



<b>Title:</b> QSUI FY2018	<b>Author:</b> Thisdell/ADs	<b>Date:</b> 02/23/2018
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## National Radio Astronomy Observatory

### Quarterly Status Update (QSU) I FY2018

October – December 2017

PREPARED BY	ORGANIZATION	DATE
Thisdell/ADs	Director's Office	02/23/2018

APPROVALS (Name and Signature)	ORGANIZATION
Nicole Thisdell	NRAO
Tony Beasley	NRAO
Dave Curren	AUI

**NRAO Quarterly Status Update**  
**QSUI FY2018**

**Q1 Performance Assessment**

POP Section	POP Milestone	Milestone	Completion Date	Cost	Schedule	Scope
2.5		<b>Atacama Large Millimeter/submillimeter Array (ALMA)</b>				
		<b>Operations</b>				
	1	AODs in support of telescope operations in Chile	12/31/2017			
	2	Diagnostic support for troubleshooting issues and problems found during array operations	12/31/2017			
	5	Review all the Phase 2 Scheduling Blocks submitted by PIs for ALMA Cycle 5	12/31/2017			
	9	SWST supporting calibration and imaging heuristic development	12/31/2017			
	10	Assemble the Cycle 6 Release 1 (C6R1) requirements providing support for running the Cycle 5 Pipeline on PI data	12/31/2017			
	11	Provide Support for Running Cycle 5 Pipeline	12/31/2017			
	13	Lead role in testing the Cycle 6 ALMA Archive access	12/31/2017			
	14	Data services team will deliver on average between 20–25 datasets per week	12/31/2017			
	16	Preparation of the Cycle 6 Call for Proposals and user documentation including all updates and edits to the ALMA science portal	12/31/2017			
	17	Act as CSs and liaisons to the NA ALMA PI observing programs	12/31/2017			
	18	Initiate the ALMA Ambassadors program and train the scientific community to run outreach events	12/31/2017			
	19	Host data reduction visitors over the FY with the goal of hosting a minimum of 12 visits	12/31/2017			
		<b>Development</b>				
	25	FY2018 (Cycle 5) Study Proposal Awards	12/31/2017			
		<b>Maintenance, Renewal, and Warranty Claims</b>				
	28	NA Antenna Surface Accuracy Improvement Critical Design Review	12/31/2017			
	30	Completion of Antenna Nutators Root Cause Analysis Definition of Mirror Cracking	12/31/2017			
	31	Antenna Nutators – Reword Cost/Benefit Analysis	12/31/2017			
		<b>NRAO –Chile Office</b>				
	34	Collective Bargaining Preparation and Negotiation	12/31/2017			
	36	Multicancha Project	12/31/2017			
	37	Key Performance Indicators	12/31/2017			
	38	OCA Office Move to SCO or Other Location	12/31/2017			
	40	Environmental Work Plan	12/31/2017			
	41	Broadening participation of URM in STEM	12/31/2017			
3.4		<b>Very Large Array</b>				
		<b>VLA Science Operations</b>				
	1	Define VLA general and shared risk capabilities to be offered for semester 2018B	12/31/2017			
		<b>VLA Development</b>				
	26	Deliver ngVLA design and development proposal	12/31/2017			
		<b>VLA Observing Capability Enhancements</b>				
	38	Solar observing promoted from RSRO to SRO	12/31/2017			
4.3		<b>Central Development Laboratory</b>				
		<b>Repair, Maintenance, Production, Support</b>				
	1	Build and test Band 1 amplifiers	12/31/2017			
		<b>Research and Development</b>				
	3	Band 2+ Project Closeout	12/31/2017			
	4	Band 2 components	12/31/2017			
	6	Demonstrate reflectionless filter with active synthetic elements	3/31/2018			
5.6		<b>Science Support and Research</b>				
		<b>Telescope Time Allocation</b>				
	5	TAC Meeting, Semester 2018A	12/31/2017			
	7	Update SW Tools Requirements for TAC Support 2018B	12/31/2017			
	13	SRP/TAC Process Change Decision	12/31/2017			
		<b>Science Ready Data Products</b>				
	15	SRDP Project Scientist Identified	12/31/2017			
	18	SRDP Project Scope Established	12/31/2017			
		<b>Scientific User Support &amp; Student Programs</b>				
	20	New DAs for VLASS Started	12/31/2017			
	22	NM Symposium	12/31/2017			
	23	VLA Data Reduction Workshop	12/31/2017			
	25	CASA Validation	12/31/2017			
	26	CASA Guides	12/31/2017			
	31	Student Observing Support Selection (VLA)	12/31/2017			
		<b>Reference Services</b>				
	36	BiblioMetrix Implementation Decision	12/31/2017			
	37	Metrics Analyst Handover Complete	12/31/2017			
		<b>Scientific Staff &amp; Jansky Fellows</b>				
	39	SciStaff Performance Reviews Completed	12/31/2017			

**NRAO Quarterly Status Update**  
**QSUI FY2018**

**Q1 Performance Assessment**

POP Section	POP Milestone	Milestone	Completion Date	Cost	Schedule	Scope
	43	Jansky Fellows Selection Completed	12/31/2017			
6.5		<b>Data Management &amp; Software</b>				
		<b>Scientific Information Services</b>				
	1	Red Hat Enterprise Linux Migration testing on workstations	12/31/2017			
	3	Installation of a CASA Parallel Test Cluster	12/31/2017			
	9	VLASS and SRDP support	12/31/2017			
		<b>CASA</b>				
	20	CASA v5.1 public release	12/31/2017			
		<b>CASA Pipeline</b>				
	22	CASA ALMA Cycle 5 pipeline release	12/31/2017			
		<b>SSA</b>				
	24	Archive Access Tool release 3.0	12/31/2017			
	26	2018B PST and 2018A OPT release	12/31/2017			
		<b>ARDG</b>				
	32	Algorithm R&D group implementation plan	12/31/2017			
7.5		<b>Program Management Department</b>				
		<b>New Mexico Operations</b>				
	1	NM Documentation Support	12/31/2017			
	2	NM PM/SE Learning Opportunities	12/31/2017			
	3	NM Proposal Development Leadership	12/31/2017			
	4	NM PM/SE Project Leadership	12/31/2017			
	5	ngVLA PM/SE Support for Design Proposal	12/31/2017			
		<b>LBO</b>				
	8	LBO Documentation Support	12/31/2017			
	10	LBO PM/SE Project Leadership	12/31/2017			
		<b>CDL</b>				
	11	CDL Documentation Support	12/31/2017			
	12	CDL PM/SE Learning Opportunities	12/31/2017			
	13	CDL Proposal Development Leadership	12/31/2017			
	14	CDL PM/SE Project Leadership	12/31/2017			
	15	CDL Band I CLNA Quarterly Reports	12/31/2017			
		<b>ALMA Development</b>				
	17	ALMA-D Cycle 5 Studies Commence	12/31/2017			
		<b>SRDP</b>				
	20	SRDP Complete Project Planning Documents	12/31/2017			
		<b>Headquarters</b>				
	22	PMHQ Observatory-wide Documentation Support	12/31/2017			
	24	PM/SE Training/Workshop	12/31/2017			
	25	PMHQ PM/SE Project Leadership	12/31/2017			
		<b>Sport Facility at ALMA OSF</b>				
	26	Sport Facility at ALMA OSF Construction Contract Awarded	12/31/2017			
		<b>VLA Electrical Infrastructure Upgrade</b>				
	30	VLA Electrical Infrastructure Upgrade Project Planning	12/31/2017			
8.5		<b>Education and Public Outreach</b>				
		<b>STEAM</b>				
	1	Assessment of opportunities to grow the program beyond cultural exchange	12/31/2017			
	7	Develop and administer survey about current outreach	12/31/2017			
		<b>News and Media Relations</b>				
	12	Review of other science news websites to define types of content	12/31/2017			
	16	Establish social media calendar	12/31/2017			
	18	Create blog template for NRAO blogs	12/31/2017			
		<b>Multimedia Engagement</b>				
	22	Define framework for CDL virtual tour	12/31/2017			
	26	Define the framework of "the Basics"	12/31/2017			
	29	Establishing priorities for cataloging process	12/31/2017			
		<b>Visitor Center Operations</b>				
	30	Audit current brochures and handouts	12/31/2017			
9.4		<b>Computing and Information Services</b>				
	1	Migration to Microsoft Windows 10	12/31/2017			
	6	Bi-annual network perimeter scan	12/31/2017			
	12	Implement "Enhanced Computing Support"	12/31/2017			
10.3		<b>Office of Diversity &amp; Inclusion</b>				
		<b>Diversity Council</b>				
	1	Diversity Council Meeting	12/31/2017			
		<b>Local and National Programs</b>				

**NRAO Quarterly Status Update**  
**QSUI FY2018**

**QI Performance Assessment**

POP Section	POP Milestone	Milestone	Completion Date	Cost	Schedule	Scope
	3	RAMP-UP	12/31/2017			
		<b>International Programs</b>				
	6	ODI Chile Undergraduate Recruiting	12/31/2017			
	9	Diversity and Cultural Awareness Program Plan Developed and Implemented	12/31/2017			
11.7		<b>Human Resources</b>				
		<b>Human Resources</b>				
	10	JAO Collective Bargaining	12/31/2017			
12.2		<b>Science Communications</b>				
	1	Update NRAO Research Facilities brochure	12/31/2017			
13.7		<b>Administration</b>				
		<b>Budget</b>				
	3	Develop cost estimator position requirements, job description and advertise position. Form a search committee.	12/31/2017			
		<b>Environmental, Safety and Security</b>				
	5	Training workers on fall and equipment hazards	12/31/2017			
	8	Modification of policies to prohibit discouraging workers from reporting an injury or illness. Supervising training on new policies	12/31/2017			
		<b>Management Information Services</b>				
	10	Prepare Project Plan and Schedule for upgrade to 9.2 and order Upgrade Equipment	12/31/2017			
14.3		<b>Spectrum Management</b>				
	1	WP 7D meeting	12/31/2017			
15.2		<b>Director's Office</b>				
		<b>ALMA</b>				
	1	ALMA Board Meeting	12/31/2017			
	2	ALMA Director's Council	12/31/2017			
		<b>Corporate Meetings</b>				
	3	AUI Board of Trustees Meetings	12/31/2017			
	4	AUI Executive Committee Meetings	12/31/2017			
		<b>Science Community</b>				
	6	Appoint new Users Committee members	12/31/2017			
		<b>Management Reviews</b>				
	8	NSF Annual Program Review	12/31/2017			

POP Section	POP Milestone	Milestone	Completion Date	QI Performance Assessment		
				Cost	Schedule	Scope
		<b>ngVLA</b>				
2.2		<b>Antenna Reference Design</b>				
	1	Initiate contract for the ngVLA Costed Antenna Reference Design	12/31/2017			
3.5		<b>Education and Public Outreach</b>				
	1	Launch second round of ngVLA community studies	12/31/2017			
4.3		<b>Technical Development</b>				
	1	Release Science Requirements document	12/31/2017			
	2	Release Operations & Maintenance Concept document	12/31/2017			
5		<b>Administration and Management</b>				
5.1		<b>Project Office</b>				
	1	Complete recruitment and hiring process for open ngVLA positions	12/31/2017			
5.4		<b>Cost Estimation</b>				
	1	Recruit Cost Estimator	12/31/2017			
5.5		<b>Systems Engineering</b>				
	1	Provide initial versions of systems engineering process planning and documentation	12/31/2017			
5.6		<b>Requirements Management</b>				
	1	Provide initial versions of Requirements Management process planning and documentation	12/31/2017			



POP MILESTONE # 2.5.28

ALMA

NA Antenna Surface Accuracy Improvement CDR

Cost

Schedule

Scope

COST:

Labor Actuals	Expected
\$0	\$0
Material Actuals	Expected
\$0	\$0
Travel Actuals	Expected
\$0	\$0

SCOPE:

Conduct a CDR for the proposed Receiver Cabin Wall Heater System to confirm satisfactory performance for resolving the Antenna surface thermal dependence problem. The CDR should also address impacts on existing antenna systems, any heater system design/hardware changes prior to installation on all N.A.Antennas, and proposed schedule for installation on the remaining antennas.

SCHEDULE:




Milestone	Schedule	Target
I Conduct Wall Heater System CDR	12/31/2017	04/15/2018

RISK & MITIGATION:

Risk	Mitigation
I Cannot complete this milestone in Q1	I Correct heater system design deficiencies and test corrective actions prior to proceeding to CDR

2

QSUI FY2018

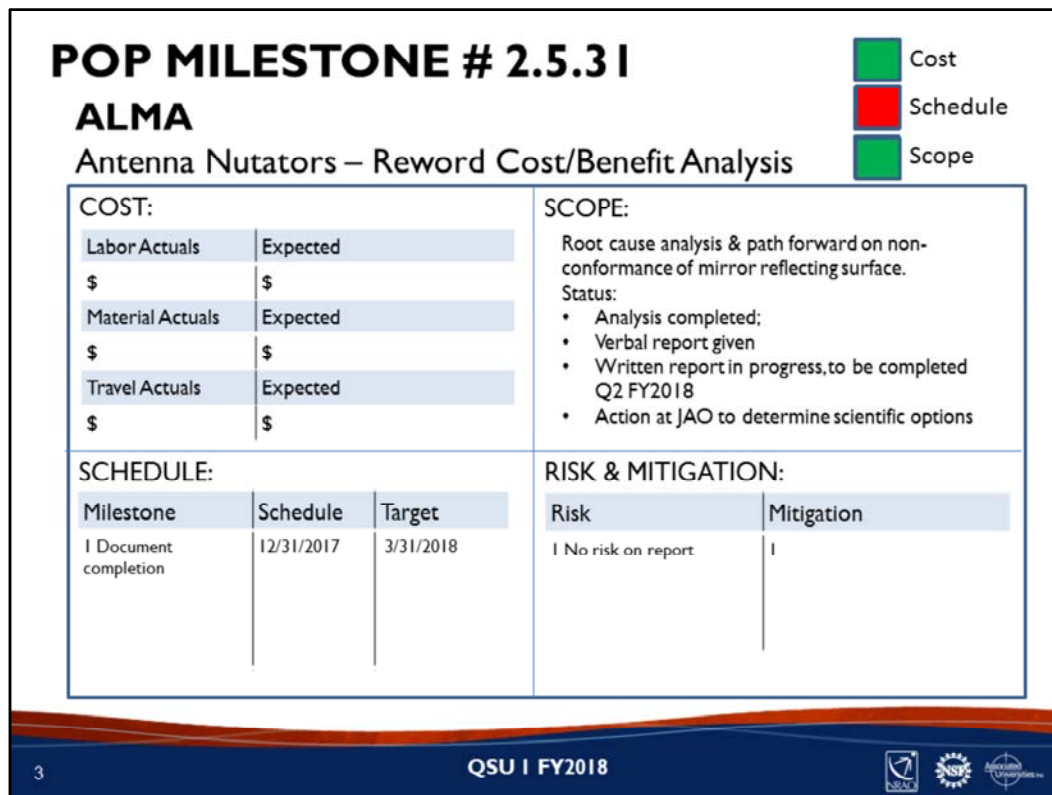
**COST:** The vendor is responsible for resolving this issue.

**SCOPE:** The root cause of the surface accuracy behavior has been traced to local temperature variations in the antenna receiver cabin wall that generate mechanical strain (due to thermal expansion/contraction) which is transferred through the antenna back-up structure (BUS) and “imprinted” on the reflecting surface of the dish. The antenna contractor, Vertex Antennentechnik, GmbH, has developed a mitigation system consisting of thermostatically controlled wall heaters that may be adjusted to maintain more uniform wall temperature and a corresponding stable surface rms versus ambient temperature. This concept was tested via astrophotography and thermocouple readings during FY2017 on four antennas (DV06, DV09, DV14, and DV25). The planned CDR is meant to confirm the heater system’s ability to improve the overall antenna surface thermal performance, identify any impacts to other Antenna systems, and identify any design and/or hardware changes prior to installation on the remaining N.A. Antennas.

**SCHEDULE:** Final analysis and assessment of astrophotography results which were delayed because of poor AOS weather conditions and JAO Operations decisions were not completed until the first of November 2017. The assessment indicated mixed heater system performance with the system on DV09 performing at or above expectations; however, the test systems on DV06, DV14, and DV25 appeared to provide no or marginal improvements to antenna surface thermal performance. Based on these results, both NRAO and Vertex concluded that the proposed heater system was not ready for a CDR; instead, a Face-to-Face meeting was conducted on 15 November 2017 to discuss the prototype system performance. It was concluded at this F2F Meeting that poor performance on the three Antennas was likely the result of the Controllers not receiving adequate feedback from the wall thermal sensor components combined with the inoperability of several heating pad sections. The path forward is to install improved wall thermal sensors and a real-time logger system in addition to resolving the inoperability of the heater system components. The installation of this improved thermal sensor system is now scheduled for the end of February to be followed by a two week test period. If satisfactory thermal performance is demonstrated on all four antennas, then we proceed to the CDR in early Q3 which would then be followed by the established system installation schedule for the remaining N.A. antennas.

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





COST: No impact.

SCOPE: No impact.

SCHEDULE: No impact.

**RISK & MITIGATION:** Analysis of non-conformance and options of path forward have been completed. The non-conformances cannot be repaired at a modest cost. On the other hand, the JAO has not scheduled scientific commissioning of the capability and may have an alternative (fast scanning). The JAO will assess scientific need and options before a path forward will be determined. A final write-up of findings on the nutators will be completed in Q2. NA plans to suspend work on the project when that document is completed and is making no further commitments to the effort.

POP MILESTONE # 2.5.36

NRAO-Chile Office

Multicancha Project, Contract Signature

Cost

Schedule

Scope

COST:

Labor Actuals	Expected
\$21,000	\$0
Material Actuals	Expected
\$500	\$0
Travel Actuals	Expected
\$130	\$0

SCOPE:

Signature of turnkey contract for indoor sport facility at ALMA OSF did not happen in Q1. Project funding and approval to award contract was secured in January 2018.Scope of construction project is not affected by delay of contract signature.

SCHEDULE:




Milestone	Schedule	Target
I Contract Signature	12/31/2017	1/31/2018

RISK & MITIGATION:

Risk	Mitigation
I "Marching army" costs (mostly labor)	I Earlier finish of Chilean labor (PM) + less PMD time

4

QSU1 FY2018

**COST:** Since contract signature is expected in late January/early February, the cost of a one-month delay with respect to the POP milestone was estimated using Q1 monthly averages. This "marching army" cost is mostly comprised of labor in Chile and PMD time (ICC and IDC affect all expenses, but were included in labor actuals for lack of a more appropriate category). Conceptually, a delay of one month would add this cost at the end of the project, in contrast to an expected \$0. In practice, an earlier finish of PM labor in Chile and less PMD time were identified as measures to mitigate this risk.

**SCOPE:** There are no changes in project scope, i.e. the construction contract is unaltered by signature delay.

**SCHEDULE:** The current status is consistent with the general timeframe presented to NSF in December 2017.

**RISK & MITIGATION:** Mitigation measures are also in line with the proposal presented to NSF.



POP MILESTONE # 2.5.37

NRAO-Chile Office

Key Performance Indicators

Cost

Schedule

Scope

COST:

Labor Actuals	Expected
\$0	\$0
Material Actuals	Expected
\$0	\$0
Travel Actuals	Expected
\$0	\$0

SCOPE:

In Q1, several KPIs were defined to measure OCA performance (partially achieved milestone). What is missing is an assessment of JAO perceptions and evaluations of service.

SCHEDULE:




Milestone	Schedule	Target
I Gauge JAO perceptions and evaluations of OCA service.	12/31/2017	9/30/2018

RISK & MITIGATION:

Risk	Mitigation
I Cannot complete this milestone in Q2-Q3 (collective bargaining period).	I Design and conduct a service satisfaction survey by Q4.

5

QSU1 FY2018

**COST:** There are no costs associated with missing part of this milestone.

**SCOPE:** High-level metrics for NRAO reporting to NSF were identified and are in use since FY2017. The KPIs referred to here are lower-level indicators that allow comparison to market standards or benchmarks appropriate to the specific work done by OCA (e.g. days between receipt of information and processing of purchase requests, days it takes to pay travel reimbursements, etc.). Several of these KPIs were identified and included in the PEP process during Q1.

**SCHEDULE:** A survey to gauge perceptions and evaluations of service will be designed and conducted before the end of Q4. This must be coordinated and agreed upon with the new ALMA director and JAO HR.

**RISK & MITIGATION:** During the lead up to collective bargaining (Q2) and actual negotiation period (Q3), OCA as employer of local staff must restrict its communications to employees. Circulating a survey to measure perceptions and evaluations of OCA service would be ill-advised at this time. Scheduling of survey before end of Q4 mitigates this risk.

## POP MILESTONE # 4.3.4

### Central Development Laboratory (CDL)

#### Band 2 Components

 Cost  
 Schedule  
 Scope

#### COST:

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

#### SCOPE:

The revised OMT design has been fabricated and evaluated prior to gold plating. Gold plated OMTs have been received from the vendor. Only another round of evaluation remains.

#### SCHEDULE:

Milestone	Schedule	Target
I Evaluation of the Band 2+ OMT	12/31/2017	2/28/2018

#### RISK & MITIGATION:

Risk	Mitigation
I Evaluation might result in non compliant performance	I No mitigation necessary, since there is no need to perfect the Band 2+ design/performance

COST: Not applicable / not a concern.

SCOPE: The revised OMT design has been fabricated and evaluated prior to gold plating. Gold plated OMTs have been received from the vendor. Only another round of evaluation remains.

SCHEDULE: This is only a few man days of effort and should be completed by the revised target date.

RISK & MITIGATION: As the Band 2 construction project has not been awarded, there is no risk associated with success/failure resulting from the evaluation. The activity will be halted after evaluation is completed.

## POP MILESTONE # 4.3.6

### Central Development Laboratory (CDL)

Demonstrate Reflectionless Filter with Active Synthetic Elements



#### COST:

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

#### SCOPE:

The first attempt using SPICE simulations indicates the presence of a common-mode instability which needs to be further studied and resolved. At this point, the PI remains cautiously optimistic about the prospects of achieving the original scope. Further updates will be provided in subsequent quarterlies as the situation evolves as a result of further investigation.

#### SCHEDULE:

Milestone	Schedule	Target
1 Demonstrate Reflectionless filter with active synthetic elements	3/31/2017	9/30/2018

#### RISK & MITIGATION:

Risk	Mitigation
1 Further study may or may not resolve the described problem	1 Allocation of additional time to pursue the investigation will allow time to try to resolve the problem 2 This is an R&D milestone, scope could be redefined later if/as necessary. Does not impact any other POP milestone

7

QSU I FY2018



**COST:** Not applicable / not a concern.

**SCOPE:** For now, the PI remains cautiously optimistic about the prospects of achieving the original scope. Further updates will be provided in subsequent quarterlies as the situation evolves as a result of further investigation.

**SCHEDULE:** A first attempt has been made as planned using SPICE simulations, but has so far run into difficulties. The problem seems to be the negative floating element. While it has been possible to stabilize it differentially, there is a common-mode instability that remains unresolved, possibly due to common-mode parasitics, and this remains to be analyzed/investigated carefully.

**RISK & MITIGATION:** Further study may or may not resolve the described problem. Allocation of additional time to pursue the investigation will allow time to try to resolve the problem. This is an R&D milestone, scope could be redefined later if/as necessary. Does not impact any other POP milestone.

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# POP MILESTONE # 5.6.15

## Science Support & Research

### SRDP Project Scientist Identified

Cost




Schedule

Scope

COST:			SCOPE:	
Labor Actuals	Expected		No change to project scope	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
1 ID Project Scientist	12/31/2017	April 2018	1 Resourcing understaffed	1 Proj. Dir. Serve as interim
			2 Proj. Dir. Oversubscribed	2 None / Accept

8

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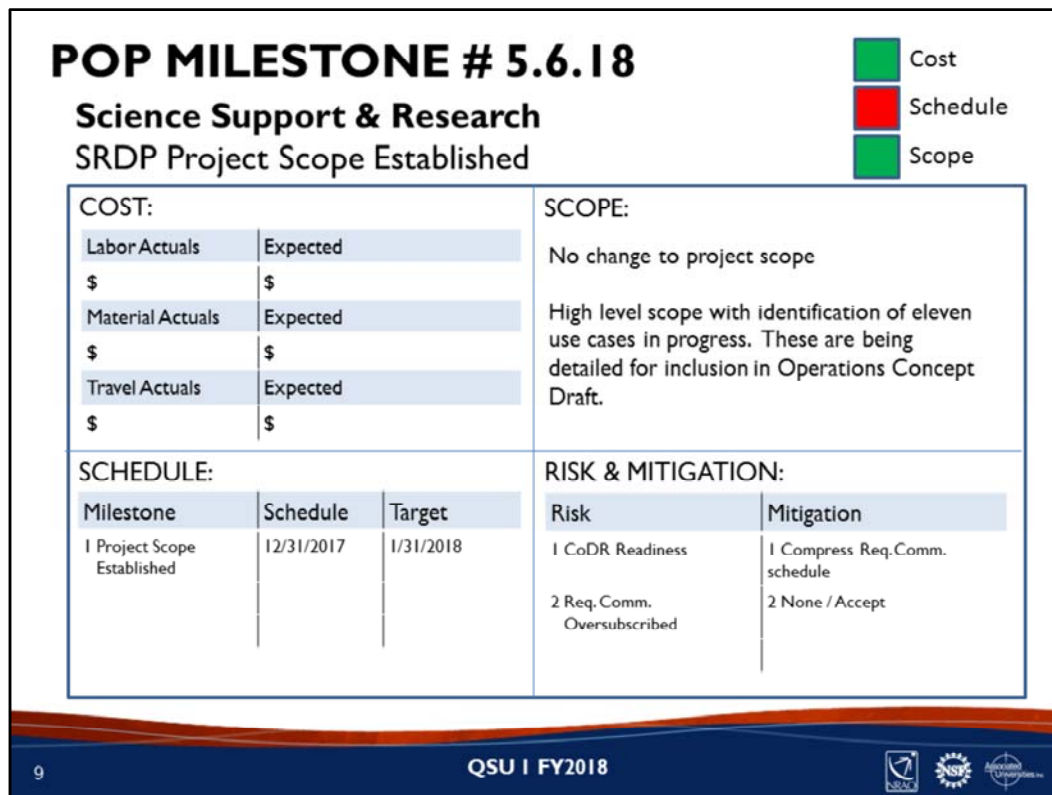




COST: No Impact.

SCOPE: No Impact.

SCHEDULE: Difficulty in recruiting a candidate for the position of Project Scientist has resulted in several months' delay. The position is in active recruitment. Although the position will remain open until filled, we hope to make an appointment early Q3 (April).

RISK & MITIGATION: Primary Risk: Resourcing understaffed – Mitigation is for the Project Director to fill role as interim. Secondary Risk: Project Director Oversubscribed – No real mitigation for this, accept risk.



**COST:** No Changes to Project Cost.

**SCOPE:** No Change to Project Scope.

**SCHEDULE:** Difficulty in recruiting a candidate for the position of Project Scientist has delayed both scope definition and requirements development, however the position is in recruitment (Milestone #5.5.15). The SRDP Requirements Committee has been convened with the Project Director acting as interim chair. The committee has identified eleven use cases, which define the scope of the project. These use cases are being fully detailed in the draft Operations Concept document, most of which have matured to draft form, remaining cases expected to mature during Jan. The Stakeholder Requirements document is also in draft and is being developed in parallel; the Project Manager is working with the Project Director and Committee to incorporate the use cases and concepts into the requirements flow down. A system engineering consultant has been retained to ensure no delay is incurred due to staffing levels within the PMO.

Project scope definition is dependent upon the outcome of an internal requirements review, which the NRAO User Committee and the CASA User Committee will both be asked to affirm. Discussion with both committees is in progress; with the goal to complete the scope definition, Operations Concept Document and the Stakeholder Requirements document in time to meet the CoDR milestone in Q2 FY2018.

**RISK & MITIGATION:** Primary Risk: CoDR Readiness. Mitigation is to manage Requirements Committee closely, compress their task schedule completion, and assure timely completion of committee tasks. Secondary Risk: Requirements Committee members oversubscribed. No real mitigation for this, accept risk.

POP MILESTONE # 5.6.20

Science Support & Research

New DAs for VLASS started

Cost

Schedule

Scope

<div>COST:</div> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<div>SCOPE:</div> <div>No change to project scope</div>		
Labor Actuals	Expected																
\$	\$																
Material Actuals	Expected																
\$	\$																
Travel Actuals	Expected																
\$	\$																
<div>SCHEDULE:</div> <table> <tr> <th>Milestone</th> <th>Schedule</th> <th>Target</th> </tr> <tr> <td>1 New DAs started</td> <td>12/31/2017</td> <td>2/15/2018</td> </tr> </table>			Milestone	Schedule	Target	1 New DAs started	12/31/2017	2/15/2018	<div>RISK &amp; MITIGATION:</div> <table> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>1 Delayed data release</td> <td>1 Use scistaff effort</td> </tr> <tr> <td>2 Delays to single epoch</td> <td>2 Refocus scistaff ASAP</td> </tr> </table>			Risk	Mitigation	1 Delayed data release	1 Use scistaff effort	2 Delays to single epoch	2 Refocus scistaff ASAP
Milestone	Schedule	Target															
1 New DAs started	12/31/2017	2/15/2018															
Risk	Mitigation																
1 Delayed data release	1 Use scistaff effort																
2 Delays to single epoch	2 Refocus scistaff ASAP																

10

QSU | FY2018

NSF

NSF

NSF

**COST:** No Impact.

**SCOPE:** No Impact.

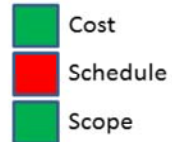
**SCHEDULE:** Recruitment took longer than hoped, but appointments have been made to both funded positions, and start dates are 8 January 2018 and 15 Feb 2018. A third position may be filled for Q4 if need is confirmed based on actual workload from early stages of the survey.

**RISK & MITIGATION:** Primary risk: Release of Quick Look images delayed. Mitigation: Scientific staff effort applied to data processing. Secondary risk: Decreased scientific staff attention to Single Epoch analysis and other issues. Mitigation: Refocus scientific staff effort ASAP, accept delay in delivery of SE images and/or consider bringing forward hiring of third DA.

## POP MILESTONE # 7.5.2

### Program Management Department

#### NM PM/SE Learning Opportunities



<b>COST:</b>			<b>SCOPE:</b>	
Labor Actuals	Expected		No impact	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
<b>SCHEDULE:</b>			<b>RISK &amp; MITIGATION:</b>	
Milestone	Schedule	Target	Risk	Mitigation
I QI Learning Session	12/31/18	02/15/18	I N/A	

COST: No impact.

SCOPE: No impact.

SCHEDULE: The NM PM/SE learning opportunity was originally scheduled for early December, but due to a number of scheduling conflicts was postponed until Q2.

RISK & MITIGATION: No impact.



## POP MILESTONE # 7.5.26

### Program Management Department

Sport Facility at ALMA OSF Construction Contract Awarded



COST: To be Re-baselined			SCOPE:	
Labor Actuals	Expected		No change in scope	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
I Sport Facility at ALMA OSF Construction Contract Awarded	Q1 2018	Completed Q2 2018		

COST: A change request to re-baseline is in progress.

SCOPE: No Change in scope

SCHEDULE: A change request to re-baseline is in progress.

RISK & MITIGATION: Primary Risk is an interruption caused by a strike interrupting scheduled progress.

## POP MILESTONE # 8.5.26

### Education and Public Outreach

Define the framework of “the Basics”



COST:			SCOPE:	
Labor Actuals	Expected		Update old content on the new website for the basics of radio astronomy.	
\$	\$2500			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
1 Identify science writer	12/31/2017	02/15/2018	I These are low, we want to update one piece of the web at a time, these pages have low hit rates and there are no public expectations for new content	I We will contract with a writer to work with our team
2 Coordinating meeting with multimedia group	12/31/2017	03/01/2018		
3 Deliver new content	12/31/2017	03/20/2018		

13

QSU | FY2018



**COST:** \$2500 will be covered by salary breakage for artist vacancy.

**SCOPE:** No change, update: <https://public.nrao.edu/radio-astronomy/what-are-radio-waves/> and <https://public.nrao.edu/radio-astronomy/what-is-radio-astronomy/>.

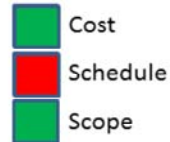
**SCHEDULE:** Contract in mid February for completion by March 20.

**RISK & MITIGATION:** Current staff is unable to meet the writing load, so this piece will be contracted out.

## POP MILESTONE # 8.5.30

### Education and Public Outreach

#### Audit Current Brochures at VLA



COST:			SCOPE:	
Labor Actuals	Expected		There is a hodge-podge of brochures and handouts at the VLA and we'd like to come up with a consistent branded look to them all. In the numbering issues in the POP, this simply landed in the wrong quarter.	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
I Audit brochures	12/31/2017	Q4	I Branding confusion	I Listing all the handouts and establishing a unified look and feel

14

QSU | FY2018



**COST:** No Impact.

**SCOPE:** No Impact.

**SCHEDULE:** We ended up with two #30's in the POP and this just landed in the wrong quarter. The intent was to do this over the summer and end the year with a unified branded look. The audit will happen in April, with all of the rebranding completed by the end of FY2018.

**RISK & MITIGATION:** This whole project is to mitigate the risk of brand confusion.

## POP MILESTONE # 13.7.8

### Admin (ESS)

Modification of policies to prohibit discouraging workers from reporting an injury or illness. Supervising training on new policies.



COST:			SCOPE:	
Labor Actuals	Expected		The supervisory training has not been completed for compliance with the OSHA anti-retaliation rule. OSHA had changed the enforcement dates and final determinations not made by OSHA regarding drug testing and incentive programs. This made it impossible to develop and present training by the planned date.	
\$ No changes	\$			
Material Actuals	Expected			
\$ No changes	\$			
Travel Actuals	Expected			
\$ No changes	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
1 Complete supervisory training	12/31/17	2/28/18	1 No risk for compliance as OSHA deferral will result in no violations	2 Complete training in timely manner
			2 Risk for compliance exists if not completed by end of Q2	

15

QSU | FY2018



**COST:** No change.

**SCOPE:** The supervisory training has not been completed for compliance with the OSHA anti-retaliation rule. OSHA had changed the enforcement dates and final determinations not made by OSHA regarding drug-testing and incentive programs. This made it impossible to develop and present training by the planned date.

**SCHEDULE:** Complete supervisory training by 2/28/2018.

**RISK & MITIGATION:** . No risk for compliance as OSHA deferral will result in no violations. Risk for compliance exists if not completed by end of Q2- Complete training in timely manner.

## POP MILESTONE # 13.7.10

### Admin (MIS)

Prepare Project Plan and Schedule for upgrade to 9.2, order equipment



#### COST:

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

#### SCOPE:

Update Oracle J.D.Edwards ERP to new release (from 9.0 to 9.2). Partial Hardware updates are within scope of this project.

#### SCHEDULE:

Milestone	Schedule	Target
1 Prepare Plan	Q1	Completed
2 Order Hardware	Q1	02/9/2018

#### RISK & MITIGATION:

Risk	Mitigation
1 Hardware not ordered	1 Ordered Feb 9, no impact to schedule

COST: No impact.

SCOPE: Partial Hardware updates are within scope of this project.

SCHEDULE: Hardware ordered February 9, 2018.

RISK & MITIGATION: Hardware not ordered. Order will be placed upon review of quotes.

# POP MILESTONE # ngVLA 4.3.2

## ngVLA

Release Operations & Maintenance Concept document

Cost

Schedule

Scope

COST:			SCOPE:	
Labor Actuals	Expected		Further develop and document an operations and maintenance concept for the ngVLA.	
\$	\$			
Material Actuals	Expected			
\$	\$			
Travel Actuals	Expected			
\$	\$			
SCHEDULE:			RISK & MITIGATION:	
Milestone	Schedule	Target	Risk	Mitigation
I Release document	12/31/17	03/31/18	I No impact	

17

QSU | FY2018

COST: No impact.

SCOPE: No impact.

SCHEDULE: A charter for the ngVLA Operations and Maintenance Working Group was developed. The Working Group has been recruited and has started to update a preliminary version of the Operations & Maintenance Concept document. This preliminary concept was also described at the ngVLA session titled *The VLA Today and Tomorrow* at the 231<sup>st</sup> meeting of the AAS in National Harbor, MD on January 11. The Working Group started a series of recurring meetings on February 2.

RISK & MITIGATION: No risks associated with this task.

## POP MILESTONE # ngVLA 5.1.1

### ngVLA

Complete recruitment and hiring process for ngVLA

Cost

Schedule

Scope

<b>COST:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 2px;">Labor Actuals</td> <td style="padding: 2px;">Expected</td> </tr> <tr> <td style="padding: 2px;">\$</td> <td style="padding: 2px;">\$</td> </tr> <tr> <td style="padding: 2px;">Material Actuals</td> <td style="padding: 2px;">Expected</td> </tr> <tr> <td style="padding: 2px;">\$</td> <td style="padding: 2px;">\$</td> </tr> <tr> <td style="padding: 2px;">Travel Actuals</td> <td style="padding: 2px;">Expected</td> </tr> <tr> <td style="padding: 2px;">\$</td> <td style="padding: 2px;">\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b>  Recruit and hire staff for the ngVLA project		
Labor Actuals	Expected																
\$	\$																
Material Actuals	Expected																
\$	\$																
Travel Actuals	Expected																
\$	\$																
<b>SCHEDULE:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%; padding: 2px;">Milestone</th> <th style="width: 20%; padding: 2px;">Schedule</th> <th style="width: 20%; padding: 2px;">Target</th> </tr> <tr> <td style="padding: 2px;">I Complete recruitment and hiring process for open ngVLA positions</td> <td style="padding: 2px;">12/31/17</td> <td style="padding: 2px;">03/31/18</td> </tr> </table>			Milestone	Schedule	Target	I Complete recruitment and hiring process for open ngVLA positions	12/31/17	03/31/18	<b>RISK &amp; MITIGATION:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; padding: 2px;">Risk</th> <th style="width: 50%; padding: 2px;">Mitigation</th> </tr> <tr> <td style="padding: 2px;">I No impact.</td> <td style="padding: 2px;"></td> </tr> </table>		Risk	Mitigation	I No impact.				
Milestone	Schedule	Target															
I Complete recruitment and hiring process for open ngVLA positions	12/31/17	03/31/18															
Risk	Mitigation																
I No impact.																	

18
QSU I FY2018

COST: No impact.

SCOPE: : No impact.

SCHEDULE: Job descriptions/postings have been created for a project manager, systems engineer, antenna engineer, software engineer/scientist, mechanical engineer, and three research associates (one each for configuration studies, array calibration, and operations/communications). Interviews have been held for the project manager and systems engineer candidates. The ngVLA recruitment and hiring process is currently underway, with each position in various stages of the recruitment process. The recruiting delays have largely been due to the holidays that occurred during the quarter.

RISK & MITIGATION: No risks associated with this task.



# POP MILESTONE # ngVLA 5.4.I

## ngVLA

### Recruit Cost Estimator

Cost




Schedule

Scope

<b>COST:</b> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b> Recruit the Cost Estimator for the ngVLA project		
Labor Actuals	Expected																
\$	\$																
Material Actuals	Expected																
\$	\$																
Travel Actuals	Expected																
\$	\$																
<b>SCHEDULE:</b> <table> <tr> <th>Milestone</th> <th>Schedule</th> <th>Target</th> </tr> <tr> <td>I Recruit Cost Estimator</td> <td>12/31/17</td> <td>01/22/18</td> </tr> </table>			Milestone	Schedule	Target	I Recruit Cost Estimator	12/31/17	01/22/18	<b>RISK &amp; MITIGATION:</b> <table> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>I No impact</td> <td></td> </tr> </table>			Risk	Mitigation	I No impact			
Milestone	Schedule	Target															
I Recruit Cost Estimator	12/31/17	01/22/18															
Risk	Mitigation																
I No impact																	

19

QSU I FY2018

COST: No impact.

SCOPE: : No impact.

SCHEDULE: The recruitment and hiring process for the Cost Estimator required additional rounds of interviews due to candidate withdrawals. The recruitment and hiring process has completed, and the Cost Estimator started on 01/22/2018.

RISK & MITIGATION: No risks associated with this task.



## Scorecard – FY2017 POP Milestone Carryovers

FY2017 Milestone Carryovers for Quarter I					
POP Section Number	POP Milestone	Milestone	FY17 Due Date	New Completion Date	Status
3.5		Very Large Array			
		VLA Track Maintenance			
	30	Identify and replace 5000 aging or damaged cross-ties during the course of the year	9/30/2017	12/31/2017	Completed
6.4		Data Management & Software			
		VLA System Software			
	18	Implement currently used solar modes	6/30/2017	12/22/2017	Completed
7.4		Program Management Department			
		New Mexico Operations			
	2	NM PMSE Learning Opportunities	9/30/2017	10/10/2017	Completed
		Headquarters			
	30	Incorporate Changes and Feedback into SOPs	9/30/2017	10/30/2017	Completed
8.5		Education & Public Outreach			
		Visitor Center Operations			
	17	VLA Visitor Center Education and Interpretive Plan completed	6/30/2017	12/31/2017	Completed
	18	VLA Visitor/Education Center architectural schematic designs completed	6/30/2017	3/31/2018	due Q2
11.7		Human Resources			
		Employment			
	14	Workforce Management Plan	3/31/2017	12/1/2017	Incomplete
12.1		Communications			
	4	Publish 2016 NRAO Annual Report	9/30/2017	2/9/2018	due Q2

## POP MILESTONE FY15 # 3.4.62

### Admin (from NM Ops)

#### Renew VLBA lease for SC and OV

Cost
  Schedule
  Scope

<b>COST:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 2px;">Labor Actuals</td> <td style="width: 70%; padding: 2px;">Expected</td> </tr> <tr> <td colspan="2" style="padding: 2px;">No changes</td> </tr> <tr> <td style="padding: 2px;">Material Actuals</td> <td style="padding: 2px;">Expected</td> </tr> <tr> <td colspan="2" style="padding: 2px;">No Changes</td> </tr> <tr> <td style="padding: 2px;">Travel Actuals</td> <td style="padding: 2px;">Expected</td> </tr> <tr> <td colspan="2" style="padding: 2px;">No changes</td> </tr> </table>			Labor Actuals	Expected	No changes		Material Actuals	Expected	No Changes		Travel Actuals	Expected	No changes		<b>SCOPE:</b> Owens Valley, CA site lease is not renewed. LBO is awaiting lease negotiation outcome by Caltech (we sublease from Cal Tech) and the LA Water and Power. Walter Briskin and Mark McKinnon were contacted on 10 January 2018 by Anthony Readhead of CalTech. CalTech is moving ahead with negotiations with LADWP on the OVRO lease renewal. CalTech hopes to send an draft sublease to LBO by the end of January 2018.		
Labor Actuals	Expected																
No changes																	
Material Actuals	Expected																
No Changes																	
Travel Actuals	Expected																
No changes																	
<b>SCHEDULE:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 30%; padding: 2px;">Milestone</th> <th style="width: 30%; padding: 2px;">Schedule</th> <th style="width: 40%; padding: 2px;">Target</th> </tr> <tr> <td style="padding: 2px;">Owens Valley Lease renewed</td> <td style="padding: 2px;">03/31/2015</td> <td style="padding: 2px;">Unknown</td> </tr> </table>			Milestone	Schedule	Target	Owens Valley Lease renewed	03/31/2015	Unknown	<b>RISK &amp; MITIGATION:</b> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; padding: 2px;">Risk</th> <th style="width: 50%; padding: 2px;">Mitigation</th> </tr> <tr> <td style="padding: 2px;">1 Impact on VLBA operating budget (increase in lease cost)</td> <td style="padding: 2px;">Adjust VLBA Operating budget, if necessary.</td> </tr> <tr> <td style="padding: 2px;">2 Impact on VLBA operations</td> <td style="padding: 2px;">Avoid by periodic follow up of Caltech negotiation progress.</td> </tr> </table>			Risk	Mitigation	1 Impact on VLBA operating budget (increase in lease cost)	Adjust VLBA Operating budget, if necessary.	2 Impact on VLBA operations	Avoid by periodic follow up of Caltech negotiation progress.
Milestone	Schedule	Target															
Owens Valley Lease renewed	03/31/2015	Unknown															
Risk	Mitigation																
1 Impact on VLBA operating budget (increase in lease cost)	Adjust VLBA Operating budget, if necessary.																
2 Impact on VLBA operations	Avoid by periodic follow up of Caltech negotiation progress.																

22
QSUI FY2018

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

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

1. 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.

# POP MILESTONE FY17 # 11.7.14

## Human Resources

### Workforce Management Plan

Cost

Schedule

Scope

<b>COST:</b> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b> No impact		
Labor Actuals	Expected																
\$	\$																
Material Actuals	Expected																
\$	\$																
Travel Actuals	Expected																
\$	\$																
<b>SCHEDULE:</b> <table> <tr> <th>Milestone</th> <th>Schedule</th> <th>Target</th> </tr> <tr> <td>I Develop/Distribute WFM Plan</td> <td>3/31/2017</td> <td>3/31/2018</td> </tr> </table>			Milestone	Schedule	Target	I Develop/Distribute WFM Plan	3/31/2017	3/31/2018	<b>RISK &amp; MITIGATION:</b> <table> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>I No risk</td> <td></td> </tr> </table>		Risk	Mitigation	I No risk				
Milestone	Schedule	Target															
I Develop/Distribute WFM Plan	3/31/2017	3/31/2018															
Risk	Mitigation																
I No risk																	

23

QSU4 FY2016

COST: No impact.

SCOPE: No impact.

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

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

# ESS Exception

## ES&S and NM Ops

### Cryo Fume Hood Exception

Cost

Schedule

Scope

<b>COST:</b> <table> <tr> <td>Labor Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Material Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> <tr> <td>Travel Actuals</td> <td>Expected</td> </tr> <tr> <td>\$</td> <td>\$</td> </tr> </table>			Labor Actuals	Expected	\$	\$	Material Actuals	Expected	\$	\$	Travel Actuals	Expected	\$	\$	<b>SCOPE:</b> <p>Action Items from Cryo Fume Hood event</p> <p>Track progress on completing actions from fume hood fire investigation</p>					
Labor Actuals	Expected																			
\$	\$																			
Material Actuals	Expected																			
\$	\$																			
Travel Actuals	Expected																			
\$	\$																			
<b>SCHEDULE:</b> <table> <tr> <th>Milestone</th> <th>Schedule</th> <th>Target</th> </tr> <tr> <td>1 Emergency evacuation routes posted</td> <td>Q1, FY2018</td> <td>Completed</td> </tr> <tr> <td>2 See exception report for Q2, FY2018 milestones</td> <td></td> <td></td> </tr> </table>			Milestone	Schedule	Target	1 Emergency evacuation routes posted	Q1, FY2018	Completed	2 See exception report for Q2, FY2018 milestones			<b>RISK &amp; MITIGATION:</b> <table> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>1 No risks for Q1</td> <td></td> </tr> <tr> <td>2 Q2 risks include difficulty in recruitment and establishing core team of 6 members.</td> <td>Train existing members and continue recruitment until the full complement can be recruited</td> </tr> </table>			Risk	Mitigation	1 No risks for Q1		2 Q2 risks include difficulty in recruitment and establishing core team of 6 members.	Train existing members and continue recruitment until the full complement can be recruited
Milestone	Schedule	Target																		
1 Emergency evacuation routes posted	Q1, FY2018	Completed																		
2 See exception report for Q2, FY2018 milestones																				
Risk	Mitigation																			
1 No risks for Q1																				
2 Q2 risks include difficulty in recruitment and establishing core team of 6 members.	Train existing members and continue recruitment until the full complement can be recruited																			

24

QSU4 FY2016

## NOTES ARE REQUIRED FOR EACH 4-SQUARE REPORT

COST:

SCOPE:

SCHEDULE:

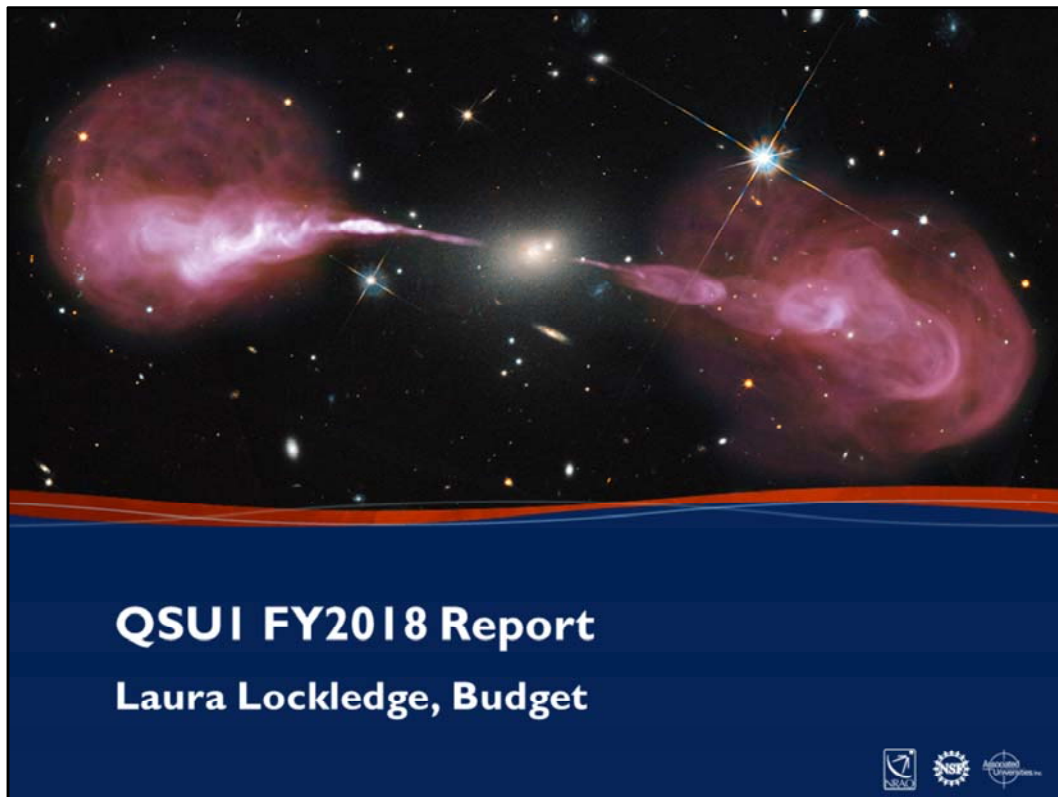
**RISK & MITIGATION:** The fire brigade is a completely volunteer membership. Employees must be recruited and trained. Coordination of training coupled with the recruitment effort could result in having a Fire Brigade that is not a full squad strength of 6 members. Mitigation is to ensure existing members are trained and ready to respond. At the same time continue recruitment efforts until the full squad strength is achieved. This will be an ongoing risk as squad member rollover occurs.

# ES&S – Cryo Fume Hood Event

## Action Items from Investigation

Recommendation	Response / Action	Schedule
Place signs designating proper evacuation locations	Agreed	Q1, FY18, Complete
Establish a core fire team consisting of at least six trained firefighters.	To have a minimum of six people on the fire brigade, identify over seven people who are willing to train and serve in this capacity	Q2, FY18
Monitor refresher training for the VLA fire team on proper site entry methods and perform practice drills at least monthly to demonstrate competency in proper entry, escape, rescue and the two-man rule	Ensure training and drills on entry, escape, rescue and the two-man rule are performed and documented on the recommended cadence	Q2, FY18
Educate management and VLA fire brigade members on the principles of the Incident Command System	ES&S will provide NM Ops with training and guidance on Incident Command protocols for management and fire brigade members	Q2, FY18
Conduct incident response training for all VLA site employees	ES&S will provide training to all VLA employees	Q2, FY18
Develop SOP defining emergency response actions	Operators will attend the Incident Command training provided by ES&S and relevant documentation / training materials updated to be consistent with that training	Q2, FY18
Modify existing hardware, update policies to notify site staff and visitors, as needed, of emergency situations and the need to evacuate to muster areas.	VLA management will investigate how to add more loud speakers around the site to improve the coverage of emergency announcements	Q2, FY18, Complete
ES&S and NMOPs will outline a Fire Brigade training plan	Develop and improve training plans. Continue to schedule meetings, training, and practice sessions, and incorporate any additional training items recommended by the plan	Q3, FY18
Educate the VLA firefighters on hazards of flammable liquids, and the proper storage and protocols on removal of flammable liquids	Fire Brigade will work with ES&S to ensure that training on hazards of flammable liquids, proper storage and protocols on the removal of flammable liquids is performed and documented	Q3, FY18
Inventory and purchase proper fitting brigade gear, including SCBA equipment for each firefighter. Train all firefighters on proper donning and doffing of all gear at least monthly during drills	Ensure that fire-fighting garb is in compliance and inventoried and that all fire brigade members practice monthly to confirm each person's familiarity and comfort with it	Q4, FY18





## Budget Overview: Q1 FY2018

- ICC/IDC reflect FY2017 approved rates
- Benefits @ 34.9% vs. budget of 36%

27

QSU I FY2018



Benefits results are extraordinary for this time of year.

FY2018 ICC/IDC rates have not (as of this writing) been submitted to NSF by AUI.

## CSA-V QI Results

	FY18 POP Budget	FY18 Rev. Budget	FY18 YTD Expenses	YTD % Rev Budget
NSF	32,860	38,860	10,565	27.2%
Carryforward/Other	405	1,308	1,308	0.0%
<b>Total CSA-V Revenues</b>	<b>33,265</b>	<b>40,168</b>	<b>11,873</b>	<b>29.6%</b>
Telescope Ops	11,476	11,476	2,302	20.1%
Development	3,506	7,734	868	11.2%
Science Ops	5,905	6,222	1,167	18.8%
Admin Services	9,464	11,426	1,678	14.7%
Director's Office	2,161	2,500	394	15.8%
Education & Public Outreach	753	810	142	17.5%
<b>FY18, Total</b>	<b>33,265</b>	<b>40,168</b>	<b>6,551</b>	<b>16.3%</b>
<b>FY18 CSA-V Net</b>	<b>0</b>	<b>0</b>	<b>5,322</b>	

QI spending historically low:

- 1) Project start up lag (NM infrastructure, ngVLA)
- 2) October payroll divided between FY2017 and FY2018

- NM Infrastructure program on track
- Includes ngVLA additions in development, ICC, IDC
- Admin services increase includes ngVLA ICC bump + carryover for facilities

## CSA-A QI Results

	FY18 POP Budget	FY18 Rev. Budget	FY18 YTD Expenses	YTD % Rev Budget
NSF	43,480	37,480	10,075	26.9%
Carryforward	13,700	16,291	16,291	100.0%
Canadian Contribution	1,500	1,634	0	0.0%
Other	400	377	235	62.3%
<b>Total CSA-A Revenues</b>	<b>59,080</b>	<b>55,782</b>	<b>26,601</b>	<b>47.7%</b>
Telescope Ops	22,521	25,389	5,064	19.9%
Development	5,585	9,894	348	3.5%
Science Ops	6,869	7,215	1,181	16.4%
Admin Services	7,759	9,653	1,742	18.0%
Director's Office	2,894	2,971	663	22.3%
Education & Public Outreach	679	662	116	17.5%
<b>FY18, Total</b>	<b>46,307</b>	<b>55,784</b>	<b>9,114</b>	<b>16.3%</b>
<b>FY18 CSA-A Net</b>	<b>12,773</b>	<b>-2</b>	<b>17,487</b>	

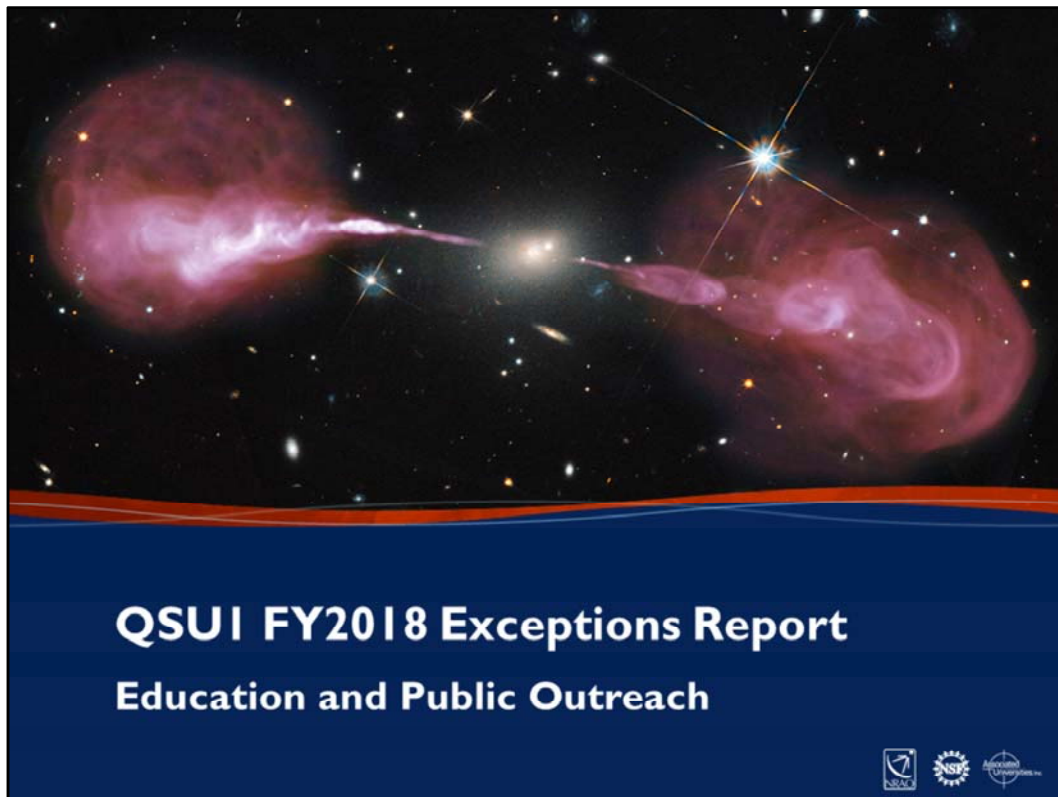
QI spending historically low: October payroll divided between FY2017 and FY2018.

- Other funding from ASIAA received as credits in Telescope Ops (removed from totals)
- Tel Ops includes currency reserve and balance of NSF forward-funded projects
- Admin Services includes budget for Multichancha construction
- EPO reduction due to salary breakage

## ICC QI Results

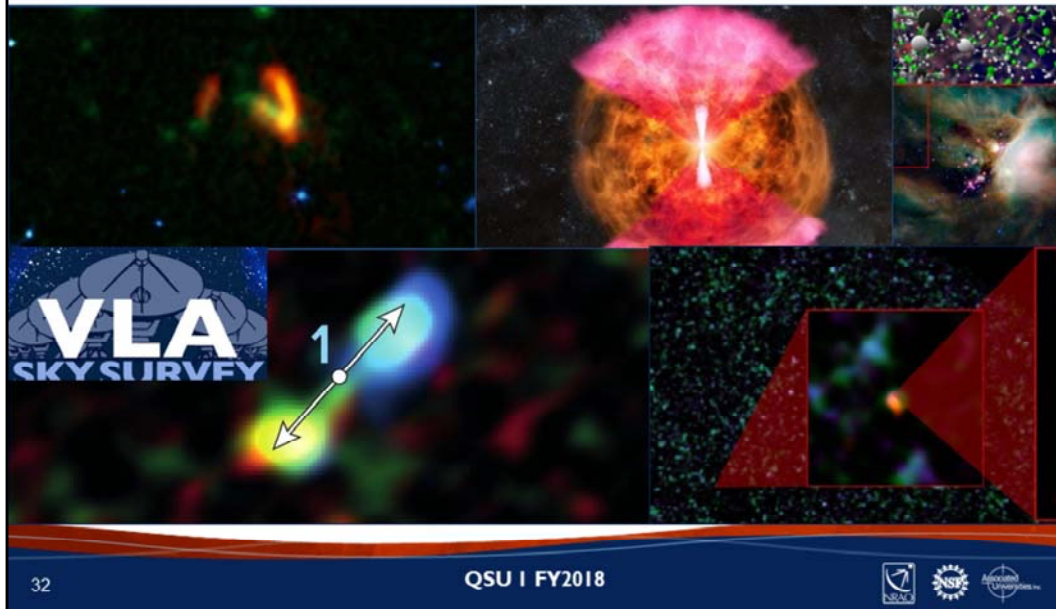
	FY18 POP Budget	FY18 Rev. Budget	FY18 YTD Expenses	YTD % Rev Budget
NRAO Recoveries	12,828	12,865	2,201	17.1%
External Recoveries	3,381	3,381	783	23.2%
<b>Total ICC Revenues</b>	<b>16,209</b>	<b>16,246</b>	<b>2,984</b>	<b>18.4%</b>
Telescope Ops	105	105	20	19.0%
Development	429	439	86	19.6%
Science Ops	2,379	2,416	479	19.8%
Admin Services	11,244	11,234	2,195	19.5%
Director's Office	2,052	2,052	346	16.9%
<b>FY18, Total</b>	<b>16,209</b>	<b>16,246</b>	<b>3,126</b>	<b>19.2%</b>
<b>FY18 ICC Net</b>	<b>0</b>	<b>0</b>	<b>-142</b>	

ICC underrecovered by 142K. Reflects lower FY2017 ICC rate rather than budgeted FY2018 rate.



## EPO: Exception Report

### News and Public Info



It was a solid quarter for news with 14 press products, which generated 217 national (US) and 985 international media stories about NRAO programs, telescopes, milestones, and science, as reported by the Meltwater media monitoring service. The international hits far outstrip other quarters for the past year and is nearly triple that reported in Q4 of 2017.

Four press releases were generated from ALMA science. The most significant of these related to observations near Sgr\* A and signs of star formation there (NRAO's own Al Wootten was involved in this research). ALMA also made significant strides in observing surprisingly massive galaxies in the Early universe.

The real newsmaker of the quarter, however, was the VLA, which provided essential data for the multimessenger astronomy observations of colliding neutron stars. This result actually generated two VLA press releases, one just a few weeks ago announcing the results of ongoing observations.

VLBA also made considerable news with its parallax measurements of the Milky Way.



## EPO: News and Public Info

### Three VLA Discoveries in the News



#### IMAGE RELEASE: Shocking Results of Galaxy-Cluster Collisions

November 7, 2017 at 11:49 am | News Release

A giant collision of galaxy clusters has produced a spectacular panorama of shocks and energy produced by the violent encounters.



#### Radio Observations Point to Likely Explanation for Neutron-Star Merger Phenomena

December 20, 2017 at 1:00 pm | News Release

VLA observations have pointed to the most likely explanation for the phenomena that followed the violent collision of a pair of neutron stars in a galaxy 130 million light-years from Earth.



#### Radio "Eyes" Unlocking Secrets of Neutron-Star Collision

October 16, 2017 at 10:00 am | News Release

The VLA made the first detection of radio waves coming from the neutron-star collision that generated a ripple of gravitational waves. Radio telescopes will continue to reveal new facts about this phenomenon in the coming months.

33

QSU | FY2018

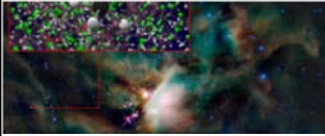


As noted, the VLA was instrumental in observations of the aftermath of the gravitational wave / neutron star event. Both the initial announcement and follow-up observations were true collaborative efforts between Charlottesville and Socorro—with nearly the entire EPO team contributing to the announcement in one way or another.

NRAO also collaborated directly with NSF to ensure a representative on the news conference panel could discuss the VLA detection.

## EPO: News and Public Info

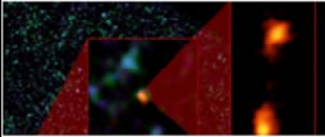
### Four ALMA Discoveries in the News



#### Astronomers Discover Traces of Methyl Chloride around Infant Stars and Nearby Comet

October 2, 2017 at 11:00 am / News Release

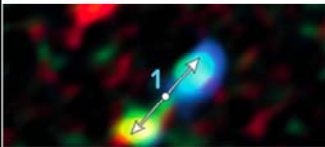
ALMA and the Rosetta spacecraft have each detected methyl chloride in space. This intriguing molecule may have interesting astrobiology implications.



#### Duo of Titanic Galaxies Captured in Extreme Starbursting Merger

November 13, 2017 at 11:00 am / News Release

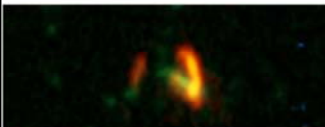
Astronomers using ALMA have discovered two rarely seen, distant galaxies spiraling in toward each other.



#### ALMA Discovers Infant Stars Surprisingly Near Galaxy's Supermassive Black Hole

November 28, 2017 at 11:00 am / News Release

ALMA discovers remarkably early signs of low-mass star formation near the supermassive black hole at the center of the Milky Way.



#### Massive Primordial Galaxies Found Swimming in Vast Ocean of Dark Matter

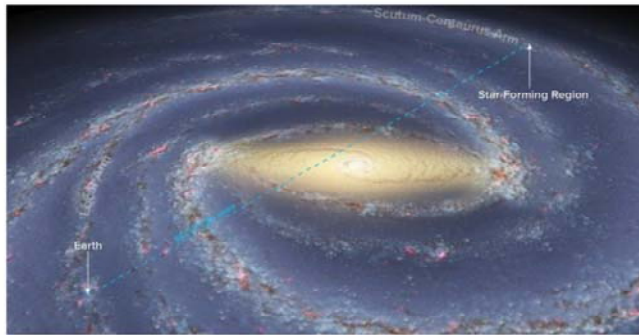
December 6, 2017 at 1:00 pm / News Release

New ALMA observations push back the epoch of massive-galaxy formation even further by identifying two giant galaxies seen when the universe was only 780 million years old, or about 5 percent its current age.

ALMA had four science results; the greatest coverage was of infant stars near the galaxy's supermassive black hole. Two other result focused on ALMA's ability to studying high-z galaxies; this will continue to be an area of research and news for ALMA.

## EPO: News and Public Info

### VLBA Result in the News



#### VLBA Measurement Promises Complete Picture of Milky Way

October 12, 2017 at 2:00 pm | News Release

A new record for directly measuring distances within our home Galaxy gives astronomers the ability to finally produce an accurate map of the whole extent of the Milky Way.

The VLBA continues to make high-impact news, though often with less regularity than other NRAO/AUI instruments. This result was widely featured in the national and international science news. There were no GBO news releases in Q1.

## EPO: News and Public Info

### NRAO in the News



36

QSU | FY2018



We had five AUI/NRAO releases.

Dr. Ir. Omid Noroozian, an associate scientist and senior research engineer with the NRAO's Central Development Laboratory, was honored with NASA's prestigious Nancy Grace Roman Technology Fellowship in Astrophysics.

*Four Pillars of Radio Astronomy: Mills, Christiansen, Wild, and Bracewell:* We announced the new book that explores the early history of radio astronomy by telling the stories of four pioneers who laid the foundations not only for today's cutting-edge research facilities but also for technologies that have transformed daily life.

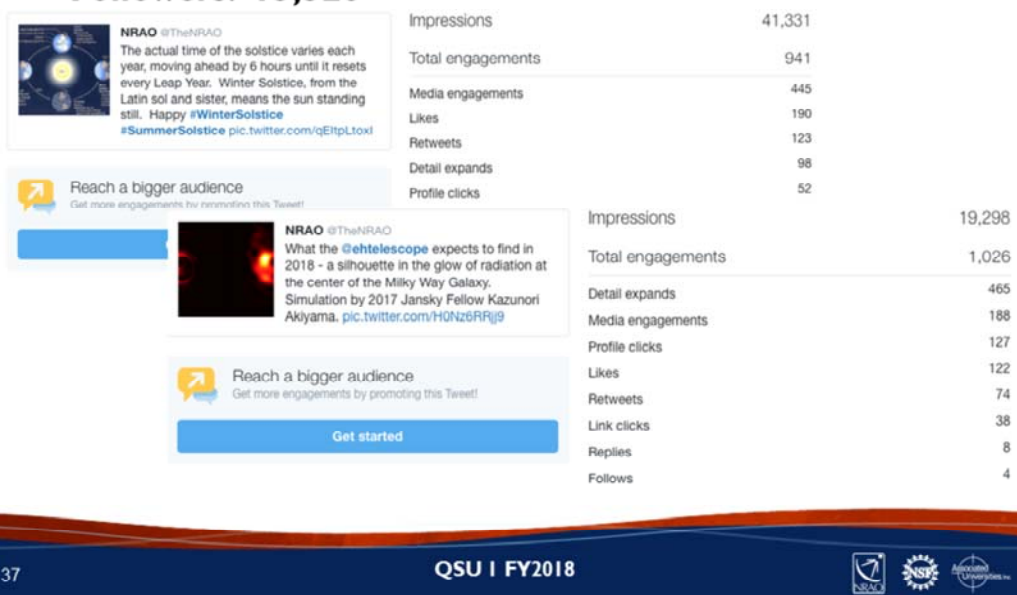
During the Square Kilometer Array (SKA) Board of Directors meeting, the SKA Organization and NRAO signed a Memorandum of Understanding (MoU) for the design and development of new data models to address the data processing requirements of their next-generation telescopes.

Astronomers from a consortium of Canadian universities, led by the University of Toronto, have been awarded Can\$10 million to develop a radio astronomy data center that will play a major role in the Very Large Array Sky Survey (VLASS).

The prestigious Chilean business organization ICARE (Instituto Chileno de Administración Racional de Empresas) chose the Atacama Large Millimeter/submillimeter Array (ALMA) in its Special Category for its annual award to people, businesses, or institutions who stand out for their contribution to business development through business excellence and support for the country's growth.

## EPO: Social Media Twitter

• **Followers: 13,528**



Followers: 13,528

Our social media audience continues to grow. A few details here from some popular posts give some insights into the reach through those followers. Where an individual post about the EHT may get 122 likes, its reach is multiplied through retweets to over 19k impressions. It's sad that EHT gets so many fewer than a simple post about the seasons, but by mixing posts to include simple general astronomy facts, we can grow our audience.

Even though its apparent reach was smaller, this EHT post was picked up and included in a British paper covering EHT:

<https://www.express.co.uk/news/science/894104/Einstein-theory-gravity-black-hole-Sagittarius-A-Milk-Way-galaxy-National-Radio-Astronomy>

# EPO: Social Media Facebook

- Followers = 61,775

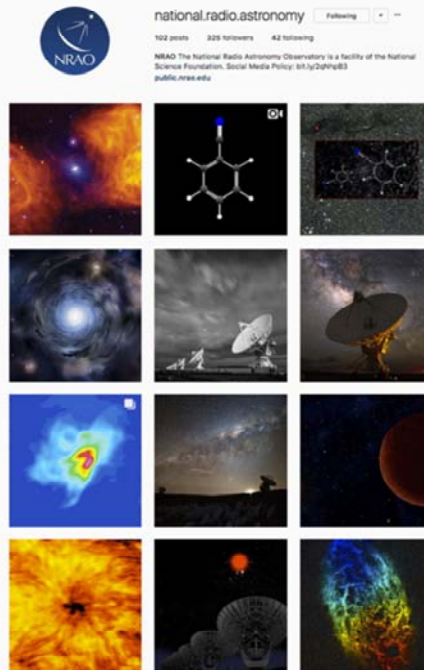
The collage displays three Facebook posts from the National Radio Astronomy Observatory (NRAO) page. The leftmost post is a birthday tribute to Bengali biologist and radio wave researcher Jagadish Chandra Bose, mentioning his 1897 paper on millimeter radiation. The middle post is a meme with a cartoon of two men looking at a small black hole on a coffee table, with the text: "WHY DO YOU HAVE A MINIATURE BLACK HOLE ON YOUR COFFEE TABLE? IT REALLY BRINGS THE ROOM TOGETHER." The rightmost post is a photo of a signal from Voyager 1's transmitter as seen from the Very Long Baseline Array (VLBA) telescope, with a caption stating it was captured in 2013 and is the result of the VLBA's antenna configuration.

Followers = 61,775

This audience is our largest following, but with changes in their algorithms, we expect slower growth.

## EPO: Social Media Instagram

- Followers: 324



39

QSU | FY2018



Followers: 324

This is growing steadily. We have a wealth of imagery to feed here. After consulting with NSF social media gurus, we're going to start some new strategies.



## EPO: Community Outreach

### Hour of Code



40

QSU | FY2018



Hour of Code workshop joint with ALMA, with the participation of local AUI/NRAO employees in Chile training students from a low income school in Santiago. Around 60 students attended this activity.

## EPO: STEAM Education Community outreach



PVCC hosts Career Days at UVa twice a year. At the end of October, NRAO participated.

- 1900 students attended the event, with an estimate of ~360 students who came by our booth
- 9 high schools
- 48 career exhibitors
- 35 volunteers

DAs are a great addition to the volunteers, they are closer in age to the attendees, so are relatable as well as being a bit more diverse than our general scientist and engineering population. Last quarter we had some more traditional representation with Bob Treacy from PMD also volunteering.



The annual Festival of the Cranes hosted by the Bosque del Apache, south of Socorro, brings hundreds of visitors to the area. It also provides an opportunity for some unique opportunities. On 11/15/2017 we provided a tour for attendees, Festival of the Cranes tour #16 (Faith). That same evening, we hosted an astrophotography workshop coordinated by the Festival and they split the proceeds. The class had 30 participants, 40 total, including volunteers (Judy & Faith). We also get the use of the winning photos, like this one from last year.

## EPO: STEAM Community Partnerships

### Enchanted Skies Star Party



43

QSU | FY2018



NRAO sponsored ESSP again this year. This event began in 1996 with Dave Finley and other NRAO Staff hosting an annual Star Party. The event has been held in many surrounding venues in the Socorro and for the past three years has found a home with NM Forest Service three miles north of Magdalena at a lovely spot we call Star Village. The event is sponsored by NRAO and Magdalena Astronomical Society plus others in our community. The event is five days in duration. Two weeks in October surrounding and including the actual event is the amount of time we dedicate to pulling this off. Planning meetings once a month start in January plus a re-cap meeting happens in November.

## EPO:VLA Visitor Center Tours

Tours	Attendance
10/11/17 Red Ink Ministries tour	22
10/12/17 Tour Chris Carilli/Dave F reporter	5
10/18/17 ESSP VLA tours	21
10/19/2017 ESSP VLA tours	18
10/20/17 Hamfest tour -	25
10/20/17 49'ers tour - 18	18
10/25/17 Data reduction workshop Tour -30	30
10/28/17 Road Scholar tour -27	27
11/4/17 First Saturday tours 11:00-67 total	67
11/4/17 First Saturday tours 1:00-55 total	55
11/4/17 First Saturday tours 13:00 -49 total	49
11/4/17 Mark Claussen students antenna climb	12
11/10/17 Placitas Tour	37
11/15/17 Festival of the Cranes tour	16
11/15/17 Festival of the Cranes Nite Photo class	40
11/16/17 Sacarrino MS event all day	
11/18/17 Boy Scout tour	26
12/2/17 First Saturday tours 11:00 -	55
12/2/17 First Saturday tours 1:00	44
12/2/17 First Saturday tours 3:00	26
12/15/17 Wounded Warrior tour	16
Total	609

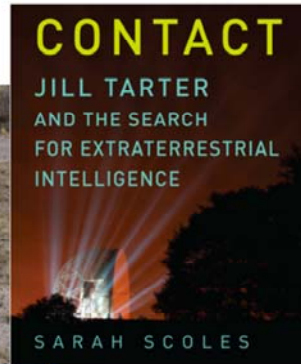


Overall attendance at the VLA exceeded 7500 people last in Q1. That's 1200 more than the same time last year.

Tours were booked by 13 groups, totaling 609 people with the six first Saturday tours.



## VLA:Visitor Center Open House



45

QSU | FY2018



The October Open House Celebrated the 20<sup>th</sup> anniversary of the release of the movie *Contact*.  
Total attendance at the VLA was 926, a record from the last 10 years.

Total tours 17

Total people who went on tours 690

Total of 8 talks "Remembering the filming of *Contact*, in the activity center by Dave, Bryan, Miller, & Tony average attendance for each was about 20 for a total of around 160,

Book signing at the Visitor Center by Jill Tarter and Sarah Scoles was busy, numbers are hard to come by but our best estimate was around 200 plus visitors got something signed!

The Sundial exhibit was very popular with Miller, Faith, as explainers and our dedicated Volunteer Cathie Havens operating a PST showing off the sun's prominences!

Total at Jill Tarter/Sarah Scoles lecture at Fidel 82

Total at star party at Etscorn 150 (beautiful weather/clear skies!)

Total NRAO staff & family that volunteered 26

Total number of community and Tech volunteers 6

Site Staff total 3

Beautiful weather! Parking Attendants were Janet Goldstein & Theresa Palomar, they did a great job. Both Helen and Aspen our Safety officers were on board keeping tour groups moving along and helping with handicap needs.

Special thanks to our tour guides: Steve Durand, Kumar Golap, Rick Perley, Lerato Sebokol, Eric Greisen, and Mike Revnell.

The Visitors loved the "Remembering Contact" stories. Thanks to: Dave Finley, Miller Goss, Bryan Butler, Tony Perreault.

Jill Tarter/Sarah Scoles book signing at VLA Visitor Center Exhibit Area was a huge success. Thanks Jill and Sarah!

Our terrific Antenna Explainers were busy as bees; thanks to: Mark McKinnon, Peggy Perley, and Barry Clark

Out Visitor Center Explainers kept the Visitor engaged! thanks to Cindy McWhorter and Suzy Gurton.

Our fearless Gatekeepers set the tone for the event. Thanks to Brent Avery and Meri Stanley.

The photo opportunities were very popular. Special thanks to Laura Barich and Jeff Hellerman.

The Sundial is the focal point of our outdoor exhibits and always very popular with Visitors. Special thanks to: Miller Goss, Faith Vowler, Cathie Havens.

Having parking attendants makes all the difference. A huge thank you to: Janet Goldstien and Teresa Palomar.

Evening events in Socorro at NM Tech Fidel Center Ballroom - Jill Tarter and Sarah Scoles lecture and book signing/selling was inspirational. Thank you Jill and Sarah!

Our tireless Gift Shop Crew made sure everyone got to take home a unique souvenir. Way to go Collette Foard and Teresa Pino!

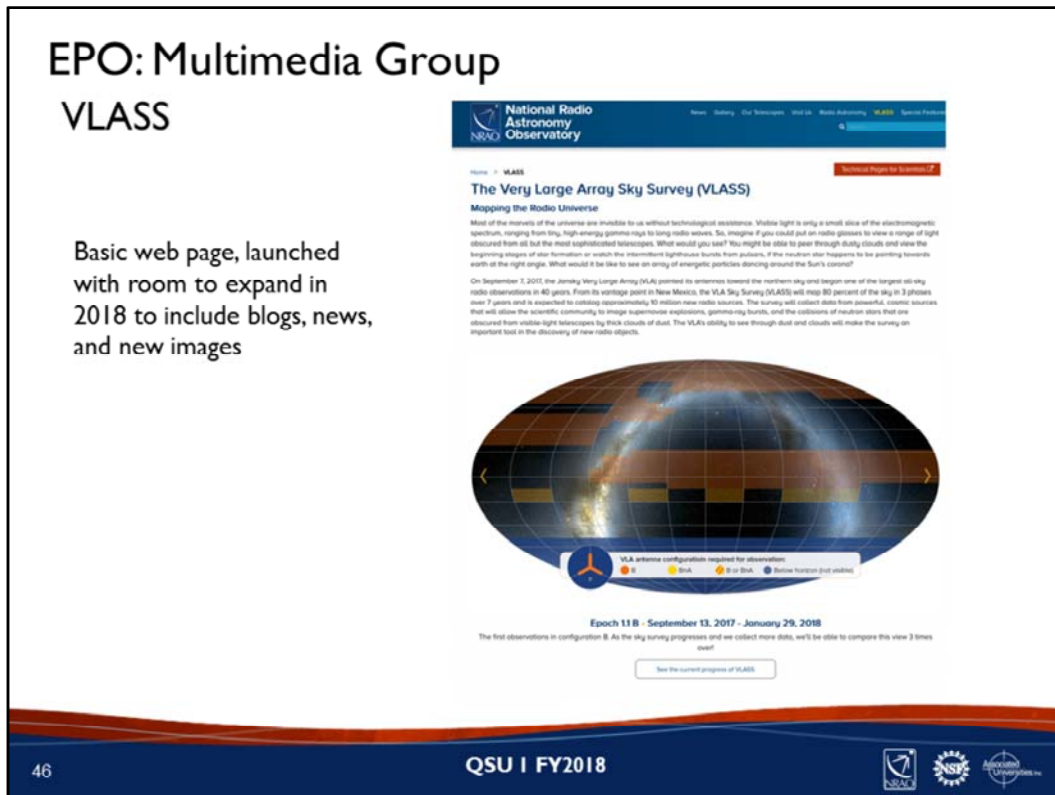
The Star Party at Etscorn hosted over 150 excited Visitors. Thanks so much to Drew and Hedi Medlin and Dr. Dan Klinglesmith.



## EPO: Multimedia Group

### VCLASS

Basic web page, launched with room to expand in 2018 to include blogs, news, and new images



In addition to supporting all the efforts of the EPO team, the multimedia group launched the VCLASS web page: <https://public.nrao.edu/vlass/>



[www.nrao.edu](http://www.nrao.edu)  
[science.nrao.edu](http://science.nrao.edu)

[public.nrao.edu](http://public.nrao.edu)

*The National Radio Astronomy Observatory is a facility of the National Science Foundation  
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