Skype, the Science Club Connection with the high school in Maine, is an annual event, this year Judy skyped in with the REU students who were in Socorro and they with the high school students about their research experiences and career goals.



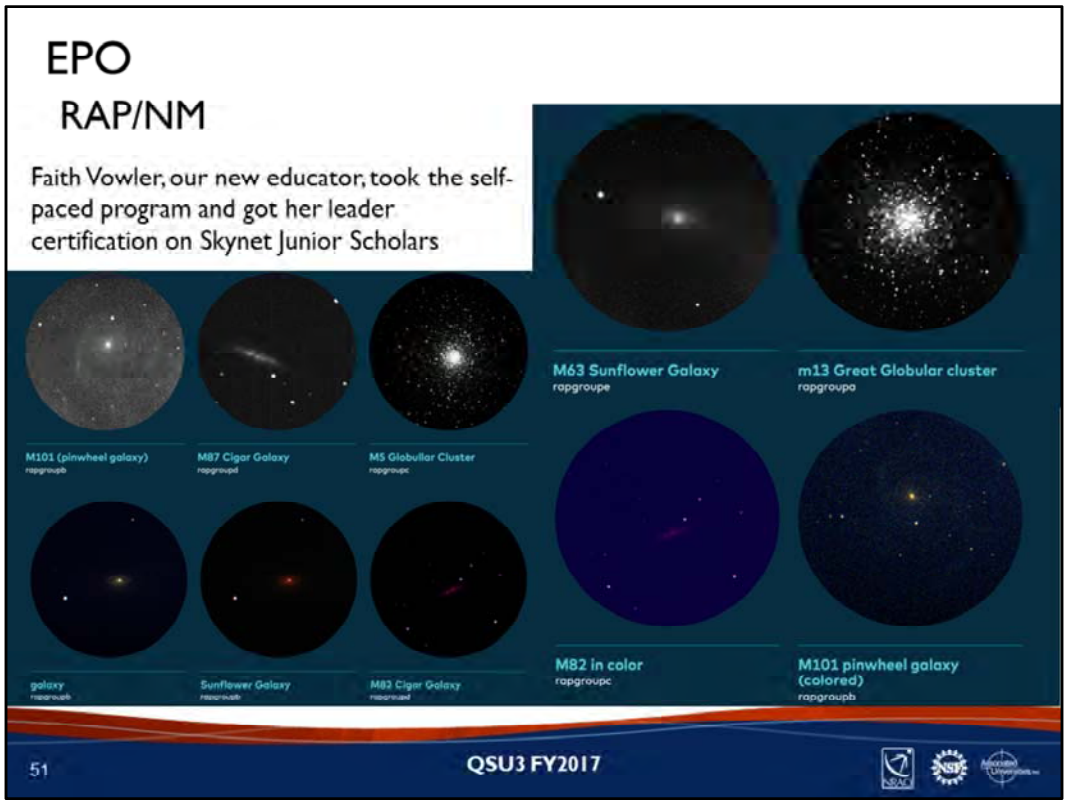
You've heard of embedding reporters with troops in wartime, our little experiment was to embed artists in a science meeting.
We invited four artists: Aldo Spadoni, a classic space artist and retired aerospace engineer; Jon Ramer, president of the International Association of Astronomical Artists (IAAA) who uses an impressionistic dot technique with his space art; and Eddie Edwards, a local Santa Fe artist whose style of editorial illustrations often includes collage. The fourth participant was our own Bill Saxton.

And our own Bill Saxton who illustrates most of our press releases, including this piece, imagining the second supermassive black hole in a famous galaxy. We covered their travel to the ngVLA science meeting in Socorro and have commissioned a full color piece of art from each.



They have agreed to share scans of all the sketches they made during the meeting and will work with us on full color final pieces.

These slides actually belong in my Q4 report, but I wanted to give a preview. Eleven students participated in the Pilot Radio Astronomy and Physics in New Mexico Camp in July. It's a residential camp using the dorms on the NM Tech campus, their meeting rooms, physics labs, and swimming pool. Students from Alamo, Magdalena and Socorro signed up, unfortunately none of the Alamo kids showed up. These pictures look like they sat and listened, but this one session features http://www.jedidahislerphd.com/about.html Jedidah Isler, an astrophysicist who studies black holes and an active advocate for diversity. She skyped in to have a conversation with the kids. The top pic is of one of the REU students presenting to the campers.



The campers also participated in science and engineering activities, they built their own crystal radio set and took observations using the SJS telescopes, first black and white ones and then learned how to process them to create color images. I'll give a full report in Q4 when I have the evaluation.

NRAO

www.nrao.edu
science.nrao.edu

public.nrao.edu

The National Radio Astronomy Observatory is a facility of the National Science Foundation operated under cooperative agreement by Associated Universities, Inc.